Provincial Development Strategy of Selected Provinces in Northwestern Region (Part B: Gansu Province)

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CONTENTS

General Report: Study on Gansu Province Development

Abstract ......................................................................................................................................... 40

Section 1. Macroeconomic Background and Basis of the Status Quo .......................................... 42
1.1 Macro background of the strategy ........................................................................................... 42
1.1.1 Changes of national development policies—the scientific outlook on development as the main theme, energy saving and emission reduction as the most important task .................................................. 42
1.1.2 Changes of the mode of economic operation and governance—marketization and economic globalization remodeling pattern of regional development ....................................................... 44
1.1.3 Changes in the orientation of regional industrial development —the increasing saturation of traditional industries and acceleration of the spatial shift of industries .............................................. 46
1.1.4 Basic ideas of the “11th Five-Year Plan” of the western regions —laying a solid foundation and promoting the equalization of basic public services ................................................. 47
1.2. The Characteristics of Gansu’s natural endowment ................................................................. 48
1.2.1 The ecological environment is relatively weak; the bearing capacity for socioeconomic development is low .......................................................................................................................... 48
1.2.2 Constraint of water resources on socioeconomic development is very prominent ............ 50
1.2.3 Advantages of mineral resources have gradually weakened, but some sorts of ores have good prospects for exploration ...................................................................................................... 50
1.3. The Status of Social and Economic Development of Gansu .................................................... 53
1.3.1 Major economic development achievements of Gansu since “the Tenth Five-Year Plan” period ........................................................................................................................................... 53
1.3.2 A comparison in socio-economic development between Gansu and the whole country ...... 55
1.4. The major problems existing in the socioeconomic development ........................................... 60
1.4.1 The outstanding structural contradiction in the industrial development caused by “path-dependence” ................................................................................................................................. 60
1.4.2 The development of local economy and non-public economy lagging far behind .............. 61
1.4.3 The economic development mode does not suit the needs of the new situation ............... 63
1.4.4 The storage of human capital is poor; the structure of talents is unreasonable .................. 64
1.4.5 The economic development is rather internalized and the drive of the external force is obviously inadequate ..................................................................................................................... 65

Section 2 Positioning of Strategic Functions and Strategic Choice ............................................ 65
2.1 Gansu’s Positioning of Its Strategic Functions in the Country .............................................. 66
2.1.1 Ecological Security Function .............................................................................................. 66
2.1.2 Function as an Economic and Cultural Route .................................................................... 68
2.1.3 Function as a Base for Several Competitive Industries in Western Areas .......................... 68
2.1.4 Function as demonstration of coordinated development between man and nature
2.2 Guiding Ideology and Strategic Goals

2.2.1 Try All Means to Transform Traditional Growth Pattern
2.2.2 Choose a Diversified Path Combining both Internal and External Forces
2.2.3 Strategic Goals

2.3 The general strategy and restructuring orientation

2.3.1 Transition from taking the economic growth as the core to pursuing the scientific development, striving to give play to the multi-strategic functions
2.3.2 Transition from giving priority to the scale expansion of few trades to sustainable development pattern featured by diversification
2.3.3 Transition from “strengthening the province” as the priority to combining “enriching the people” with “strengthening the province”, with the former being first
2.3.4 Transition from relying mainly on development of natural resources to emphasizing development of human resources

2.4 Strategic choice

2.4.1 Strengthen and extend the existing preponderant industries to achieve sustainable competitiveness
2.4.2 Accelerate industry's diversification through excavating and giving play to the
2.4.3 Positively give play to the priority strategic function of ensuring national ecological security
2.4.4 Accumulate capabilities for development with human resources development

Section 3 Supporting Measures and Major Action Plans

3.1 Special Support Needed from the Central Government

3.1.1 Help Gansu improve poor public services
3.1.2 Step up support for Gansu’s major infrastructure construction and environment control
3.1.3 Set up a “comprehensive pilot zone for coordinated development between man and nature in Hexi Corridor (Gansu Corridor)”
3.1.4 Carrying out an experiment on the new cadre evaluation system

3.2 Major Supporting Measures for the Diversified Strategy of Enriching the People and Strengthening the Province

3.2.1 Initiate the projects of riverhead protection at the upper reaches of the Yellow River and Hexi Pilot Zone
3.2.2 Step up Efforts to Reinforce Infrastructure Construction and Improve Access to the Outside World
3.2.3 Further Deepen Reform and Opening-up, Improve Investment Climate and Promote the Development of Non-public Sector
3.2.4 Focus on the Promotion of Gansu and Attraction of Investment, Combined with the Development of Tourism Industry
3.2.5 Actively Adjust Urban Layout and Promote the Construction of Urban Economic Zone and Industrial Clusters
3.2.6 Facilitate Human Resources Development, and Transform the Economic Growth Mode through Science and Technology Innovation
Sub-report 1: Study on Development Strategy of Characteristic and Advantaged Industries in Gansu

Abstract ....................................................................................................................................... 115

Section 1 General Development Trends of the Industries in Gansu.............................................. 117
1. The Vertical Analysis on Gansu’s Industries ............................................................................. 118
1.1 Expanded Scale...................................................................................................................... 118
1.2 More Rational Industrial Structure ......................................................................................... 119
1.3 Elevated Level of Development ............................................................................................ 121
1.4 Changing the Extensive Growth Pattern ................................................................................. 122
1.5 Emerging Strengths of Unique Industries ............................................................................... 122
2. Horizontal Analysis of Gansu’s Industries.............................................................................. 123
2.1 Gradually Reduced Underpinning Role of Pillar Industries ................................................ 123
2.2 Inferior Position..................................................................................................................... 125
2.3 Weakened Competitiveness ................................................................................................... 126
3 Comprehensive Understanding .................................................................................................. 128
3.2 The basic trend constitutes an important part of Gansu as a whole being marginalized .......... 129
3.3 The reasons in deep level for the trend are the backwardness of the systems and mechanisms. .............................................................................................................................................. 129

Section 2 SWOT Analysis and Identification of Characteristic and Advantaged Industries........ 130
1. Opportunity .................................................................................................................................. 130
1.1 Global economic integration boosts industrial convergence .................................................. 130
1.2 China Western Development Program clarifies the direction for industrial progress ............. 131
1.3 The reform of old industrial bases such as Northeast China could also be applied in Gansu, providing new opportunities for upgrading the traditional industries. .................................................. 131
1.4 The initiatives for moderately prosperous society and new socialist countryside give impetus to industrial development in Gansu. .......................................................................................................... 131
2. Threat ....................................................................................................................................... 132
2.1 The advantages of traditional industries in Gansu are being diluted, which adds to the difficulty for industries in Gansu to become more powerful and stronger ............................................................................ 132
2.2 The crash and conflicts of the similar industries both home and abroad are the constraining factors of the development of industries in Gansu. .................................................................................. 132
2.3 The development of industries in the neighboring provinces poses challenges for Gansu. .... 133
3 Strength ..................................................................................................................................... 135
3.2 The resources of agriculture byproducts with characteristics are abundant .......................... 137
3.3 The industries like petroleum and chemicals, nonferrous metal and metallurgy have nearly formed the industry chain and the room for deep processing is broad. ...................................................... 137
3.4 The technology and facilities of the core enterprises in industries like petroleum and chemicals, nonferrous metal, metallurgy, equipment manufacturing, and medicine are either nationally
advanced or internationally advanced, but this just disperses in a few enterprises in these fields.

3.5 The establishment and strengthening of Lanzhou as the commerce, trade and logistic center smoothes the circulation channel.

4.1 The development of the industries in Gansu adopts the extensive pattern and the efficiency is low.

4.2 The problem of lack of capital and capital outflow are coexisting.

4.3 The cost of the development of industries is increasing.

4.4 Compared with the eastern provinces, the atmosphere of the development of industries is tight, which are reflected in the following aspects: the cooperation, combination, centralization and dispersal among industries and products are lagged behind, the cost of capital flow is high and the returns on the key factors of production are low.

5. Conclusion.

Section 3 Selection of the Characteristic and Advantaged Industries in Gansu

1. Selection Principles

1.1 Principle of Comparative Advantages

1.2 Principle of Diversified Development

1.3 Principle of Applicability of Technology

1.4 Principle of Market Orientation

1.5 Principle of Enriching the People and the Province

1.6 Principle of Functional Zones

2 The Reality

3. Quantitative Selection

3.1 Cluster Analysis

3.2 Hierarchy Analysis

3.3 Accumulation of Cluster Analysis and Hierarchy Analysis

4 Conclusion

4.1 The supporting role of characteristic and advantaged industries will be bigger.

4.2 The quantity of the Rich People’s industries and Rich Province’s industries is basically

4.3 In the market of Northwest region, the development of the characteristic and

4.4 In the national market, the series of characteristic and advantaged industries of Gansu

Section 4 Development Strategy of Characteristic and Advantaged Industries in Gansu

1. Strategic Planning for Developing Characteristic and Advantaged Industries in Gansu–Discrepancy Strategy

1.1 Discrepancy Strategy as the Overall Strategy of Developing Characteristic and Advantaged Industries in Gansu

1.1.1 Discrepancy strategy is Inevitable for Gansu to Develop Characteristic and Advantaged Industries

1.1.2 The Basic Direction of Discrepancy Strategy

1.2 Industrial bases, industrial parks and clusters as factors of the vertical (chain) discrepancy

1.2.1 Enhancing the building of industrial bases

1.2.2 Build Characteristic Industrial parks
Appendix of Sub-report 1: Case Study on Baiyin's
Transformation as a Resource-oriented City

Abstract ....................................................................................................................................... 233

Section 1 Brief History and Present Features of Baiyin’s Development as A Resource-Based City......................................................................................................................... 234
1.1. Natural, Economic and Social Status ................................................................................. 234
1.2. City Status and Its Features at Present Stage ....................................................................... 235
1.2.1. Baiyin possesses an important status in China as well as in Gansu Province................. 235
1.2.2. Baiyin is a typical resource-exhausted city. .................................................................... 237
1.2.3. Baiyin faces various difficulties in its socio-economic development ............................. 238

Section 2 Practice and History of Development and Transformation of Baiyin as a Resource-Based City...................................................................................................................................... 240
2.1. Representative Thinking of City Transformation................................................................. 240
2.1.1. “Second Pioneering of Business” of Baiyin Co.to support industrial growth............... 240
2.1.2. Developing hi-tech industry and building energy bases in West China to foster alternative and substitude industries ...................................................................................................................................... 241
2.1.3. Developing circular economy for coordinated and sustainable regional development..... 242
2.2. Effect of Economic Transformation of Baiyin................................................................. 242
2.2.1. Effect of “Second Pioneering of Business”................................................................. 242
2.2.2. Effect of developing hi-tech industry and building energy bases in West China ............ 243
2.2.3. Effects of circular economy ......................................................................................... 244
2.3. Inspiration of the Practice of City Transformation............................................................ 245
2.3.1. Transformation of resource-based cities should satisfy the requirements of economic globalization and market integration................................................................. 245
2.3.2. The Core is to realize transformation of industries and enterprises .............................. 246
2.3.3. Hi-tech industry and circular economy will radically change the pattern of economic growth of resource-based cities ................................................................................................. 246

Section 3 SWOT Analysis on Transformation of Baiyin and Solution Selection ......................... 247
3.1. Analysis of Strengths........................................................................................................ 247
3.1.1. Baiyin is rich in nonmetallic mines, water, land and biological resources..................... 247
3.1.2. Baiyin has been equipped with certain industrial base ...................................... 248
3.1.3. Baiyin possesses a good regional position. ................................................................. 248
3.2. Analysis ofWeaknesses .................................................................................................. 248
3.2.1. Resource guarantee for the present dominant industry is decreasing............................... 248
3.2.2. The pillar enterprises are facing with aging technical equipments, outdated technologies, difficulties in management and high cost of reform ............................................. 249
3.3. Analysis ofOpportunities............................................................................................... 249
3.3.1. Scope of resource allocation is enlarging under economic globalization ....................... 249
3.3.2. Opportunities for multi-industrial development are increasing in regional integration ..... 249
3.3.3. The State has given more support to the transformation of resource-based cities ......... 250
3.4. Analysis of Threats.................................................................................................................250
3.4.1. Increasing competition faced by the dominant industry .....................................................250
3.4.2. The national industrial policies have increasing influence over the enterprises’ selection of
growth pattern ...............................................................................................................................251
3.5. Conclusions and Solution Selection....................................................................................... 251
3.5.1. Promoting multi-support for industry ................................................................................. 253
3.5.2. Accelerating the integration of Lanzhou-Baiyin .................................................................253
3.5.3. Speeding up reform of SOEs.............................................................................................. .254
Section 4 Thinking and Countermeasures of Multi-Support for Industry.............................. 254
4.1. Orientation of Multi-Support for Industry ......................................................................... 254
4.2. Measures of Multi-Support for Industry ................................................................................255
4.2.1. Promoting the construction of economic zones and centralized industrial areas ........255
4.2.2. Enhance economic & technical cooperation and exchange ..............................................257
4.2.3. Mobilizing non-public economy .........................................................................................257
Section 5 Thinking and Countermeasures of Promoting Economic Integration of
Lanzhou-Baiyin…………………….......................................................................................... 258
5.1. Analysis of the Complementariness for Lanzhou-Baiyin Integration ....................................258
5.2. Strategy for Lanzhou-Baiyin Integration ............................................................................ 259
5.2.1. Speeding up integration of infrastructure ..........................................................................259
5.2.2. Promoting industrial integration .......................................................................................260
5.3. Advancing the Mechanism Design for Lanzhou-Baiyin Economic Integration.................262
5.3.1. Pushing forward the programming and industrial policies into practice ..........................262
5.3.2. Setting up Joint Conference Mechanism between Lanzhou and Baiyin to solve common
problems......................................................................................................................................262
Section 6 Thinking and Countermeasures for the Reform of SOEs........................................... 263
6.1. Separating the Social Roles from Enterprises .....................................................................263
6.2. Separating Secondary Industries from Major Industries and Accelerating the Reform of
Secondary Industries..................................................................................................................265
6.3. Facilitating the Displacement of Industrial Workers......................................................... 266
6.4. Addressing Cost Payment for the Reform of SOEs ..............................................................267
6.4.1. Striving for the same preferential policies enjoyed by the resource-based enterprises in the
Northeast Industrial Base.............................................................................................................267
6.4.2. Expanding financial channels to properly share the cost ..................................................267
6.4.3. Promote the systematic reforms ......................................................................................267
6.5. Promoting Baiyin Co. to Transfer from Resource Provider to Technique Exporter ...........268
Reference......................................................................................................................................269

Sub-report 2: Study on the Agriculture Development
Strategy in Gansu
Abstract ...................................................................................................................................................... 271

Section 1 Status of Agricultural and Rural Development .............................................................................. 272
1.1 Features of the New Socialist Countryside Endeavor in Gansu ........................................................... 272
1.2 Major Features of Gansu’s Agricultural Development at the Present Stage ........................................ 274
1.2.1 Remarkably intensify our efforts to invest in agriculture, support and benefit farmers .......................... 274

Topic 1: Emphasize market-based operation and scale up and strengthen the beef cattle industry .............. 279

Topic 2: Feature agricultural products processing and export in Yima, Qingcheng County scored remarkable achievement. ........................................................................................................ 279

1.2.3 Farmers’ income increases, the urban-rural gap widens. .................................................................. 280

1.2.4 Strengthened infrastructure construction and improved comprehensive agricultural productivity ................................................................. 284

1.2.5 Strengthened Science and Technology Application Capacity, New Achievements scored in Agricultural Science, Research and Promotion ................................................................. 285

1.2.6 Anti-poverty campaign scored notable achievement, poverty reduction is still a daunting task. ....... 285

1.2.7 Large number of surplus rural laborers and slow process to transfer them out of farming. .............. 287

1.2.8 More investment brings forward the development of rural social services ...................................... 288

1.3 Barriers in Rural Development .............................................................................................................. 289

1.4 Comprehensive Evaluations of Agriculture and Rural Development ................................................. 293
1.4.1 Evaluation of the Building of a Moderately Prosperous Society in an All-round Way in Gansu’s Rural Area ................................................................................................................. 293

1.4.2 Basic Evaluation of Gansu’s Building of a New Socialist Countryside ............................................. 296

Section 2 Function Positioning and Strategic Options ................................................................................. 300
2.1 Function Positioning of the Building of Modern Agriculture ............................................................. 300
2.2 Guideline, Objective and Development Strategy .................................................................................... 303
2.2.1 Guideline ......................................................................................................................................... 303
2.2.2 Strategic Goals .................................................................................................................................. 304
2.2.3 Development Thinking ..................................................................................................................... 305
2.2.4 Development Strategies ................................................................................................................... 306

3.2 Transform Production Mode and Build Grass-feeding Stockbreeding into A Strategic Leading Industry .................................................................................................................. 313

3.3 Push Ahead Agricultural Restructuring and Develop Industrialized Operation .................................... 314

3.4 Accelerate the Setting-up of Advantageous Industries and Develop Deep Processing .......................... 315

3.5 Develop Hi-tech Agriculture and Transform Traditional Agriculture to Modern Agriculture 318
3.5.1 Promote Intensive Farming by developing facility Agriculture ....................................................... 318
3.5.2 Develop Bio-agriculture Industry and Change the Driving Force of Agriculture from Resources to Technologies ........................................................................................................... 319

3.5.3 Expand IT Application in Agriculture ............................................................................................ 319

3.6 Develop resource-conservation agriculture to promote sustainable development ............................. 322
3.6.1 Boost grassland development and crop planting together to make the two complimentary. ............ 322
3.6.2 Establish a modern water-conservation technology system to promote water-efficient
agriculture ..................................................................................................................................... 322
3.6.3 Development of agricultural circular economy ................................................................. 324
3.7 Develop labor economy to achieve leapfrog development of rural labor transfer ............ 325
3.8 Step up poverty reduction and development efforts, and improve the village-based measures and mechanism of poverty reduction and development ............................................. 326
Section Four Strategic measures and action plans ................................................................. 327
4.1 Strategic measures for rural and agricultural development .................................................. 327
4.1.1 Study and formulate the regional planning of provincial agricultural functions ............. 327
4.1.2 Accelerate institutional building of modern agriculture .................................................... 327
4.1.3 Improve rural market system and develop logistics industry that meets the requirement of modern agriculture .......................................................... 329
4.1.4 Establish rural financial system to ensure successful building of a new countryside .......... 330
4.1.5 Develop county economy to speed up rural public service programs ............................ 331
4.2 Four major projects for the development of modern agriculture ......................................... 333
4.2.1 Promote the development of facility agriculture ............................................................... 333
4.2.2 Promotion of dry-land agriculture and water-conserving technology in agricultural irrigation .......................................................... 333
4.2.3 Promote the training of new types of farmers ................................................................. 334
4.2.4 Promote agricultural industrialization and processing of agricultural products ............ 334
4.3 Support from the Central Government is needed for agriculture development and the building of a new countryside in Gansu ................................................................. 335
4.3.1 The Central Government has decided to extend the fiscal allocation for “Hexi, Dingxi and Xihaigui” for ten years to further support poverty-reduction and development in Gansu ......... 335
4.3.2 Increased government fiscal allocation to Gansu would help reach the objectives set in the Poverty-reduction and Development Guidelines ......................................................... 336
4.3.3 Implement ecological compensation and make it the major source of income for residents in the ecologically fragile regions ................................................................. 336
4.3.4 Integration of agriculture-assistance resources should be put into the legislation process to solve financial difficulties in building a new countryside ......................................................... 337
Appendixes ................................................................................................................................ 338
Appendix 1 .................................................................................................................................... 338
1. Basic characteristics of commercialized potato industry in Dingxi ...................................... 339
1.1 Planting is becoming more sophisticated ......................................................................... 339
1.2 Marketing system is constantly being improved ................................................................. 339
1.3 Processing capability is increasingly strengthened ............................................................ 340
1.4 Storage facilities are increasingly improved ..................................................................... 341
1.5 The potato industry is becoming increasingly organized ............................................... 341
2. SWOT analysis on the development of potato industry in Dingxi ........................................ 341
2.1 Strength (S) ....................................................................................................................... 341
2.2 Weakness (W) ............................................................................................................... 345
2.3 Opportunity (O) ............................................................................................................. 347
2.4 Threats (T) .................................................................................................................... 348
3. Suggestion on the development of Dingxi potato industry .................................................... 348
3.1 To improve the supply system of virus-free seed potatoes .......................................................... 348
3.2 To have an insightful understanding about the developing direction of customization in potato industry .......................................................... 349
3.3 To establish and improve an organization system for the potato industry .................................. 349
3.4 To innovate system and vigorously develop processing industry .................................................. 349
3.5 To develop and improve potato market system ............................................................................. 350
Appendix 2 ........................................................................................................................................ 352
1. Analysis on factors that impact on demand for major competitive agricultural products in Gansu .................................................................................................................. 354
1.1 factors that matter ...................................................................................................................... 354
1.2 model-building .......................................................................................................................... 355
1.3 Analysis on the roles of affecting factors .................................................................................. 356
2. Analysis on factors affecting the production of major competitive crops in Gansu .................. 356
2.1 Affecting factors ...................................................................................................................... 356
2.2 Model building .......................................................................................................................... 357
2.3. Analysis of the role of affecting factors .................................................................................. 359
3. Analysis on factors affecting competitive livestock products in Gansu ..................................... 360
 a. Affecting factors ...................................................................................................................... 360
3.2 Model-building ......................................................................................................................... 360
3.3 Analysis on the role of affecting factors.................................................................................. 361
4. Suggestions on how to optimize agricultural product mix in Gansu ......................................... 362
4.3 Development concept for cash crops ....................................................................................... 364
Appendix 3 ........................................................................................................................................ 365
4. General analysis on investment efficiency of agriculture .......................................................... 365
1.1 Analysis on the production function model .............................................................................. 365
1.2 model estimation ........................................................................................................................ 366
2. Analysis on the grey correlation between agricultural input and output ................................... 369
2.1 calculation method of correlation degree .................................................................................. 369
2.2 analyses on the correlation between agricultural input and output in Gansu ......................... 370
1.3.1 Malmquist Index .................................................................................................................. 372
1.3.2 Analysis on the changes in TFP of agriculture in Gansu ....................................................... 374
2. Analysis on investment efficiency of grain .................................................................................. 375
3. Analysis on investment efficiency of crop farming ..................................................................... 377
4. Analysis on investment efficiency of animal husbandry .............................................................. 379
5. Summary ..................................................................................................................................... 381
Bibliography ..................................................................................................................................... 382
Appendix 4 ........................................................................................................................................ 383
1. Gansu's agricultural development policies and their performance prior to the reform and opening up ...................................................................................................................... 383
1.2. Agricultural development policy and its performance during the period of "Great Leap Forward" Movement and adjustment in the 1960s ........................................................................ 385
1.3 Agricultural development policy and its performance during the period of the "Culture Revolution" ...................................................................................................................... 387
Sub-report 3: Technology Innovation and Hi-tech Industry

Abstract ....................................................................................................................................... 394

Section 1 Environment and Background for Gansu’s Technology Innovation and Hi-tech Industry Development.........................................................................................................................396
1.1. New opportunities and challenges coming along with changing international and domestic situations.................................................................396
1.1.1. Economic globalization and technology revolution present grave challenges as well as new opportunities to the less developed regions. .................................................................................396
1.1.2. National policies of building an innovation-oriented country and implementing the Western Development Program unfold unprecedented possibilities to Gansu............................................397
1.2. Strategic choices of Gansu for its development mode under new circumstances ..................398

Section 2 Status-quo of and Problems in Gansu’s Technology Innovation and Development of Hi-tech Industry.....................................................................................................................399
2.1. Technology Innovation Network ............................................................................................ 399
2.2. Government expenditure on Science and Technology ...........................................................401
2.3. Innovation capability and vitality of Gansu’s Enterprises......................................................402
2.4. Innovation friendly mechanism and policies ......................................................................... 403

Section 3 Gansu’s Potential and Resources for Technology Innovation and Development of Hi-tech Industry..........................................................................................................................406
3.1. Industries of Comparative Advantages and Technology Concentration ...............................406
3.2. Major local innovative factors being activated ....................................................................408
3.3 Comparative price advantage of productive factors and strong potential of hi-tech industry. 409
3.4. National Innovation Strategy and Gansu’s development opportunities .................................410

Section 4 Strategic Choices and Countermeasures on Realizing Technology Innovation and Developing Hi-tech Industry of Gansu ..............................................................................................................411
4.1 Strategic Choices.....................................................................................................................411

Sub-report 4: Development Strategy of Tourism in Gansu
Abstract ....................................................................................................................................... 428

Section 1 Comprehensive Assessment of Gansu’s Conditions for Developing Tourism in Gansu………………… ................................................................................................................ 430

1. Strengths............................................................................................................................................. 430
1.1 Gansu enjoys immense potential for developing resources of tourism and clear comparative edges. ............................................................................................................................................ 430
1.2 Geographically Gansu is granted with favorable conditions to joint hands with other regions for inter-provincial tours. ..............................................................................................................432
1.3 The advantage of backwardness in economic growth could stimulate fast development of the tourism industry............................................................................................................................................. 433
1.4 New opportunities rise for Gansu’s tourism industry........................................................................ 433

2 Problems, obstacles and difficulties that stand in the way of tourism development in Gansu...436
2.1 An ill-defined position coupled with insufficient policy support............................................ 436
2.2 The tourism industry as a whole is not strong......................................................................... 439
2.3 Tourism brands have yet to be established to fully avail of Gansu’s strength.........................439
2.4 The central tourism cities have yet to become the engine for province-wide development....440
2.5 Underdeveloped infrastructure like transport and tourist services constrains tourism development ................................................................................................................................................. 440
2.6 Blurred ownerships, ill-defined rights, and irrational systems and institutions stand in the way............................................................................................................................................. 442
2.7 Gansu suffers from the shortage of high-level professionals who are good at running, managing, promoting and marketing tourist projects.......................................................... 443
2.8 Threats confront Gansu’s ecology and environment............................................................... 443

Section Two: Strategic Position of Gansu’s Tourism Industry......................................................444
1. The Economic Position of Gansu’s Tourism Industry............................................................... 444
1.1 As a new source for economic growth, tourism should become a pillar industry underpinning Gansu’s economy in the near future and a leading industry in the long run. ....................... 444
1.2 The tourism industry should be a strategic sector that optimizes Gansu’s industrial structure, changes the pattern of economic growth and serves as a pilot driving force. ...............................446
2 Social Position of the Tourism Industry..................................................................................... 447
2.1 Tourism should serve as a major channel for employment in Gansu........................................ 447
2.2 Tourism should serve as a new driving force for Gansu’s urbanization and regional sustainable development ............................................................................................................................................. 448
2.3 To develop comprehensive tourism should present an essential way in which Gansu will make strategic breakthroughs in building a harmonious society, further open up to the outside and promote social progress and civilization................................................................. 448
3. The ecological position of tourism.......................................................................................... ..448

Section Three  Gansu’s Strategy of Tourism Development ........................................................ 449
1 Strategy of Comprehensive Tourism.......................................................................................... 449
1.1 Focus on develop the industrial system of comprehensive tourism and change the conventional pattern of economic growth. ............................................................................................................. 449
1.2 The brand strategy should be adopted featuring the Silk Road and the eco-tours. Quality
tourism products should be developed and diversified..........................................................452
1.2.1 Core tourism products..............................................................................................452
1.2.2 Characteristic tourism products...............................................................................452
1.3. Pattern of Interactive Development for Center-Peripheral Tourism..........................453
1.4 Efforts should be focused on developing the market of surrounding regions of Gansu in the northwest and of the east coastal cities, meanwhile active steps should be taken to tap the overseas market..............................................................................................................456
1.5 Proactive steps should be taken to promote the tourism related to agriculture, farmers and the countryside, and gradually open up the countryside tourism market.................................................................457

Section 4. Solutions and Suggestions...............................................................................458
1. Administrative Systems of tourism should be established at provincial and subsidiary levels to strengthen the strategic role of the government at the preliminary development stage..................458
2. Four major tourism development programs should be implemented..........................459
2.1 Tourism for Employment Program..............................................................................459
2.2 Program on Regional Cooperation in Tourism: building a world-class tourism economy belt in west China featuring the Silk Road.................................................................459
2.3 Human Resources Program........................................................................................460
2.4 Tourism for Poverty Alleviation Program: asking for policy support from national experiment zones of poverty alleviation through tourism.................................................................460
3. Build up tourism’s capacity of market-based operations..............................................461
3.1 Diversify the ownership of tourism companies...........................................................461
3.2 Take active steps to explore market-based models for managing tourist destinations...462
3.3 Give full play to tourism associations and intermediaries, and regulate the practice of tourism companies.................................................................................................................................462
3.4. Set up the Gansu Provincial Tourism Investment Company, Ltd...............................463
4. Tourism Promotion Strategies.......................................................................................463
4.1. Combined Promotion Means......................................................................................463
4.2 Increased Investment in Tourism Promotion..............................................................464
4.3 Focused and Differentiated Marketing......................................................................464
4.4 Net-worked Tourism.................................................................................................465
4.5 Combined Promotion Via Media, Festival and Caravan............................................465
4.5.1 Unleash commercial ads about Gansu tourism on major domestic newspapers and magazines to promote tourism products.................................................................465
4.5.2 Shoot a new documentary of Gansu tourism, to design a logo of Gansu tourism, and to launch a series of programs about Gansu tourism in channels of the China Central Television (CCTV) to introduce the life, customs and tourism products in Gansu.........................465
4.5.3 Set up commercial ads bulletin boards showcasing natural beauty at tourism spots in Gansu and welcome signs at squares, bus and railway stations, docks, airports, main streets, entrances and other public places in major cities of Gansu.................................................................465
4.5.4 Launch an advertising campaign along major transportation routes such as the Beijing-Kowloon Railway and the Shanghai-Chengdu Highway; to set up roadside ad boards and to put ads on seatback on trains and airplanes and on handles on buses in an effort to attract more tourists and passengers, who happen to go through Gansu, to stop for a brief tour; and to improve

14
internet websites for an enhanced on-line promotion for tourism products........................................465
4.5.5 Make use of existing festival celebrations of certain scales in the province, such as Pinliang Kongdong International Wushu (martial arts) Festival, Qingyang International Fragrant Sachet Festival, Gannan Shambhala International Tourism and Art Festival by setting up ad boards, staging performances and sending brochures in festival hosting cities to showcase Gansu tourism products....................................................................................................................................................466
4.5.6 Launch the promotion campaign of “Sending Gansu Tourism Products to Your Doorway”; to train in tourism off-season a group of qualified promotion staff who have a good knowledge of local customs and traditions; and to organize road shows by tourism promotion caravans in major target market cities..........................................................................................................................................................466
Appendix: Major Tourism Investment Projects of Gansu Province.............................................466
1. Overview of Tourism Development Projects in Gansu Province..................................................466
1.1 Major Projects of the Gansu Province Tourism Development Plan from the 11th Five-year Plan Period to 2020..........................................................................................................................................................466
1.2 Key Scenic Area (Spot) Road Construction Projects of the Gansu Province Tourism Development Plan from the 11th Five-year Plan Period to 2020.............................................................................................................467
2. Construction Timetable of Major Tourism Projects in Gansu Province....................................467
2.1 Near Term (in the 11th Five Years) Major Tourism Projects...................................................468
2.1.1 Projects on Major Tourism Products....................................................................................468
2.1.1.1 Silk Road Tour.................................................................468
2.1.1.2 Great Wall Culture Tour.........................................................469
2.1.1.3 Ancestral Culture Tour..........................................................469
2.1.1.4 Gansu Folk Culture Tour..........................................................470
2.1.1.5 Peripheral Mountain Eco-tour......................................................470
2.1.1.6 Leisure and Holiday Tour..............................................................471
2.1.1.7 Characteristic Tour......................................................................471
2.1.2 Major Projects of Tourism Infrastructure...........................................................................472
2.1.3 Major Projects on Building Tourism Eco-Environment..................................................472
2.1.4 Major Projects on Hotels and Restaurants......................................................................473
2.1.5 Visitor Center Projects.................................................................................................473
2.1.6 First Aid Center.................................................................................................473
1.2 Major Mid-and-Long Term (2011-2020) Tourism Projects ......................................................474

Sub-report 5: Development Strategy of Non-public Economy in Gansu

Abstract ................................................................................................................................................548
Section 1 Status quo of Non-Public Economy in Gansu and Its Development Environment...........549
1.1. Status quo of non-public economy in Gansu

1.2. Environmental assessment for the development of non-public economy in Gansu

1.2.1 Assessment of natural and socio-economic environment

1.2.2. The overall assessment of environment for the growth of non-public economy

1.3. The major problems in Gansu's non-public economic growth

Section 2 The overall Strategy for the Non-public Economy in Gansu

2.1. The overall strategy for the development of non-public economy in Gansu

2.2. The basic strategic targets for the development of non-public economy

2.3. The basic strategic stages for the non-public economy in Gansu

2.4. The virtuous circle model for the non-public economy

2.4.1 Raise socio-economic & social benefits through NPEs

2.4.2. Intensify the support of fiscal and taxation policy to non-public economy

2.4.3. Form virtuous interaction between rapid non-public economy growth and fast fiscal revenue increase

Section 3 Improving Social Environment for the Development of Non-public Sector

3.1. Carry out innovations for a better policy system conducive to non-public economy

3.1.1. Improve policy system for the non-public sector with focus on policy quality improvement and implementation

3.1.2. Formulate new policies to address predominant issues concerning current and future non-public sector growth to facilitate breakthroughs

3.1.3. In support of S&T system reform with sound polices on science & technology

3.1.4. Carry out innovations for better market entry policies and fairer market

3.1.5. Continue to strive for preferential policies for non-public sector in Gansu and the western regions in the following key areas: increasing fiscal investment for infrastructure

3.1.6. Update policies for more detailed and specific contents based on the needs of the development of non-public economy

3.1.7. Explore better and innovative ways to implement non-public economy policies

3.2. Remove system drawbacks hindering non-public economy growth

3.3. Improve investment and financing system

3.4. Industrial restructuring

3.5. Advocate and promote region-wide entrepreneurship

3.6. Constantly improve the hard environment for the development of non-public economy

Section 4 Strengthening Self-development Capability of Non-public Economy

4.1. Strengthen macro guidance and service-oriented management

4.3. Strengthen the NPEs capacity of capital formation and accumulation

Section 5 Optimizing the Internal Structure of NPE & Its Relationship with External Parties

5.1. Optimization of internal structure of NPE

5.2. Optimization of structural relationship between NPE and state-owned economy

5.2.1. Deepen restructuring and reorganization of SOEs

5.2.2. Study and deploy “second step reform” of the state sector

5.2.3. Push forward reform on monopoly industries

5.2.4. Promote alliance and cooperation between state-owned & non-public economy
5.3. Optimization of structural relationship between the non-public economy and the current industrial system ...........................................................................................................................581

Section 6 Industrial and Regional Initiatives on Promoting NPE Development .........................................................................................................................582

6.1. Initiatives on development of non-public sector in three levels of industries ................................................................................................................582

6.1.1. Initiatives on the development of NPE in agriculture and rural areas ...............................................................................................................................582

6.1.2. Initiatives on NPE development in industrial fields .................................................................................................................................583

6.1.3. Initiatives on the NPE development in the tertiary industry ............................................................................................................................583

6.2. Regional initiatives on the NPE development ....................................................................................................................................................584

6.2.1. Strengthen the level of urbanization to bring into full play the role of cities ........................................................................................................584

6.2.2. The local governments should develop NPE according to local realities ........................................................................................................585

6.2.3. Promote formation and upgrade of industrial clusters ...........................................................................................................................585

Sub-report 6: Urbanization Strategy of Gansu

Abstract ........................................................................................................................................588

Section 1 Characteristics and Problems of Urbanization .........................................................................................................................589

1.1. Low level and slow pace ........................................................................................................589

1.2. Urban spatial structure is out of proportion with population distribution, and regional disparity of urbanization is apparent ........................................................................................................590

1.3. Immature urban system and small cities ........................................................................591

1.4. Government and industry are the major forces behind urbanization; the functions of many small and medium sized cities are too simple ........................................................................................................592

1.5. Low quality urbanization with spatial extension as the major form ........................................................................................................593

1.6. Short of funds in urban construction, lack of diverse financing channels & underdeveloped infrastructure.......................................................................................................................................................595

1.7. Incompatible education infrastructure ........................................................................597

Section 2 Major Negative Factors in Urbanization .................................................................................................................................597

2.1. Blocks in polices and systems ........................................................................................................597

2.2. Underdeveloped economy, emphasis on heavy industry, and lack of internal impetus for urban development .......................................................................................................................................................598

2.3. Immature market lacking driving forces ........................................................................600

2.4. Rural labor forces with little education and difficulty in transfer for the lack of incentives .......................................................................................................................................................601

2.5. Limits of natural conditions and pressures on eco-environment .......................................................................................................................................................602

Section 3 Geographical Layout of Urbanization .................................................................................................................................602

3.1. Develop multi-tier central cities & establish different regional centers as geographically defined .......................................................................................................................................................602

3.1.1. Principles and methods to define central cities ........................................................................602

3.1.2. Central city hierarchic structure ..................................................................................605

3.2. Establishing Three City Clusters (belts) to improve the Function of Central Cities ............607
Sub-report 7: Study on Human Resource Strategy in Gansu

Abstract ....................................................................................................................................... 635

Section 1: HR Status Quo and Potentials....................................................................................... 636
1.1 HR quantum and structure ........................................................................................................ 636
1.1.1 Change of HR quantum ........................................................................................................... 636
1.1.2 Population structure and urbanization .................................................................................... 637
1.2 Professional skills of human resources .................................................................................... 638
1.2.1 The overall professional skills of human resources are rather low ........................................ 638
1.2.2 The proportion of illiteracy and semi-illiteracy is rather high .............................................. 639
1.3 Human resources development evaluation .............................................................................. 640
1.3.1 Economy, education, science and technology couldn’t underpin HR development .......... 640
1.3.2 Status quo of HR development .............................................................................................. 641
1.3.3 HR development lags behind. ............................................................................................... 643

Section 2: On-going HR Strategy and its Achievements .............................................................. 645
2.1 Strategies and policies on HR development ............................................................................ 645
2.1.1 Explicit road map .................................................................................................................... 645
2.1.2 Down-to-earth manner ............................................................................................................ 645
Section 4: Strategies and Measures to Promote HR Development .................................................. 660

4.1 Continue basic education and character building ................................................................. 661

4.1.1 Consolidate and adjust primary and secondary education ............................................... 661

4.1.2 Expand and restructure higher education ........................................................................ 661

4.1.3 Support private and ethnic minority education ................................................................. 661

4.1.4 Develop vocational education as a new education industry ............................................. 662

4.2 Strengthen Farmers’ Employment Ability by Training and Skill Improvement ................... 662

4.2.1 Establish standard investment channels for peasant training ........................................ 662

4.2.2 Diversify training measures ............................................................................................. 663

4.2.3 Help farmers expand employment channels in labor-intensive industries ....................... 663

4.2.4 Establish and improve a united labor force market ......................................................... 664

4.3 Carry out Employment and Reemployment Project to Realize the Fundamental Goal of Improving People’s Livelihood ................................................................. 664

4.3.1 Enhance macro-regulation on employment and reemployment ....................................... 664

4.3.2 Increase various employment channels ............................................................................ 665
4.3.3 Government departments concerned should actively introduce job opportunities to the unemployed…………………………………………………………………………………………………………………………..665
4.3.4 We need to have trainings on self-employment and give more policy support to self-employment endeavors. ........................................................................................................666
4.4 Concentrate on increasing badly-needed professionals and tackle talent shortage ………667
4.4.1 Measures to cultivate enterprise management talents…………………………………………………………..667
4.4.2 Strategies to cultivate technical professionals……………………………………………………………………667
4.4.3 Strategies to cultivate high-level technical talents …………………………………………………………….668
4.4.4 Strategies to cultivate rural practical talents……………………………………………………………………668
4.4.5 Improve environment for talents to grow up……………………………………………………………………669
4.5 Take employment structure adjustment as an opportunity to enhance labor transfer and employment……………………………………………………………………………………………………670
4.5.1 Take rural economic and social development strategy into comprehensive consideration ..670
4.5.2 Absorb rural labor by developing an in-depth agriculture ………………………………………………………670
4.5.3 Promote the development of township enterprises and service industry ……………671
4.5.4 Improve small towns’ capability to absorb surplus labor………………………………………………………672
4.5.5 Organize the transfer of redundant rural labor …………………………………………………………………672
4.5.6 Initiate and carry out the “Return Project”…………………………………………………………………………673
4.6 Proposals on HR development policies in Gansu …………………………………………………………………673
Annex………………………………………………………………………………………………………………………………………………679
1. Definition and practice of migration through education in poverty-stricken counties………679
1.1 Selection of places for the survey ………………………………………………………………………………………679
1.2 Definition of migration through education…………………………………………………………………………679
1.3. College enrollment since 1977…………………………………………………………………………………………..680
1.4. Annual numbers of the four counties’ graduates, those returned and those not…………………680
2. Contribution of migration through education to easing population pressure ……………..682
2.1 Analysis model of the contribution of migration through education to social development…682
3. Characteristics of migration through education in poverty-stricken counties…………………685
3.1 Migration through education is migration of well-educated people. ……………………………685
3.2 Migration through education bears evident effects. ………………………………………………………………685
3.3 Migration through education has a stable mechanism. ……………………………………………………………685
3.4 Migration through education may have collateral effects. …………………………………………………686
3.5 The cost of migration through education is rather low…………………………………………………………686
4. Promotion of migration through education in poverty stricken counties……………………688
4.1 The role of government……………………………………………………………………………………………………688
4.2. The role of the public ………………………………………………………………………………………………………688
4.3 The role of family ……………………………………………………………………………………………………………689
4.4. The role of education loan……………………………………………………………………………………………690
5. Strategy and policy of migration through education…………………………………………………690
5.1 12-year compulsory education should be implemented in western poverty-stricken regions and ethic minority areas………………………………………………………………………691
5.2 The central government should formulate special policy for migration through education in poor areas.…………………………………………………………………………………………………691

20
Sub-report 8: Study on Public Finance System

Abstract ....................................................................................................................................... 695

Section 1 Major Problems for Financial Operation in Gansu ....................................................... 696
1.1. Analysis of status quo ............................................................................................................ 696
1.1.1. Rapid increase of fiscal revenue ......................................................................................... 696
1.1.2. Increase of transfer payment from the central government ................................................. 698
1.1.3. Financial distribution orienting towards public services ..................................................... 700
1.1.4. Efforts in striking financial balance .................................................................................... 702
1.2. Major problems ..................................................................................................................... 703
1.2.1. The low financial capacity has restricted future socio-economic development .................. 703
1.2.2. Inequivalent vertical distribution and greatest difficulties at the grassroots level .............. 704
1.2.3. Unbalanced horizontal distribution of financial strength with increased gap between different districts ........................................................................................................................... 707
1.2.4. Unbalanced financial strengths between the urban and rural areas & lack of public products and services in the rural areas ................................................................................................................................. 708
1.2.5. The waste of insufficient capital intensifies the conflicts ...................................................... 709
1.3. Reasons .................................................................................................................................... 710
1.3.1. Weak economy and laggard restructuring ........................................................................... 710
1.3.2. Unmatched fiscal and administrative Capacity ................................................................... 710
1.3.3. Unsound transfer payment mechanism ................................................................................ 711
1.3.4. Rapid increase of finance supported population .................................................................. 712
1.3.5. Unsound financial management mechanism ....................................................................... 713

Section 2 General Thinking for Setting up Public finance System ............................................ 713
2.1. Goals and principles .............................................................................................................. 713
2.1.1 Goals .................................................................................................................................... 713
2.1.2. Basic principles ................................................................................................................... 714
2.2. Analysis of difficulties .......................................................................................................... 715
2.2.1. Gansu is Building its Public finance on A Poor Foundation ............................................. 716
2.2.2. The dual influence of corpus function area ......................................................................... 716
2.2.3. Reform on current resources is more difficult than newly increased ones ......................... 716
2.3. Major policies ........................................................................................................................717
2.3.1. Gradual realization of balanced basic public services...........................................................717
2.3.2. Vigorously pushing forward innovation of TP system............................................................720
2.3.3. Optimizing the fiscal distribution structure.................................................................................723
Section 3 Suggestions on Building Public finance System in Gansu............................................726
3.1. Suggestions to the central government ..................................................................................726
3.1.1. Improving the central-to-local transfer payment system.........................................................726
3.1.3. Building a local debt mechanism as soon as possible...............................................................730
3.1.4. Pushing forward the reform on resources tax........................................................................731
3.1.5. Supporting “Hexi Corridor Experimental Zone for Coordinated Development between Man and Nature” through central fiscal policies..............................................................732
3.2. Suggestions to Gansu.................................................................................................................733
3.2.1. Deepening the reform on grassroots finance system...............................................................733
3.2.2. Enhancing local fiscal support to the “Three Rural” issues.......................................................735
3.2.3. Improving the social security system.........................................................................................736
3.2.5. Facilitating growth of small and medium-Sized enterprises through fiscal polices..............738
3.2.6. Deepening fiscal reform to build a conservation-oriented government.................................739
Reference ...........................................................................................................................................741

Sub-report 9: Ecological Protection and Construction

Abstract ..............................................................................................................................................743
Section 1 Gansu’s Position in Safeguarding National Ecological Security ......................................745
1.1. Gansu lies in the intersection of three natural geographical regions, and is an essential ecological hub in West China.................................................................745
1.2. Gansu lies in the upstream of the Yellow River, Yangtze River and the continental rivers in Hexi, with the upper reaches of many important rivers in this province ..............................746
1.2.1. Ecological problems in the important water resource region for the Yellow river in Gannan have a direct bearing over the sustainable development in the Yellow River drainage area.........746
1.2.2. Decrease of ice and snow resources in the Qilian Mountainous Region and the water conserving capacity of forests and grasslands seriously threaten the ecological environment of the drainage area of the continental rivers in Hexi .................................................................747
1.2.3. Water and soil loss and water pollution in the Gansu Yellow River drainage area threatens the middle and lower reaches........................................................................................................747
1.2.4. Landslide, debris flow and water and soil loss in the Yangtze River drainage area within Gansu seriously impacts over the ecological improvement of the Yangtze River .........................747
1.3. Gansu lies in the “wind gap” of Northwest China, and its sandstorm seriously deteriorates air quality in North China........................................................................................................748
Section 2 Evaluation of Ecological Environment ............................................................................748
2.1. The problem of water resources are mainly shown in the following areas: ..........................748
2.2. Large amount of land resources but small production potential .................................750
2.3. Excessive use of natural grassland leads to hard task for grassland rehabilitation ....751
2.4. Vulnerable ecological system with obvious land degradation ....................................752
2.5. Heavy burden in environment pollution control, with the environment condition highly worrisome…… .............................................................................................................................755
2.6. Serious debris flow ........................................................................................................757

Section 3 Analysis of the Causes for the Eco-environment Problems ........................................757
3.1. Vulnerable ecological system is the root for aggravating ecological environment ........757
3.2. Increasing population poses heavy pressure for the ecological environment protection ....758
3.3. Backward productivity and extensive growth model has aggravated ecological degradation758
3.4. Sustaining resource exploitation without any protection has damaged the stability of ecological system and environment quality ..................................................................................758
3.5. Poverty and market competition are the modern causes leading to excessive natural resource development and ecological damages........................................................................................... 759
3.6. Wrong government decision is another direct cause for ecological degradation in some areas………… ..............................................................................................................................759

Section 4 Evaluation of Irrigation and Ecological Construction in the Last 30 Years ................759
4.1. Finished key irrigation projects .................................................................................760
4.1.1. Jingtaichuan Electricity Projects (Jingdian Project). .................................................760
4.1.2. Jingdian Project Phase 2 expands to transmit water to Minqin ..................................760
4.1.3. Yanhuadingyanghuang Gansu Exclusive Project ....................................................761
4.1.4. Channeling Liu to Jinchang Project ............................................................761
4.1.5. Channeling Da to Qin Irrigation project .................................................................761
4.1.6. Shule River Agriculture Comprehensive Development Project ..............................762
4.1.7. Dongxiang Nanyang Channel Irrigation Project ......................................................762
4.1.8. Hei River Drainage Area Rectification Project .........................................................762
4.2. Analysis of ecological projects’ effects .......................................................................763
4.2.1. Forest Rehabilitation ............................................................................................763
4.2.2. Stop pasturing to conserve grassland .....................................................................765

Section 5 Ecological Environment Bearing Capacity .................................................. 767
5.1. Method and results ......................................................................................................767
5.2. Comprehensive analysis of ecological bearing capacity ...........................................769

Section 6 Analysis and Forecast of Water and Soil Resources Capacity .......................... 772
6.1. Analysis of water resources capacity .........................................................................772
6.1.1. Availability of water resource availability ...............................................................772
6.1.2. The development and utilization of water resources ................................................773
6.1.3. Water security analysis ..........................................................................................775
6.1.4. Regional water resources supply and demand problem .......................................780
6.2. Analysis & forecast of cultivated land resources bearing capacity .............................781
6.2.1. Analysis of dynamic changes of population, cultivated land and grain output in Gansu...781
6.2.2. Analysis of changes in population, grain output and cultivated land area in different ecological zones.................................................................785
6.2.3. Analysis and forecast of cultivated land resources in Gansu ............................................. 789

Section 7 Thoughts and Focus on Eco-environment Construction and Protection in Gansu .... 793
7.1. Basic thoughts ........................................................................................................................... 793
7.2. Eco-environment construction and protection goals ............................................................... 797

Section 8 Countermeasures and Suggestions ............................................................................ 799
8.1. Strengthen planning and management of provincial functional regions, optimize land development protection structure .................................................................................................................. 799
8.2. Build a water conserving society & improve water utilization efficiency .............................. 800
8.3. Conserve energy and reduce consumption & develop recycling economy ............................ 800
8.4. Build an ecological protection innovation and demonstration system to enhance the technology guarantee for ecological construction upgrading ................................................................. 801
8.5. Put people first, respect nature and promote ecological restoration and environment rectification in a scientific way .............................................................................................................. 801
8.6. Protect cultivated land & strike grain supply and demand balance based on local conditions .................................................................................................................................................. 802
8.7. Implement the strategy of ecological migration and salvage important ecological system in grave danger .............................................................................................................................................. 802
8.8. Proactively utilize cloud water resources and upgrade the level of artificial precipitation .... 803
8.9. Stimulate the enthusiasm of farmers in ecological construction and make them important player .............................................................................................................................................. 803
8.10. Establish a coordination mechanism for the population, resources and environment departments and a long-term mechanism for ecological environment construction ........................................ 804

Section 9 Ecological Environment Policies Needing State Support ......................................... 804
9.1. Step up national subsidy in ecological construction & increase the number of key restoration projects .............................................................................................................................................. 804
9.2. Carry out capacity building in poor areas and key ecological functional regions and add earmarked funds for human resource upgrading .................................................................................. 806
9.3. Support industrial transformation and resources comprehensive utilization & encourage the key enterprises and urban to develop recycling economy ........................................................................ 807
9.4. Support geological disaster prevention and rectification ..................................................... 807

Reference ..................................................................................................................................... 808

Sub-report 10: Regional Development of the United States

Abstract ........................................................................................................................................ 811

Section 1 Related theories ............................................................................................................. 812
1. Big Push Theory ....................................................................................................................... 812
1. O-Ring Theory ......................................................................................................................... 814
1. Endogenous Growth Theory ..................................................................................................... 815
Sub-report 11: Regional Development of Australia--Best Practice in Regional Economic Development --Abridged Version --An International Perspective

Abstract ....................................................................................................................................... 861

Section 1: Best Practice Principles............................................................................................ 863
1.1 The triple bottom line approach ...................................................................................... 864
1.2 Key Principles for Sustainable Regional Development ................................................. 865
1.2.1 World Class Investment Environment .......................................................................... 868
1.2.2 Regional Infrastructure Coordination ........................................................................... 871
1.2.3 Regional Investment constraints .................................................................................. 872
1.2.4 Establishing a regional best practice program ............................................................... 873
1.2.5 Key Considerations & Conclusions ............................................................................. 875
1.3 Practical approaches to regional development: An illustration .................................... 877
1.3.1 Governments as change leaders .................................................................................. 892
1.3.2 Key areas of a TBL strategy ....................................................................................... 893
1.3.3 Key Considerations & Conclusions ............................................................................. 894
1.4 Regional Economic Development .................................................................................... 896
1.4.1 Liveability and regional development ......................................................................... 899
1.4.2 Regional connectivity and leadership ........................................................................... 900
1.4.3 Creativity, innovation and technology ......................................................................... 901
1.4.4 The importance of leadership ..................................................................................... 902
1.4.5 Key Considerations & Conclusions ............................................................................. 906
1.5 Regions and Regional Connectivity .................................................................................. 908
1.5.1 The Global Region ...................................................................................................... 909
1.5.2 Economic Diversity ..................................................................................................... 912
1.5.3 Population Multiculturalism ....................................................................................... 913
1.5.4 Creative/ Skilled Workforce ......................................................................................... 913
1.5.5 Connectivity ............................................................................................................... 914
1.5.6 Strategic Capacity ................................................................................................................ 915
1.5.7 Innovation and entrepreneurship.......................................................................................... 916
1.5.8 Quality of Housing / Community ....................................................................................... 917
1.5.9 Quality amenity base............................................................................................................. 917
1.5.10 Social cohesion .................................................................................................................. 918
1.5.11 Governance ........................................................................................................................ 918
1.5.12 Neuro-net of interdependent economic development variables ........................................ 919
1.5.13 Key Considerations & Conclusions .................................................................................. 921

Section 2: Australian Case Studies ........................................................................................................... 923

2.1 Case Study One - The Socio Economic Impacts of Rapid Industrial Growth ......................... 923
2.1.1 Coal Mining in the Bowen Basin, Central Queensland .......................................................... 923
2.1.1.1 Overview of the coal industry in the Bowen Basin ........................................................... 926
2.1.1.2 Commodity cycles ........................................................................................................... 929
2.1.1.3 Operational changes ....................................................................................................... 931
2.1.1.4 Social and demographic changes ...................................................................................... 932
2.1.5 Key Considerations & Conclusions .................................................................................... 933

2.2 Case Study Two - Social Infrastructure ................................................................................... 934
2.2.1 The Importance of Social Infrastructure ............................................................................. 935
2.2.1.1 The relationship between social infrastructure and economic development .................. 935
2.2.1.2 Government investment in infrastructure ........................................................................... 936
2.2.1.3 Definitions and categorisations for Social Infrastructure .................................................. 939
2.2.1.4 The effects of public infrastructure on productivity in the private sector ......................... 940
2.2.1.5 Assessing the benefits of social infrastructure ................................................................. 942
2.2.1.6 The contribution of social infrastructure to regions ......................................................... 944
2.2.1.7 Modelling the contribution of Social Infrastructure to economic growth ..................... 947
2.2.1.8 Key Considerations & Conclusions ................................................................................ 950

Conclusion ............................................................................................................................................ 953

References ............................................................................................................................................ 956

List of Figures

Figure 0-1 The current land usage situation map of Gansu ............................................................. 48
Figure 0-2 Basic Thought and Framework of Gansu Province’s Development Strategy ............ 75
Figure 1-1 Percentage of Secondary Industries in Total GDP of Gansu ........................................ 118
Figure 1-2 Percentages of Pre-tax Profits by Industries in Provincial Income .............................. 118
Figure 1-3 Percentages of Employees in Secondary Industries ...................................................... 119
**List of Tables**

Table 0-1 The change in ranking of GDP per capita of all provinces and autonomous regions during “the Tenth Five-Year Plan” period ........................................... 55

Table 1-1 Ranking of Major Industrial Products in Gansu (2005) .................. 120

Table 1-2 Selected Pillar Industries of Gansu in Different Periods ................... 124

Table 1-3 Percentages of Industrial Added-Values from Three Traditional Pillar Industries in the Provincial Total in 10th Five Year Plan Period (Petrochemical, Nonferrous Metal and Metallurgy) ........................................ 124

Table 1-4 the Percentage of Gansu’s Advantage industries in the National Total 2000-2005 .......................................................... 125

Table 1-5 Indicators and Weight of Industrial Competitiveness ...................... 126

Table 1-6 Gansu’s Rankings of Industrial Competitiveness Indicators from 1998-2004 ........................................................................................................ 127

Table 1-7 Comparison of Industrial Competitiveness of the Five Provinces in West China ........................................................................................................ 128

Table 1-8 Increase Rate of Major Economic Indicators of Gansu and Neighboring Provinces during the 10th Five-Year Plan Period ......................... 134

Table 1-9 Increase Rate of Major Economic Indicators of Gansu and Neighboring Provinces in the Year 2005 ................................................................. 134

Table 1-10 Increase Rate of Major Economic Indicators of Gansu and Neighboring Provinces during the 11th Five-Year Plan Period .......................... 135

Table 1-11 Nonferrous Metal and Black Metal Resources in part of Gansu ......... 135

Table 1-12 Adequacies of Major Mineral Resources in Gansu ......................... 136

Table 1-13 Comparative Analysis on Some Indicators of Brewery Material Industries in Gansu ................................................................. 137

Table 1-14 SWOT Analysis on Gansu’s Industrial Development and the Matrix Table ........................................................................................................ 140
Table 1-34 Comparison Analysis of Characteristic and advantaged industries of Gansu in National Structure

Table 1-35 Baiyin’s Ranking among Resource-Based Cities and Nonferrous Metals-Based Cities in China in 2000

Table 1-36 SWOT Analysis on City Transformation of Baiyin

Table 1-37 Basis of Selection for the Supporting Industries in

Table 1-38 Complementariness for Economic Development between Lanzhou and Baiyin

Table 2-1 Agricultural Expenditure in Gansu from 1994 to 2005

Table 2-2 Per capita net income of western provinces from 1996 to 2006

Table 2-3 Per capita net income growth rate of farmers in western provinces

Table 2-4 income of urban and rural residents in Gansu from 1978 to 2005

Table 2-5 Agricultural Development Comprehensive Competitiveness Evaluation in Several Provinces in 2005 (RCA index)

Table 2-6 Comprehensive Comparison between Gansu the Whole Country in Building a Moderately Prosperous Society 2005

Table 2-7 New Socialist Countryside Status Quo Comparison

Table 2-8 Recommended project of Potato Processing, Dingxi City

Table 2-9 Potatoes versus other crops in terms of output per mu (Dingxi)

Table 2-10 Potatoes versus other crops in terms of cost (Dingxi)

Table 2-11 Potatoes versus other crops in terms of output value per mu

Table 2-12 Potatoes versus other crops in terms of net profit per mu (Dingxi)

Table 2-13 Recommendable potato processing projects

Table 2-14 Per capita consumption of major agricultural products in 2005

Table 2-15 parameter estimation of demand for major agricultural products in Gansu from 1978 to 2005

Table 2-16 parameter estimation on production function of major crop farming products in Gansu from 1978 to 2005

Table 2-17 parameter estimation on production function of major livestock products in Gansu from 1978 to 2005
Table 2-18 Aggregate yielding and input of various factors of agriculture in Gansu from 1978 to 2005 .................................................................................................................................366

Table 2-19 Estimation on production function model of agriculture in Gansu I .................................................................367

Table 2-20 Estimation on production function model of agriculture in Gansu II ...........................................................................368

Table 2-21 Aggregate yielding and sequential growth rate of various input factors of agriculture in Gansu from 1979 to 2005 % ..............................................................................................370

Table 5 Grey correlations between agricultural input and output in Gansu from 1979 to 2005 .................................................................................................................................371

Table 2-22 Malmquist Index analysis on agricultural production in Gansu from 1979 to 2005 .................................................................................................................................374

Table 2-23 Agricultural input and grain output in Gansu ..................................................................................................................376

Table 2-24 Analysis on investment performance of crop farming industry in Gansu ..................................................................................................................................................377

Table 2-26 Agricultural performance in Gansu during the economic recovery and the First Five-Year Plan ..........................................................................................................................377

Table 2-27 Agricultural performance in Gansu during the “Great Leap Forward” and the 1960s ..............................................................................................................................................384

Table 2-28 Agricultural performance in Gansu during the “Culture Revolution” period ..............................................................................................................................................386

Table 3-1 Government expenditure Structure of Gansu: 1994-2005 .................................................................................................................401

Table 3-2 Statistics on S&T activities in Enterprises of Five Western Province ..............................................................................................402

Table 3-3 2005 S&T Activities in Large and Medium-sized Enterprises of Gansu ..............................................................................................403

Table 4-1 Number of national tourist destinations in Gansu VS that of neighboring regions ........................................................................................................................................403

Table 4-2 National tourist destinations in Gansu VS those in neighboring regions .............................................................................................................................................................403

Table 4-3 Financial Input of Some Provinces in 2002 and Related Economic Indicators .................................................................................................................................................403

Table 4-4 Position of the Tourism in Gansu and its Neighbors and a Comprehensive Analysis of Corresponding Policies and Measures .........................................................................................403
Table 4-5 Comparison between Gansu and its Neighbors in Building Brands .................................................................439
Table 4-6 Percentage of tourism income of the GDP (2001-2006) of Lanzhou........440
Table 4-7 From Lanzhou and other western cities to Beijing and Shanghai.........441
Table 4-8 Composition of foreign exchange income from tourism in Gansu and China (Cost of Travel) (2002) ..........................................................441
Table 4-9 Forecast for Tourism Development in Gansu Province from 2006 to 2020 .........................................................................................................................................445
Table 4-10 Per Capita Pre-tax Profits of China International Tourist Service (Gansu) vs. Other Areas.................................................................445
Table 4-11 Investment Efficiency of Tourism Development Projects in Gansu in the 11th Five Years ........................................................................................................446
Table 4-12 Potential for Employment from Tourism Project Investment in the 11th Five Years in Gansu ......................................................................................................447
Table 4-13 Major Projects of the Gansu Province Tourism Development Plan........466
Table 4-14 Gansu Province Major Tourism Projects I ..............................................475
Table 4-15 Gansu’s Major Tourism Projects II .......................................................480
Table 4-16 Gansu’s Major Tourism Projects III .......................................................486
Table 5-1 2001～2005 Development of individually-owned businesses and private companies .................................................................551
Table 6-1 Urbanization rate in Gansu (% , 2004) .........................................................591
Table 6-2 Size and structure of urban system in Gansu (2005) .................................591
Table 6-4 Industrial structure in cities of Gansu (%)..............................................593
Table 6-5 Comparison between Gansu and the nation in terms of modernization in cities ..........................................................................................................................594
Table 6-6 Growth of cities and population during urbanization in Gansu Province .594
Table 6-7 Fund configuration for city construction in Lanzhou (2004-2006) ........596
Table 6-8 Comparison between Gansu and the whole nation in terms of infrastructure ..................................................................................................................596
Table 6-9 Rates of total industrial output of different types (2000-2005) %..............601
Table 6-10 Comprehensive evaluation index and index weights for cities in Gansu 603
Table 6-11 Comprehensive evaluation index for city classification in Gansu ............604
Table 6-12 Hierarchic structure of central cities and townships in Gansu ..............606
Table 6-13 Breaking-points between Lanzhou and other cities & adjacent counties, and the field strength at the breaking-points.............................................................608
Table 6-14 Distance between breaking-points of adjacent cities and counties under their jurisdictions, and the field strength at the breaking-points..............................609
Table 6-15 Radiation radius of major cities in Gansu ..........................................613
Table 6-16 2005 regional distribution of passenger and cargo transport volume of Tianshui..........................................................617
Table 6-17 Predictions on urbanization rate in different timeframes in Gansu ........625
Table 6-17 Predictions of the grey system..............................................................626
Table 6-19 Comprehensive prediction on urbanization in Gansu (%) .......................627
Table 7-1: Growth of human resources in Gansu ..................................................636
Table 7-2: 2005 HR status quo in 14 cities...............................................................637
Table 7-3: School life expectancy.............................................................................638
Table 7-4: Economy, Education, Science and Technology Support HR Development ...........................................................................................................640
Table 7-5: Gansu per-capita economic indicators ....................................................642
Table 7-6: Gansu’s employment circumstance and structure....................................643
Table 7-7: 2005 technical professionals of state-owned entities ...............................644
Table 7-8: Transfer of rural labor and income fluctuation in Gansu .......................648
Table 7-9 Students admitted to colleges and technical secondary schools (1993-2000) ...........................................................................................................680
Table 7-10 Graduates returning to hometowns (1997-2004)......................................681
Table 7-11 Ratio of graduates returning to hometowns from 1997 to 2004 (%)..........681
Table 7-12 Adjustment coefficient of migration through education .......................683
Table 7-13 Contribution of migration through education to easing population pressure .............................................................................................................684
Table 7-14 Per-capita cost of different types of migration

Table 8-1 Fiscal Revenue and Expenditure of Gansu 1994-2005

Table 8-2 The Categories and Amount of Central Transfer Payment

Table 8-3 The Fiscal Expenditure of Gansu and Its Structure: 1994—2005

Table 8-4 Gansu’s ranking of fiscal revenue and expenditure Unit: %

Table 8-5 The Vertical Financial Distribution in Gansu

Table 8-6 Financial Strength of Different Districts in Gansu

Table 8-7 Fiscal Revenue Proportion at Different Levels in Gansu

Table 8-8 Public Service Ranking of Gansu among 31 Provinces

Table 8-9 Increase of Fiscal and Special TP since 1995

Table 8-10 Fiscal Strength per capita in Seven Provinces

Table 9-1 Ecological environment quality rating of counties and cities

Table 9-2 Comparison of River Water Quality Tests

Table 9-3 Statistics of Water Quality Grade of River Trunks

Table 9-4 Ecological bearing capacity grading standards

Table 9-5 Gansu ecological bearing capacity evaluation result

Table 9-6 Total amount of available water resources in the province

Table 9-7 Total amount of water supply capacity in the province

Table 9-8 Actual water supply of water supply projects in 2005

Table 9-9 Water consumption in 2005

Table 9-10 planned water demand in each drainage area

Table 9-11 planned water demand structure

Table 9-12 Changes in water resources per capita in the province

Table 9-13 Locally generated water resources, amount per capita and per mu in different cities

Table 9-14 Composition of cultivated land in different ecological zones in Gansu

Table 9-15 Gansu grain output forecast Unit: 10,000 tons
Table 9-16 Grain output forecast in Gansu.................................................................790
Table 9-17 Total population in Gansu as in the medium level projection...............791
Table 9-18 Forecast of Cultivated land resource population bearing capacity in Gansu----plan I.................................................................791
Table 9-19 Forecast of cultivated land resource population bearing capacity in Gansu----plan II ...............................................................792
Table 10-1 Basic Situation of California (Compared with the US) in 2005.............817
Table 10-2 Situations in Southern States of the US in 2005.................................829
Table 10-3 Per Capita Manufacturing Output in Eight Southern US States.........832
Table 10-4 Employment of the Textile Industry......................................................833
Table 10-5 Southern Migrants in 1870-80 to 1940-50 .........................................836
Table 10-6 Impact of the Re-deployment Agreement on the South and North in Terms of Salary: Average Hourly Salary..............................837
Table 10-7 Comparison of National and Southern Gross Individual Incomes ....838
Table 10-8 State Expenditure on Printing and Advertising for Development Projects .................................................................840
Table 10-9 Comparative Federal Expenditure Per Capita.....................................841
Table 10-10 Data of Nevada and Las Vegas, 2005 .................................................842
Table 10-11 Comparison of tax rates of Nevada and California .........................847
Table 10-12 Data of Pennsylvania and Metropolis of Pittsburgh, 2005..............850
Table 10-13 Pittsburgh’s Hi-Tech Economy, 2004.................................................852
Table 10-14 Pittsburgh and 5 Other Cities, 1996-2003 .......................................853
Table 11-1 Recommended activities for enhancing the underpinning prerequisites for a post mine economy. ..........................................................883
Table 11-2 Recommended activities for enhancing community capacity for economic development for a post mine economy. .................................885
Table 11-3 Recommended activities for business development for a post mine economy.................................................................886
Table 11-4 Recommended activities for supporting economic development activities for a post mine economy.............................................890
General Report

Study on Gansu Province Development Strategy

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Abstract

Gansu is a developing province of China with limited natural assets, but occupies a strategic position in the country. The Gansu province is facing more socio economic difficulties than any other provinces of China (except Guizhou). Accordingly this province needs special support from the Central Government to build a prosperous and sustainable society in an all-round way. In the past, the province’s development relied heavily on the expansion of the energy and raw materials sectors. However in recent times the province has been unable to sustain economic self reliance or achieve a desired level of community health and wellbeing.

Gansu’s future growth needs to be actively supported and underpinned by China’s development policy. The Province needs to take a scientific approach to sustainable regional development, to review its development concept and to diversify the economic base of the province. This should be achieved by enriching and building the capacity of the people. This approach to strengthening the province will require significant and ongoing support from the Central Government.

It is only by building the capacity and capability of the people and diversifying the economic and industrial base that the core goal of achieving balanced social and economic development, that reflects the national average, will be realized. The implementation of the strategy outlined in this report relies not only on specific support from the Central Government, but also on a host of strategic measures and major projects that need to be undertaken by Gansu province itself.
Since PRC’s reform and opening-up and the adoption of the national Western Development Strategy, Gansu province has seen repaid economic growth, accelerating urbanization and urban construction, and improved infrastructure and living standards. However, due to the poor condition of its natural resource base and development foundation, Gansu’s economy strength remains weak. Without intervention and support, the major indices for total economic and social output and per-capita index ranking are expected to remain among the lowest nationwide.

On the one hand, Gansu’s further development is constrained by a combination of factors including the market, technology, ecology and environment, and human capital. On the other hand, scientific outlook on development offers new avenues for its sustainable development of the province. When key constraints are broken, Gansu has great potential for development. It should be noted that Gansu’s underdevelopment and difficulties are, to a certain extent, masked by the performance of enterprises directly under the Central Government, and therefore fail to arouse due attention of the society and the Central Government. In the light of the changes in China’s macro-development strategy, Gansu needs to review its strategic positioning and development mindset to map out a sustainable and comprehensive development strategy. However, given the uniqueness and challenges faced by the province, the Central Government and society will need to give considerate support and attention to the province and its future development.

Gansu comprehensive diversification development strategy is based on enriching the people and strengthening the province. The strategy considers the development trends of the nation and the region and makes necessary adjustments to its past development strategy to better reflect the country’s macro-development momentum. These adjustments should achieve balanced economic and social development through a more diversified economy. The past development path which relied too much on simple scale expansion of energy and raw materials industry needs to be reversed. A new development mindset featured which builds community capacity and strategic function has been identified. Both practical and potential advantages will be brought into full play, and a series of micro economic adjustments to the industrial chain including value-adding and diversification of industrial development to suit Gansu’s local conditions. The strategy also considers Gansu’s strategic position and function
within the nation and seeks adjustment to the relationship between the Central Government and the Provincial Government. This adjustment is directed at achieving a more collaborative approach with the Central Government to achieve greater self reliance and sustainable regional economic development of the Gansu Province. It is expected that is this approach taken the Province to reach the national average in terms of its social development in the short term.

Section 1. Macroeconomic Background and Basis of the Status Quo

1.1 Macro background of the strategy

1.1.1 Changes of national development policies—the scientific outlook on development as the main theme, energy saving and emission reduction as the most important task

The PRC ’s economic and social development policy have shifted significantly in recent years. In the past, while the policy emphasized the need for sustainable development, the substantive focus was largely directed at promoting rapid economic growth. In 2003, the Third Plenum of the 16th CPC Central Committee put forward “the scientific outlook on development”. This was followed by “building a socialist harmonious society.” In 2007, the construction of “ecological civilization” was proposed in the 17th CPC National Congress. The new guidance polices represent a major shift in the approach to the state’s macro development. The establishment of a more scientific approach to development and the building of a socialist harmonious society is PRC ’s main theme of current socio-economic development. While the previous strategic focus for the nation was to get the economy off ground, the current focus is to strengthen community health and wellbeing that is underpinned by sustainable economic growth. This change takes into consideration the need for a stronger approach to performance evaluation of government officials at all levels. It is no longer acceptable to single-mindedly pursue GDP growth regardless of consumption of resources and environment, and social equity.

Global literature on research into sustainable regional development clearly indentifies
the need to optimize the land development pattern according to “major functional zones”. This approach was first proposed in the “11th Five-Year Plan.” The “11th Five-Year Plan” clearly articulated that, “We will take an overall consideration of PRC’s future population distribution, economic layout, and land use and urbanization patterns in accordance with the carrying capacity of resources and environment, the existing development density, and the potential for development. Then, we will divide our land into four main function-oriented zones, namely, the optimized development, priority development, restricted development and prohibited development zones, and will adjust the regional policies and improve the performance evaluation, standardize the order in space exploitation, and form a rational structure of space exploitation development in terms of their function orientation.” The implementation of control measures in those zones will be accompanied by the standardization of the fiscal transfer payment and the change in the evaluation of the local governments’ performance. As a result, it will provide some regions with new development approaches and system guarantee. In the past, local governments were preoccupied with economic growth for higher fiscal revenue and better performance. However it’s now time to seek new approaches to development.

At the end of 2006, the Central Economic Work Conference proposed sound and fast economic development to support China’s economic reform. Growth had been historically pursued using the traditional model of industrialization featured by “high input, consumption and emission, and low efficiency.” Though the nation has achieved rapid economy development, it, at the same time, paid a heavy cost for the mode of “extensive” fast-growth over the years. The high energy and resource consumption and the resulting environmental pollution and ecological damage have become a real constraint for future economic and social development. The effective transition of the growth mode to achieve the “sound and rapid” economic growth is one of the core issues in the regional development strategy.

In addition, PRC faces international political pressure to reduce energy consumption and emissions per capita. The PRC is forecast to overtake the United States to become the highest emitter of carbon dioxide per capita within 10 years. The PRC will come under increasing global pressure to reduce greenhouse gas emissions in the Post-Kyoto Protocol negotiations.
In order to effectively promote the energy saving and emission reduction, the State Council has mapped out a series of strategic plans and measures. For example, the National Leading Group to Address Climate Change and Energy Conservation & Pollutant Discharge Reduction headed by Premier WEN Jiabao was set up. Relevant government departments have promulgated documents such as “Comprehensive Working Program for Energy-saving and Emission Reduction” and “PRC’s National Program for Climate Change” and so on. Provinces, regions and municipalities (including Gansu) have made commitments to the State Council to complete the targets for energy saving and emission reduction set in the “11th Five-Year Plan.” Energy saving and emission reduction have now become mandatory requirements in economic development. As for the local governments, energy saving and emission reduction is likely to become the most important determinant of success or failure in their performance appraisal.

1.1.2 Changes of the mode of economic operation and governance—marketization and economic globalization remodeling pattern of regional development

Major changes to PRC’s economy have taken place in the past 20 years. On the one hand, the PRC’s economy has changed from the traditional planned economy into a market-oriented economy, causing a tremendous change in operations and governance. This is particularly evident in the fundamental change of the role of the government in economic development. PRC also has actively participated in the process of economic globalization, with foreign investment and foreign trade as an important driving force for economic growth. Accordingly, the driving force for the development of regions underwent great change, becoming more diversified.

In the period of the planned economy the Central Government directly participated in economic construction. This participation was mainly through productivity distribution. This investment from the Central Government was an important source of economic growth in many areas. Therefore, the local governments were used to directly seeking financial support from the higher authorities for projects. As a result, they paid too little attention to the development of their own economic self reliance. Through the past 20 years of reform, PRC’s economic system has been basically
market-oriented, with less and less direct government intervention in economic development. The main functions of the government have gradually shifted toward making macroeconomic policies and guaranteeing the fairness of the socio-economic development. Correspondingly, the investment direction of the central government has shifted more and more toward guaranteeing equity in resource allocation. In the past, economic policies targeting specific regional economic development issues (such as the policy on special administrative regions) was an important regulating means of the central government. However the future the focus will be on how to achieve socio-economic and environmental balance in regional development. How a region will benefit from these changes will depend on the local governments’ own strategies.

Since the 1980s, globalization of the economy has exerted a major impact on the development of PRC’s enterprises and regions. Through the continuous opening up of the economy of china to the outside world, China has accepted a large number of global industrial transfers with direct foreign investment. This has promoted the rapid development of foreign trade. It has not only driven the nation's high-speed economic growth, but also helped form the regional development patterns with a rapid growth in the coastal areas. At present, PRC’s rate of GDP’s dependence on exports has been as high as 35 %. Analysis shows that over the past decade the contribution of foreign investment and foreign trade to PRC’s GDP has averaged between 20-25%. For inland provinces that have very low levels of foreign investment and trade, the difference between the growth of their GDP and that of the coastal provinces can largely be attributed to the globalization of the economy. This factor is closely tied to the disadvantage of their geographic location. This will continue to be a constraint that has to be considered in regional development strategies. In this context a focus on purely economic development will be unsustainable.

Today regional development is exposed to the vagaries of global competition. In an economic sense, a region is no longer the country's region, but a global one. The stage of regional development has expanded and faces increasing competition. While providing some new and emerging market opportunities for some local industries, globalization leaves smaller and smaller room for survival of the industries which only serve a local market. Whether in sourcing raw materials, addressing production
costs, production technology or market services, most industries now have to compete in a global market place. This is a process that is reshaping our industries competitive edge—a region must now be market oriented, have a global vision and be globally aligned.

1.1.3 Changes in the orientation of regional industrial development —the increasing saturation of traditional industries and acceleration of the spatial shift of industries

Over the past 20 years, thanks to the sustained and rapid economic growth, the PRC has greatly enhanced the country's overall economic strength. In 2006, the PRC’s GDP reached RMB 21 trillion Yuan, GDP per capita averaged RMB 16,000 Yuan (according to the official exchange rate, $2,100 US dollars,). With the increase in income per capita, the consumer demand has undergone rapid change, turning from the traditional goods (food, clothing, and general household appliances, etc.) to automobiles, housing, tourism and leisure. As Chinese people are now paying more attention to savings and this investment capital has been channeled to areas with good returns. The shortage of funds has been replaced by excess liquidity. At the same time, financial resources for government macroeconomic regulation have significantly increased. In 2006, the country's financial revenues reached RMB 3.8731 trillion Yuan, with a growth rate of more than 20 % for three consecutive years.

Due to the change of the phase of development, obvious changes in the paths of regional economic development have taken place. Between the 1980s and 1990s, the bottom-up pattern of economic development represented by township enterprises was quite universal. The proliferation of local SMEs (Small and Medium-sized Enterprises) was an important component of the high-speed economic growth in many coastal provinces, and was highly encouraged. However after the mid-1990s, with the gradual improvement in the regulation of the market economy and the accelerating competition brought by globalization, the “historical window” for the township enterprises (or local SMEs) closed. It was no longer possible to copy the so-called “Wenzhou model” or “southern Jiangsu model” in less-developed regions. A survey on the PRC’s strategy for the development of small towns conducted by the World Bank shows that foreign investment has become the main contributing factor to
economic growth in many small cities / towns in the central and western regions. In other words, the emerging investment environment and foreign investment have been an important driving factor for economic growth in many regions. Regional positioning in the global economy has become increasingly important. It is of note however that the “bottom-up” growth model is still strong in areas that are endowed with certain resources (mineral, tourism, agricultural and sideline products, etc.). These micro economic environments still favor the growth of local SMEs.

After more than 20 years of rapid development, PRC has entered the medium-term of industrialization. Some traditional industries now saturate the market place. This has lead to excess capacity in industries such as the iron and steel, electrolytic aluminum industries. At the same time, the PRC is faced with the pressures of balancing resource use and the environment. The increasing international political pressure (such as emission reduction), which will put these industries on “the being restricted” list. These industries have to a large extent underpinned the economy of the central and western regions. The inability to sustain these industries has now become a major issue for these areas. Also of note is that because of the rising cost of production (especially land and wage costs) the more labor-intensive industries in eastern coastal areas are intending to transfer to the central and western regions. The increasing costs are impacting on their competitive edge. Accordingly it is now important for the less developed areas to consider these trends and take the initiative to integrate into the national / global production networks.

1.1.4 Basic ideas of the “11th Five-Year Plan” of the western regions —laying a solid foundation and promoting the equalization of basic public services

In recent years, the scale of investment of the country to the western region remained unchanged. However the implementation of strategies such as “the northeast and central PRC revitalization” and other regional development strategies, to a certain extent, directed the investment of resources (public and enterprises) away from the western regions. With the support of the Central Government the infrastructure in the western region has notably improved. This has included a focus on ecologically sensitive construction and environmental protection. The more ecologically sensitive industries are now gaining considerable momentum in regional development.
Therefore, the policy measures and the allocation of resources from the Central Government are likely to be important considerations affecting the ongoing socioeconomic development of these regions.

“The ‘11th Five-Year’ Master Plan for the Western Region” approved by the State Council at the end of 2006 is the guiding document for formulating the development strategies of all the western provinces, autonomous regions and cities. The plan focuses on consolidating the base of long-term development by promoting equity in the provision of basic public services and a continued emphasis on the development of infrastructure, ecological sensitive development and the development of industries that will enhance the natural economic advantage of the region. At the same time, the plan stresses the importance of the ongoing role of science and technology, education and the importance of human resource development. The 11th Five-Year Plan listed three main objectives to be achieved during the planning horizon namely, to achieve new breakthroughs in infrastructure development and the development of ecological sensitive industries. The plans goal was to reach a new level in the development of key areas and key industries, and to make new progress in the provision of basic public services. The overall plan was established to promote western development that was scientifically based, ecologically and socially responsible. In general, strategic development of Gansu Province must embrace this broad framework.

1.2. The Characteristics of Gansu’s natural endowment

Gansu is a province with no specific natural advantage or resource base. The absence of any specific natural advantage has been a factor in constraining development to date. These limitations and constraints cannot be easily changed. In particularly the fragile nature of the regional ecosystems and the natural limitations of the land and water resource base in many parts of the province present difficulties in sustaining large-scale traditional industrial agglomeration.

1.2.1 The ecological environment is relatively weak; the bearing capacity for socioeconomic development is low.

Located in the juncture of PRC’s three natural areas (the northwest PRC’s arid area, the Qinghai-Tibet Plateau area, and the eastern monsoon area), Gansu is a province
with very fragile ecological environment. The productive capacity of this environment for traditional socioeconomic development in most parts is relatively low. It will therefore be difficult to sustain any high intensity social and economic activity.

Gansu's total land area is 425,800 sq. km., with 40% of the land classified as having severe limitations for use. Figure 1 present the distribution of this land within the province. The unused proportion of the landscape is largely regarded as unproductive and includes mountains, deserts, the Gobi and part of the plateau. The climate is arid with the annual average rainfall of less than 300 mm. Evaporation is high, > 2,000 mm/annum. Land degradation is a serious problem in the Province with high levels of soil erosion, desertification, salinization and degrading grasslands. As an example soil erosion is of major concern affecting 85% of the Province. The total annual loss of soil from the Loess Plateau is 500 million tons, landslides, mudslides, and other disasters happen in the mountainous regions in Southern Gansu every year, and land desertification in Hexi area is expanding rapidly.

The productivity of land is lower than the national average, and the socioeconomic productive capacity is also low. As there is more mountainous land than flat land, and more dry land than irrigated land, Gansu's per unit farmland yield is only 3.16 tons / ha. This is less than three quarters of the national average. Gansu is PRC’s sixth largest grassland and livestock grazing region, with 16.04 million ha of usable grassland. The grassland productivity however is also low with an average carrying capacity of one sheep per 1.02 ha of grassland. The natural grasslands are over-utilized and degrading. Degradation of the natural grassland of the province accounts for 80 % of Gansu’s usable land area. Livestock grazing pressure must now be reduced and extensive tracts of pasture land need to be rehabilitated back to productive grassland. According to the evaluation of “ecological protection and construction”, more than half of the cities (prefectures) in Gansu are in the status of high load bearing, and the ecological unsustainable.

Figure 0-1 the current land usage situation map of Gansu
1.2.2 Constraint of water resources on socioeconomic development is very prominent.

Most parts of Gansu Province are in the northwest arid areas, with low levels of precipitation and high levels of evaporation. A limited water resource is a key factor affecting development in the province. The available water in the province is 28.94 billion cubic meters, (1,077 cubic meters per capita). This is 50% of the national average, ranking Gansu Province as 20th in China. Water resources for per mu of farmland is 404 cubic meters, 25% of the national average (1mu = 1/15 ha.). Of importance is that, the spatial distribution of the water resource in the Gansu is extremely uneven with the water and soil resources not well aligned. Gannan Prefecture and Longnan City are rich in water resources, accounting for 57 % of the total of the province. Whereas the inland river basins that account for more than 60 % of the area of the province are extremely arid with 5.7 billion cubic meters of surface water resources, accounting for only 20 % of the province's total.

Major differences occur between the cities. Per capita surface water resources in the cites of Lanzhou, Baiyin, Jinchang and Jiayuguan there is less than 100 cubic meters, and water resources per mu of arable land is less than 50 cubic meters. Per capita water resources of Dingxi, Tianshui, Pingliang and Qingyang is between 300 and 500 cubic meters, and water resources per mu of farmland is between 80 and 200 cubic meters.
Owing to extremes in the spatial and temporal variability in rainfall there are serious problems of water shortages in most parts of Gansu. According to the analysis of the subject of “Exploitation of Natural Resources and Environmental Protection,” the current socioeconomic water shortage in Gansu amounts to 1.27 billion cubic meters (not including water demand for ecological rehabilitation and construction works). Water shortages are evident in the inland river basins (mainly the Hexi District). Here the extent of development and utilization of water resources is high, reaching 98.6 % utilization. This level of use and demand has resulted in supply shortages of about 300 million cubic meters per annum. The water shortage in Shiyang River Basin is the most serious. The water consumption here has exceeded the available capacity by a significant margin. The rate of development and utilization of water resources is as high as 172 %, and it has already caused serious ecological problems, such as degradation of Minqin Oasis.

The rate of development and utilization of water resources in the Black River Basin has reached 93.7 %, and some water for ecological use has channeled to the economic development. There is a sharp contradiction in water consumption between the upper, middle and lower reaches. It is generally believed in academic circles that the socio-economic water consumption should not exceed 50 % of the total water resources of any river basin. The consumption of the inner river basin in Gansu has however has far exceeded this level. The long term outlook for water consumption of the Yellow River Basin is not optimistic. Water consumption of the main stream has now reached the quota identified by the state (that is, 3.119 billion cubic meters). As the demand and use are expected to increase the quota will be exceeded. Therefore, the significant limitations and constraints in water resources must be taken into consideration in Gansu's development strategies.

1.2.3 Advantages of mineral resources have gradually weakened, but some sorts of ores have good prospects for exploration.

The comparative advantage for Gansu of many of the tradition ore industries is being lost - with the exception of some of the non-ferrous metals such as nickel, lead, zinc, tungsten, etc. and a small number of non-metallic minerals. The value per capita of the mineral endowment of Gansu is in the lowest percentile of the western regions.
The potential per capita value of the mining reserves and the potential value of identified deposits owned per unit of land area are also below the national average. The province is listed in the second lowest and last respectively in the 12 western provinces and autonomous regions. Among the key ores needed for national economic development the proven reserves of coal stand at 13.2 billion tons; oil reserves 300 million tons, with just over 100 million tons of recoverable reserves. Reserves of iron ore are limited. Of note is that the mining conditions of Jingtieshan iron mine are the harshest.

The level of development and utilization of the major ore deposits in Gansu is high. As such the competitive advantage in this area for the province is gradually declining. According to the statistics of the Gansu Province State Land and Resources Department, the general utilization rate of reserves of major minerals in Gansu has reached 50% to 90%. Some of the non-ferrous metals and some non-metallic ores have exceeded 85 %. This is 10 to 20 % higher than that of the other western provinces and autonomous regions. For example, the utilization rate of the currently mined deposits of copper, zinc, nickel, tungsten and lead is 86.5%, 86.2%, 90.4%, 93.5% and 73.2% respectively, with limited un-mined reserves. The emerging shortages in oil, iron, aluminum, copper etc, to meet the industrial needs of the province have resulted in the importation of raw materials from other provinces or regions and even abroad.

Renewable energy resources may well be a potential advantage for Gansu. Firstly, Gansu is abundant in wind resources. According to “The Evaluation Report on Wind Resource of Gansu”, the overall potential of wind as an energy resources in Gansu is 237 GW, which concentrates mainly in Hexii Corridor and some mountain pass regions; the current technologically recoverable reserves of this wind resource is 26.67 GW, ranking ahead in average for the PRC. With the mandatory requirements on energy conservation and emissions reduction, the clean energy resource could become Gansu’s competitive edge. Secondly the, Qinyang City exploration results show good prospects the petroleum, natural gas, coal, and coal bed gas industries. If more reserves are identified the position of Gansu in traditional energy resource supply would be improved.
In addition the exploration for metallic deposits in the west Qinling Mountain, middle and west Chilien Mountain shows promising results. However, based on results to date it would seem unlikely that significantly large enough new reserves will be discovered to have any significant long term impact on the industrial development of the Gansu. Nevertheless, greater effort should be made to expand the geological prospecting, as the possibility of finding new reserves of minerals in the medium to long term show reasonable promise.

1.3. The Status of Social and Economic Development of Gansu

1.3.1 Major economic development achievements of Gansu since “the Tenth Five-Year Plan” period

During the period of “the 10th Five-Year Plan”, the economic and social development of Gansu made a new step forward: Sustainable and rather rapid economic development has been realized in a wide range of areas. This was evident in urban and infrastructure development and the improvement in people’s living standards; along with large scale of capital investment. The total social investment in fixed assets in the past five years was RMB336.4 billion Yuan, exceeding the total in the past 50 years, with the annual average increasing by 14.6%. In addition, Gansu accomplished an investment of more than RMB75 billion Yuan in strengthening innovation and technology with an average annual increase of 18%.

Production of energy and raw materials was also enhanced. In particularly the scale and output value of large scale state-owned enterprises rose rapidly. In 2005, the GDP of Gansu reached RMB189 billion Yuan. The average annual increase was 10.2%, making this five-year plan period the fastest growth period for Gansu when compared to any period of the previous “Five-Year Plans”. Heavy industrial revenue, including local revenue and the central government portion, exceeded RMB10 billion Yuan and RMB20 billion Yuan respectively.

The restructuring of the economy has yielded considerable benefits. This is reflected in the following areas: 1) A number of syndicates and large companies that have strong market competitiveness have emerged. 2) Some pillar industries such as the
petrol-chemical industry, metallurgical industry, and energy resources and so on, have been developed and expanded in the west of the PRC. In 2005, in Gansu the processing capacity of crude oil reached 14.5 million tons with ten kinds of nonferrous metals reaching 1.05 million tons; and the newly installed generator capacity was 3.45 GW, with the total capacity exceeding 10 GW). Grain yield has grown steadily, basically achieving a balance between demand and supply within the province. Industrialization of agricultural products with local features has resulted in a significant breakthrough. The industrial bases for potatoes, brewing raw materials, traditional Chinese medicine, seed-production, fruits and vegetables and so on reached 1.49 million ha., covering over 40% of the total crop area in Gansu, which has resulted in an effective increase in-farm income.

Infrastructure construction has made an outstanding achievement, and the efforts in ecologically sensitive construction have registered considerable progress. By the end of 2005, the mileage of expressways in the province exceeded 1,000 km. The Baoji-Lanzhou Railway Line II and Wuwei-Jiayuguan Railway lines were electrified. The construction of Dunhuang Railway was also completed. Se-Ning-Lan natural gas pipelines and Lanzhou-Chengdu-Chongqing oil product pipelines were finished. The communication network covered almost the whole province. Some major water conservation projects, such as the comprehensive agricultural exploration of Shule River Basin and the first phase of the project for comprehensive control of the Black River basin were largely completed. Between 1999 and 2005, the rate of vegetation coverage of the province rose by 3.35%, returning 1.54 million ha of tillable field to forest, which included returning 655,000 ha. of land to forest. In addition 827,000 ha of forestation on barren hills and wasteland, and 60,000 ha of forest on the closed mountains were also completed.

During “the 10th Five-Year Plan” period, the divesting of state owned property was basically accomplished in 75% of the large and middle-sized state-owned enterprises, and preliminary modern business institutions were set up. A group of large scale key enterprises both at home and abroad were introduced to take a controlling stake and own shares in, or merge and acquire the large and middle-sized enterprises. The provincial government decentralized the administrative right of a number of affiliated state-owned enterprises to the lower level, hastening the small-and-medium-sized
enterprises to withdraw from general competitive fields.

1.3.2 A comparison in socio-economic development between Gansu and the whole country

While significant economic growth has occurred in recent years, Gansu has continued to be one of the two provinces with the lowest per capita GDP (the other one is Guizhou). In 2005, the GDP per capita of Gansu was RMB 7,477 Yuan, only 53% of the average of the country, ranking nationally as the second lowest (Table 0-1). Due to the contribution of the large state enterprises in petrol processing, petrochemical and nonferrous metallurgical industries, the industrial structure of Gansu ranked at the median level in the country. In the same year, the proportion of the non-agricultural industry GDP in Gansu was 84.1%, which, though lower than the national average (93.7%), was higher than that of the big agricultural provinces in the middle part of PRC, such as Jiangxi, Henan, Anhui, Hunan, and etc. However, during “the 10th Five-Year Plan” the proportion of GDP produced by secondary industries in Gansu dropped. Additionally, in terms of the employment, the proportion of people in the nonagricultural industry of Gansu in 2005 was only 36.33%. However, if the people who went out to do odd jobs temporarily were included, the proportion would probably exceed 50%.

Table 0-1 The change in ranking of GDP per capita of all provinces and autonomous regions during “the Tenth Five-Year Plan” period

<table>
<thead>
<tr>
<th>Provinces and autonomous regions</th>
<th>GDP per capita Year 2000,yuan</th>
<th>Ranks Year 2000</th>
<th>GDP per capita,yuan</th>
<th>Ranks Year 2005</th>
<th>Rank changes</th>
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<td>New Value</td>
<td>Old Value</td>
<td>Change</td>
<td></td>
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<td>-----------</td>
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Note: The GDP per capita of all provinces and autonomous regions in 2000 and 2005 are the ones of the same years.

Gansu was among the lowest in terms of economic growth in the PRC. This was not simply a function of a low growth but also low profit margin and low labor productivity, as well as high energy consumption for value added goods. This reflects that Gansu falls far short of the requirement of the “sound and rapid” development requirement established by the central government. For all the three indices—the rate of industrial added value, the ratio of profit to cost and labor productivity, Gansu was below the national average. Especially, the ratio of profit to cost of Gansu was only 3.48% (in 2005), ranking the second from the bottom in all the provinces and autonomous regions, only marginally higher than that of Ningxia.

As the raw material industries made up the mainstay of industrial production, the energy consumption per unit of additional industrial value was very high — 4.49 tons of standard coal/ RMB 10,000 Yuan in 2006, ranking the fifth in the country. The above data shows that the economic performance of Gansu was poor. By a
comprehensive analysis of the growth rate of GDP, additional industrial value, ratio of profit to cost and labor productivity, the economic vigor of Gansu was the lowest in the country, only 86% of the national average.

The rate of urbanization and the social development of Gansu is also rather low. In 2005, the average urbanization rate in the country reached 43%, while that of Gansu was only 30%, or less than 70% of the national average (only higher than Guizhou, Yunnan and Tibet autonomous region in western PRC).

The proportion of the population with junior college education and above is well below the national average. This statistic was not the lowest in the west regions with Gansu exceeding the educational standards of Sichuan, Guizhou, Yunnan and Tibet. Of note is that the level of elementary and secondary education of Gansu was above the average level of the country, especially in terms of the number of teachers per 10,000 people. However the conditions of the higher education of Gansu lagged behind the average level of the country and only reached the medium level in the west PRC Gansu was lower than Chongqing, Xinjiang, Shaanxi and Ningxia but better than Sichuan, Guizhou, Yunnan, Tibet and Qinghai.

The medical and health care of Gansu approached the average for the country. The coverage of social security however was far below the national average. Hence while the level of the social development in Gansu was at or below the average of the country (ranking the seventh in the country from the bottom) social development was better than the relative value of the level of Gansu’s economic development.

The quality of life of the people in Gansu is among the lowest in the country, followed by Tibet and Guizhou (as determined by a comprehensive judgment of the average income per capita, expenditure on consumption, the Engel coefficient, living floor space and the volume of electricity in daily use). In 2005, the average income per capita in Gansu was RMB3,813 Yuan, only 60% of the national average. The total expenditure on consumption was RMB 3,233 Yuan, 66% of the national average. In the same year, the Engel coefficient of the urban residents of Gansu was 36%, a little lower than the average of the country (36.7%). The Engel coefficient of the rural residents of Gansu was 47.2%, higher than the average of the country (45.5%).
2005, the average volume of electricity for daily use was only 188.94 KWh, 55% of the national average. The average living floor space per capita of both urban and rural residents in Gansu was lower than the national average. The comprehensive living quality of residents of Gansu was only 70% of the average of the country, 25% that of Shanghai and Beijing and less than 50% that of coastal provinces such as Guangdong, Zhejiang and Jiangsu.

Although the infrastructure of Gansu has greatly improved since the implementation of the Western Development Strategy, the current level of infrastructure is still very low — not only lower than the average of the country but also the lowest in the five provinces and autonomous regions in northwest PRC Owing to the geology and shape of the Province (long from east to west and narrow from north to south), the demand for transportation infrastructure in Gansu is higher than that of other regions at the same development level. In terms of the regional density of railway and highway communication, Gansu is far below the national average — 80% and 50% of the average of the country respectively. In terms of the number of switchboards for long distance telephones, local telephones and mobile phones per 10,000 people and the popularity of internet, the level of communication of Gansu is only 60% of the average of the country, a little better than that of Tibet and Guizhou.

In general, the level of economic development of Gansu is low and the vigor of its economic growth is poor. The comprehensive living quality of residents and regional
infrastructure of Gansu are all among the lowest of the country. Although the level of social development is a little better than other indices in the rankings, it is still among the lower level ones of the country (see Figure 0-2). According to data from “Development Report of PRC’s Public Service in 2006”, the level of public service of Gansu ranked at low position in the country, with four kinds of public services of basic education, social security, public security, infrastructure and environment protection even ranking behind the 26th among 32 provinces, autonomous regions and municipalities in the country.

1.4. The major problems existing in the socioeconomic development

1.4.1 The outstanding structural contradiction in the industrial development caused by “path-dependence”

Economic growth of Gansu excessively relied on the industries of energy and raw materials, now causing a major nexus in industrial structure (increasing demand and decreasing supply within the province). In recent years, the economic growth of Gansu has relied heavily on the expansion of the traditional industries, especially on the large-scale expansion of the production of energy and raw materials based on energy and mineral resources. Though the provincial government attached great importance on the development of the non-public economy, large agriculture and the agricultural industrialization, education and manpower capital, the industry of energy and raw materials takes the biggest share of the overall investment. On the one hand, it reflects the limitation of the resources that the provincial government can control; on the other hand, it shows that the policy of structural adjustment has not been carried out to the extent expected. Most of the financial and material resources have been absorbed by the big projects in energy and raw materials, aiming at the rapid growth of GDP.

At present, the top seven sectors in terms of value adding in Gansu are non-ferrous metal smelting and calendaring processing, petroleum processing, coking and nuclear fuel processing, ferrous metal smelting and calendaring processing, electricity, heat production and supply, manufacturing of chemical raw materials and products, oil and gas mining, coal mining and washing and dressing, etc. The supply of raw materials is
the mainstay of these industries. In 2005, the industrial value of the seven sectors was RMB 45.392 billion Yuan, making up three quarters of the industrial value of Gansu. In the same year, the national proportion of excavation, raw materials and heavy industry processing was 8.6%, 49.2% and 42.2% respectively, compared with Gansu’s 9.5%, 80.0%, and 10.5% respectively.

The development strategy of the Gansu province in the past has lead to a high level of dependence on the central Government. The province has focused on achieving high levels of heavy industrial development. This has been at the expense of the limited natural resource base and the sustainability of the socio economic wellbeing of the province. The main dependency problems are:

- The leading industries are confronting nationally a surplus of production. Macro regulation is required for these industries to control and even reduce the scale production.
- Apart from the nickel industry, which enjoys a long-term and reliable supply of local resources, other major industries in Gansu (mainly the electrolytic aluminum, oil refining, petro-chemical industry, iron and steel) do not have reliability in supply and are faced by ongoing resource constraints. From the perspective of resource security, it would be hard for the industries to realize any long term sustained expansion in scale.
- These major industries of Gansu are basically energy-intensive and highly polluting. Energy consumption and pollution per unit of GDP far exceeds the national average. According to the government bulletin on energy consumption, released in 2006, Gansu’s GDP energy consumption and energy consumption for industrial value adding in 2005 were respectively 2.26 tons and 4.99 tons of standard coal for every RMB 10,000 Yuan. GDP electrical consumption was 2,531 KWh for every RMB 10,000 Yuan, which was 85%, 93%, 86.3% higher than the national average respectively, ranking the 6th, 5th and 3rd in the country. In other words, 4,425 Yuan of GDP was produced at a cost of one ton of standard coal or 3,771 Yuan less than the average of the country and 8,233 Yuan less than Guangdong (the lowest energy consumption province of the country). If Gansu continues to seek a growth in GDP by developing these high energy-consuming and polluting industries, Gansu will not fulfill the task of saving energy and reducing emissions in the period of
1.4.2 The development of local economy and non-public economy lagging far behind

Enterprises under the central government (hereinafter referred to as “the central enterprises”) have long occupied the preferred position in the industrial development strategy of Gansu, and this position has been maintained in recent years. Since the late 1990s, with the enactment of the policy of “managing large enterprises well while easing control over small ones” for the state-owned enterprises, the proportion of state-ownership has dropped dramatically. This has been achieved by the implementation of reform measures such as structural adjustment, reorganization of capital funding and the repositioning of redundant personnel as well as the rapid development of non-public-owned enterprises.

In 2005, the proportion of output value of state enterprises to non-public-owned enterprises above the quota fell below 33.28%. This is in contrast with the status of the state industrial enterprises output value in Gansu during the “Tenth Five-Year Plan” which increased by 2.7%. Gansu became one of two regions in the country where the proportion increased. Though profits of the large state enterprises increased in recent years, most of the profit went to the central enterprises and was lost from the regional economy. The local government only receives a small fraction of the tax revenue.

In 2005, the investment in the state economy made up over 58% of the total investment in the province, the highest in the nation. During the “Tenth Five-Year Plan” period, the investment on technological innovation in Gansu reached more than RMB 75 billion Yuan, twice as much as that in “the Ninth Five-Plan”, but mainly on the traditional industries and state economic sectors such as petrochemical industry, metallurgical industry and nonferrous industry and so on. The overly high proportion of state economy brings about a series of problems:

* The industrial support for the development of the national economy is being reduced. The growth of the economy and financial revenue of Gansu is more and more dependent on the industrial sectors of raw materials. To secure
growth in GDP and revenue, more attention has to be paid to these sectors. So in a sense, the economy of Gansu is locked into a spiral.

- In recent years, large-scale reform of the state-owned enterprises, the proportion of non-state economy has risen from 25.1% in 2001 to 36.1% in 2005. However, compared with the average level of the country (41%), the index is still low. What is now required is for Gansu to pay more attention to building the economic and policy environment conducive to the development of non-state enterprises. Attention also needs to be given, to improving the development of the market economy, and to stimulating the economic vigor of non-public-owned enterprises. Investigation shows that soft investment environment in Gansu was approved by only 32% of the enterprises (for more details, see The Research Paper on the Subject of the Development of Non-state Economy).

1.4.3 The economic development mode does not suit the needs of the new situation.

There are obvious problems in managing the relationship between growth in GDP, tax revenue and community health and wellbeing. Several of the leading industries in the history of Gansu are not labor-intensive. Although these industries played an important role in increasing local revenue, they made very little contribution to the employment and wellbeing of the people. While an increase in the development of these leading industries promoted the rapid growth of GDP of Gansu, there was very little consequent increase in employment. In other words, the large scale of development of these industries did not bring about direct improvement of the living standards of the people.

Between 2000 and 2005, the proportion of employment in the secondary industry sector showed a decline. The statistics of 2005 shows that only 36% of the labor forces from the countryside were transferred to secondary industry sector and the other 64% were transferred to the tertiary industry sector. This, to a large degree, explains that the development of the leading industries of Gansu will not greatly increase the employment, and therefore, make little contribution to the increase of the income per capita.
At the same time, Gansu is faced with a limited resource base and degradation of the environment. At present economic growth and revenue excessively rely on these industries. In recent years, the GDP of Gansu has increased and strengthened. However, in a sense, the increase was realized at a cost of large-scale investment, high consumption of energy and mineral resources and high discharge of pollutants. This kind of development has brought little benefits to the people, but posed great difficulties for sustained development. If this path continues, it will harm the macroeconomic interest of the nation, and make it difficult to fulfill the task of reducing energy and emissions.

1.4.4 The storage of human capital is poor; the structure of talents is unreasonable.

Low utilization of human resources is another problem in the development of Gansu. In 2005, the school life expectancy (SLE) was 7.04 years, ranking the 27th among all the provinces in 2005, 0.9 year shorter than the average of the nation (7.93 years), and 3 years shorter than Beijing. The proportion of college graduates in 2005 accounts for 4.4% of the population above six years old, which is 1.1% less than the nation, ranking the 26th among the provinces. The level of illiteracy and semi-illiteracy was rather high, with an illiterate population of 4,139,600 in the population at and above the age of 15 years old, making up 21.11% of the population of the same age of the country, (the average of the country was 11.63%). The rate of illiteracy exceeded 20%. The level of education attained by women is particularly low, with high levels of illiterate and semi-illiterate women, twice as many as men (for more details, see the Research Report on Manpower Resource). Meanwhile, the investment in education in Gansu is quite inadequate. In 2004, the average educational fund per person in Gansu was RMB 394 Yuan, while the national average was RMB557 Yuan.

In addition, there are still some problems in the structure of the human capital. Regional development requires the cooperation of all kinds of human capital. It was generally held that regional development is promoted by entrepreneurs. However, they need to be aided by the cooperation of professionals and general human capital.
Only when the cooperation of different kinds of human capital is good can sustainable regional development be realized. The regional development may be hindered where the cooperation fails or is inadequate. According to the census in 2000, the average ratio of professional personnel to entrepreneurs of the country was 5.7 and the average ratio of ordinary employees to entrepreneurs was 92.8, while those ratios of Gansu were 8.1 and 159.5 respectively. The ratio of ordinary employees to professional personnel of the country was 16.2, while that of Gansu was 19.6. These statistics shows the evident mismatch of the human capital structure in Gansu.

Although the human capital of entrepreneurs is obviously low, the proportion of professional personnel is above the national average but below that of the coastal areas. The professional personnel are mainly concentrated in large state-owned businesses that are separated from local economy, so the spillover effect of Gansu’s technicians in the local development is rather limited (for more details, see the Research Report on the Technological Innovation).

1.4.5 The economic development is rather internalized and the drive of the external force is obviously inadequate.

The development of an external-source-oriented economy requires the establishment of effective relationships to secure funds and enterprises of foreign countries and other provinces of PRC. However, Gansu is quite slow in developing such relationships. The government of Gansu has attached great importance to attracting direct foreign investment. The proportion of the foreign capital introduced by Gansu to that of the whole country, has been falling continuously and dropped from 0.77% and 0.29% in 1995 to 0.4% and 0.03% in 2005 respectively. Seen from the structure of paid-in capital of industrial enterprises, the foreign capital and capital from Hong Kong, Taiwan and Macao actually used by Gansu only made up 1.5% far lower than the average of 22.7% for the country, ranking the second lowest in all the provinces and autonomous regions (only higher than that of Tibet). The growth of international trade of Gansu showed the same tendency. From 1995 to 2005, the volume of international trade rose from RMB 2.34987 trillion Yuan to RMB11.69218 trillion Yuan. The proportion in GDP rose from 38.7% to 63.9% and increased by 25 %. Comparatively, the proportion of the overall volume of international trade in GDP of
Gansu rose from 4.5% to 11.2%, up by less than 7%.

Apart from foreign capital and international trade, domestic capital becomes more and more important to the development of the economy of PRC, especially in the middle and west parts of PRC. However, Gansu has made little progress in attracting domestic capital. According to the statistics, Gansu introduced a total of RMB16.669 billion Yuan from other provinces during the period of “the Tenth Five-Year Plan”, while Anhui introduced RMB80.1 billion Yuan in 2005 alone. When compared with neighboring provinces and regions, Gansu still has a long way to go. In 2005, Gansu actually introduced RMB 4.889 billion Yuan from other provinces amounting to 1/21 of Inner Mongolia and 1/8 of Xinjiang, even lower than Ningxia and Qinghai. In general, the opening up of the country has been promoted in the coastal areas through to the middle and upper reaches of the Yangtze River. The external economy of Gansu however grows rather slowly. Gansu’s economic development mainly depends on “the inner strength”, and is currently lacking the drive of “the external strength.”

Section 2 Positioning of Strategic Functions and Strategic Choice

2.1 Gansu Positioning of Its Strategic Functions in the Country

Gansu is a province with special ecological conditions and strategic location. For a long time after the founding of People’s Republic of PRC, Gansu occupied an important position as PRC’s key raw material industrial base. However, with shift to market based economy and the gradual depletion of Gansu’s mineral resource base lead to a general economic decline. Against this backdrop, Gansu needs to review its strategic positioning in light of the country’s new macro-strategy and its own conditions.

According to the state’s guideline and objective for major function-oriented zoning, most areas of Gansu will not be included as key development zones at the national level. Among the three key economic zones proposed by the Overall 11th Five-year Plan for Western Areas, only Guanzhong-Tianshui economic zone involves Tianshui city in Gansu. The other two key economic zones are Chengyu and Beibuwan. Both Lanzhou and Xining are incorporated into the city belt that is being encouraged to
From the macro level, Gansu’s main function in the country’s overall development is not well positioned to contribute to PRC’s economic growth. But this is not to deny Gansu’s need for economic development. Rather, Gansu should consider performing its main strategic functions at the national level while pursuing its own regional economic growth strategy.

The understanding, however, should go beyond the country’s major function-oriented zoning, which is still under development. Firstly, the major function-oriented zoning is tentative, and does not cover all areas of the country. Secondly, the proposed four main function-oriented zones are at a macro-level and a rough classification. A more detailed approach will be required through time. Therefore, we should consider, but not be limited to, the current main function-oriented zoning, to define Gansu’s strategic function positioning in the Nation.

2.1.1 Ecological Security Function

Located at the intersection of the arid zone, Qinghai-Tibet Plateau region of northwest PRC and monsoon region of east PRC, Gansu is the country’s only province with three natural regions. Besides, Gansu lies at the upper reaches of Yellow River and Yangtze River and inland river basin, and therefore it is a region with unique ecological function and position. Its ecological conditions have a bearing not only on its own sustainable development, but on the country’s ecological security. Two issues have big impact on north PRC and the Nation.

The first concerns Yellow River. Gannan area is an important water replenishment zone for Yellow River, feeding an annual 6.59 billion cubic meters to Yellow River, or 35.8% of the river’s annual discharge. However, this region’s increasingly acute ecological and environmental degradation, (desertification, salinization of grassland, reduction in wetlands, falling water conservation) are seriously affecting the sustainable development of the Yellow River basin. Water Pollution is another area of concern. Gansu section of the Yellow River runs 913 kilometers through its four cities and prefectures, among which Lanzhou and Baiyin are heavy industrial cities. According to statistics, the annual discharge of waste water in this section runs as high as 237 million tons, while the domestic sewage treatment rate is 34%.
The second problem concerns the Hexi area’s ecological security. The ecological and environmental conditions in inland river basins of Hexi Corridor are seriously affected by the atmospheric quality of north PRC. In particular this has resulted in a declining water conservation function of the Chilian Mountains. Water supply in the Hexi Corridor is falling. This, coupled with lack of sound scientific management of water consumption has led to a severe shortage of water supply and an increasing conflict between industry and agriculture. This is evident in both the upper and lower reaches impacting on socio-economic development and ecological and environmental protection. The shift in source of oases, southward encroachment of desert, expansion of sand and dust source are the main factors behind the increase in frequency and scale of sandstorms. In addition, the oasis in Minqin is degrading at an alarming rate. Once Minqin’s oasis disappears and the two deserts of Badajilin and Tenggeli become one - immense ecological impact will be produced.

2.1.2 Function as an Economic and Cultural Route

Lying at the heart of PRC and across the border area of northwest PRC, Gansu is very important geopolitically. In particular, its capital city Lanzhou is a hub of land transport and logistics in far western areas, linking the 3.6 million sq.km of land to the west of Lanzhou. Gansu held the key to the ancient Silk Road in history and owned some very important passes and strongholds, such as Tianshui, Wuwei and Dunhuang. Those strongholds not only guaranteed the smooth and safe operation of the Silk Road, but played an important role in tightening the then political grip, consolidating the security of border areas, and boosting ethnic harmony and cultural exchanges.

Despite multiple routes leading to Xinjiang and north of Tibet other than Hexi Corridor, this route plays an irreplaceable role in terms of transportation capacity and convenience. The opening of Qinghai-Tibet railway further reinforces the importance of Lanzhou as a logistics hub for Qinghai and Tibet. To maintain economic boom and population concentration of this strategic route is of great geopolitical significance. In a sense, Gansu’s economic, social and ecological situation will have a great impact on the stability of far western areas.
Gansu’s development also concerns ethnic unity and stability. In history, Gansu was the place the dynasties in the Central Plains and regimes of ethnic minorities in border areas fought most fiercely for. In prosperous times from Han and Tang Dynasties to Ming and Qing Dynasties when the PRC was united, Gansu served not only as a stronghold for frontier defense, but as bridge binding together various dynasties in the Central Plains and ethnic minorities of the northwest PRC. Therefore, Gansu’s history is a process of exchanges and integration of different ethnic groups. A dozen ethnic minorities are concentrated in Gansu. This unique position makes Gansu a bond linking various ethnic groups in northwest border areas such as Mongolian, Tibetan, Uygur and Muslim groups, and safeguarding unity and unification of the Chinese nation. But social and economic prosperity and stability are essential for it to play such a role.

2.1.3 Function as a Base for Several Competitive Industries in Western Areas

As a priority area for construction before PRC’s reform and opening-up, particularly during the First Five-year Plan period (from 1953 to 1957) and Third-line Construction period (from 1964 to 1978), Gansu possessed strong manufacturing capabilities and a sound foundation in terms of petroleum refining, petrochemicals and non-ferrous metallurgy. In terms of its share of output in China’s corresponding industry, Gansu's petroleum, petrochemicals and nonferrous metallurgy occupied a prominent position in the western areas and the Nation.

Calculated at value added stage, Gansu’s nonferrous metallurgy accounted for 3/5 of the northwest PRC, which consists of Shanxi, Gansu, Ningxia, Qinghai and Xinjiang, its petroleum refining 2/5, and steel slightly lower than 2/5. Among them, the output of steel, rolled steel, ferrous alloy, lead, zinc, copper and nickel ranked No.1 in northwest PRC, and the production of crude oil processing, power, cement and electrolytic aluminum No.2. Lanzhou is the biggest petrochemical base in west PRC, with an oil refining capacity of 10 million tons and ethylene capacity of 0.7 million tons. The biggest iron and steel enterprise in western areas, Jiuquan Iron and Steel Group, has formed a comprehensive production capacity of 6 million tons. Therefore, Gansu is an important industrial base of energy and raw materials in west PRC (for more information, please see the study report of its special and competitive
industries).

In addition, some of Gansu’s farm and sideline products hold a high place nationwide and have great potential for production and processing. The combination of unique light and heat, water and land resources, and diversity of natural environment, gives Gansu a niche advantage in some farm and sideline products, such as maize, potatoes, raw materials for wine making, seed production, melon and fruits, tomatoes, lilies, olives, green vegetables, pasture and animal husbandry, and traditional Chinese medicinal materials. As one of the three potato seed and potato production bases of the country, Gansu has a great impact on the country’s potato trading market.

Many of its farm produce such as hemp, beet, and high-quality wheat for specific purposes, quality cotton and green vegetables, rank ahead in the whole country. With over 9,500 varieties of herbs, including wild ones, it ranks No.2 in the country. Gansu’s production of traditional Chinese medicinal materials is nationally recognised, with the main varieties including licorice, angelica, radix codonopsis, astragalus root, Hongqi and rhubarb.

2.1.4 Function as demonstration of coordinated development between man and nature

As mentioned earlier, Gansu is an ecologically fragile province. The ecological environment of many areas, inland river basin (mainly Hexi area) in particular, has a low inherent capacity for social and economic development. As one of those zones prone to the impact of global climate change, Hexi’s development is seriously threatened by shrinking water resources. Over the past decades, glaciers of Chilian Mountains have retreated. As a result of this, coupled with rapid population growth and irrational human activities, Chilian Mountains’ water conservation function has weakened and water inflow of the three inland rivers, namely Shiyang River, Black River and Shule River, has decreased annually.

Due to poor development of its water resources, Hexi has become one of the areas with severe desertification. Desertified land area covers an area in excess of 213,000 sq.km. Minqin oasis at the lower reaches of Shiyang River, in particular, has almost
lost the ecological foundation for human survival.

Over the past few years, the degradation at the lower reaches of Shiyang River has attracted attention from all social strata and the Central Government. During NPC and CPPCC sessions, Premier WEN Jiabao pointed out that the four most high-profile events in Gansu’s development are related to Hexi area. In his comments on many occasions, Premier WEN also pointed out that in no way should we allow Minqin to become the second Lop Nor, which completely runs dry now.

Therefore, Hexi area is a typical example of the need for coordinating the development between man and nature. To handle the relationship between human activities and ecological changes well can offer a good demonstration for other regions. Of course, the south of Gansu also has the same problems. In spite of relatively good natural conditions, the south of Gansu also sees overexploitation and ecological degradation. Serious soil erosion of Loess Plateau not only affects its own agricultural production, but also is the main source of sediments in the Yellow River. Given these ecological problems, if the right choices are put into practice, Gansu can offer a role model nationwide for coordinated development between man and nature. Gansu’s sustainable development itself could be a role model for others.

2.2 Guiding Ideology and Strategic Goals

Besides natural resource limitations, Gansu’s guiding ideology for development also has some drawbacks. First, it is not so responsive to the national strategies; it fails to take the initiative, and has some deficiencies in its development mentalities. Second, under the pressure of the current fiscal system and cadre’s performance evaluation system, it is preoccupied with the short-term growth in GDP. To achieve these short-term objectives, large-scale investment and expansion is needed in the traditional raw materials sector, and not enough manpower and material resources are invested to shape new advantages.

Thirdly, given Gansu’s diverse and complicated geographical environment, poor natural conditions, fragile ecological environment and backward socio-economic development, it is not easy to find a road for sound and rapid development that is
suitable for Gansu. That’s why the development strategies were frequently adjusted. Historically this shows an inaccurate analysis of the appropriate path for long-term development and an obsession with growth. Compared with other provinces, Gansu’s development model is inward-oriented and is too cautious in developing an export-oriented economy to attract foreign capital.

To overcome the deficiencies in its development strategies Gansu should actively respond to the shift in the state’s macro guidelines, take a scientific outlook on development as its guide and review its development strategy. It should also transform its traditional development model as soon as possible and choose a more scientifically robust development path. A development road suitable for Gansu’s local conditions needs to be explored and developed. Sound and rapid economic growth should not be regarded as the core for economic decision-making. A people-oriented approach should be identified. The increase of people’s employment and income should be put as a priority. A comprehensive, coordinated and sustainable development path should be chosen to bring into play all the factors required to achieve diversified development. Specifically this should include harmonious development between the social, economic and environmental dimensions.

2.2.1 Try All Means to Transform Traditional Growth Pattern

Gansu’s past development model shows a low-level development cycle, or a traditional growth pattern. The so-called low-level development cycle, from the perspective of sustainable and substantive earnings, people’s affluence in particular, means that high GDP growth does not bring a corresponding degree of improvement in people’s income and substantive welfare. As Gansu’s primary goal was to pursue ultra-speed growth of GDP and increase of fiscal revenues, it has to persistently depend on large-scale expansion of existing energy-intensive and highly-polluting industries. Meanwhile, large-scale construction and expansion of these industries is subject to the country’s stringent macro-regulation, such as regulation on capacity surplus, energy conservation and pollutant discharge reduction. This poses huge risks and substantial fluctuation in investment. Such an approach to expansion will cost resources and environment dearly, making its natural conditions impossible to sustain. Moreover, such expansion generates very limited employment opportunities and fiscal
revenues, and therefore little substantive earnings for the general public. In general, the low-level development cycle ends up exacerbating Gansu’s structural problems, unable to sustain its development.

If the development strategy and pattern continues, it is difficult to bring into play various potential factors to foster new economic growth points, coordinate development, and sustain the environment, improve GDP growth and people’s affluence. What’s more, given the investment fluctuations brought by macro-regulation the traditional growth pattern is unlikely to produce the desired results in the medium- and long term. Therefore, Gansu should work hard in shaking off its low-level development cycle.

To break away this low-level development cycle, Gansu needs to shift or adjust its previous path considerably. Gansu should pursue a comprehensive target instead of making growth in GDP as the primary goal. If it is required to realize a double-digit GDP growth, it has to build and expand big projects, and enlarge the production scale. The energy, material resources and financial strength of the government and the whole society will be sapped by this vicious circle. This will not only be subject to the restrictions of the macro economic background, but leaves less room for adjusting the industrial structure, achieving industrial diversification and developing unique economic sectors, and upgrading technological content of products.

Through development during the 10th five-year plan period, it’s time for Gansu to adjust its development strategy and concept. Many other provinces, districts and municipalities are adjusting their development concept against the new macro economic backdrop nationwide. Serious thought should be given to how to identify Gansu’s middle- to long-term development goals, including what and how to develop, and what kind of province Gansu should be. The 11th five-year plan period should be a transitional time for Gansu.

2.2.2 Choose a Diversified Path Combining both Internal and External Forces

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perspective of sustainable and substantive earnings, people’s affluence in particular, means that high GDP growth does not bring a corresponding degree of improvement in people’s income and substantive welfare. As Gansu’s primary goal was to pursue ultra-speed growth of GDP and increase of fiscal revenues, it has to persistently depend on large-scale expansion of existing energy-intensive and highly-polluting industries. Meanwhile, large-scale construction and expansion of these industries is subject to the country’s stringent macro-regulation, such as regulation on capacity surplus, energy conservation and pollutant discharge reduction. This poses huge risks and substantial fluctuation in investment. Such an approach to expansion will cost resources and environment dearly, making its natural conditions impossible to sustain. Moreover, such expansion generates very limited employment opportunities and fiscal revenues, and therefore little substantive earnings for the general public. In general, the low-level development cycle ends up exacerbating Gansu’s structural problems, unable to sustain its development.

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Gansu should also make use of external forces to break its own vicious cycle of growth. According to the “gasket theory” of development economics, modern economic activities are composed of many links, which are highly complementary to each other. If any link goes wrong, the whole economic system might get bogged down (see research findings on the international cases). This theory illustrates the mechanism for the formation of low-level trap, implying that being open to the outside world, such as attracting external capital, is a potential channel to break internal vicious cycle.

Therefore, Gansu needs a diversified development road to mobilize and make use of various development factors and potential strengths. This development path is chosen with the medium- and long-range effect in mind, and it may not produce immediate impact. However, a diversified development path that focuses on long-term development and combine both internal and external forces will help Gansu shift away from low-level development cycle to a virtuous one. “External forces” refers to not only the Central Government’s support and fiscal transfer payment, but capital and human resources from outside. Diversified path means the combination of building up the province and enriching its people, pursuit of the means to rapidly boost social development, performance of its main functions and diversification of its industrial structure. This new path can be generalized as being enriching its people, building up the province and pursuing diversification. The focus is to make Gansu’s social development and public services reach the national average in a short time.

**2.2.3 Strategic Goals**

To scientifically identify Gansu’s future development goals is to define what province Gansu should build itself into and how to accomplish it.
As mentioned above, our country’s development focus in the new era under the guidance of the scientific outlook on development brings both pressure and opportunities to Gansu. It comes under pressure because it has to transform its past economic development mode and boost its development. Meanwhile, as many other regions in the country are also facing problems in strategic adjustment and transformation of growth pattern and the state has decided to optimize land development based on key function-oriented zoning, this also presents opportunities for Gansu. We can say Gansu has exploited this round of development opportunities in a right way only when Gansu, by following the transformed development strategy, can fend off future development risks, fully tap its development potential, achieve steady and fast growth of GDP and per-capita GDP and rapid improvement of social development and benefit all the people. Gansu’s development strategy focuses on how to achieve fast and sustainable development in this less developed province. The key is how to stay away from low level economic growth and fend off this vicious cycle. Through analysis of the country’s macro development momentum and Gansu’s development foundation, problems and opportunities, Gansu should identify its future development goal as giving play to its diversified strengths and potentials and building a unique and balanced sector structure and dynamic economic system. In this process, while extending the industrial chain and improving technological content in the already strong sectors like petrochemicals, non-ferrous metallurgy, and iron and steel, particular attention should be paid to fostering industrial sectors such as equipment manufacturing, bio-industry (including special planting, animal husbandry, processing of farm and sideline products, planting and development of herbs), tourism, business and logistics, and developing them into new economic growth points. Some of them may take 10 to 15 years to become Gansu’s new pillar industries.

Figure 0-2  Basic Thought and Framework of Gansu Province’s Development Strategy
Extend advantages aiming at sustainable development

Promote industrial diversification by

Promote social development by

Build up development capabilities through

Adjust Strategic Thought

• Try all means to shed low level development cycle

Shift 1
Focus will be shifted from economic growth to scientific

Shift 2
Shift from scale expansion in a few industries to

Shift 3
Enriching the people will be put before strengthening the

Shift 4
Shift from natural resources development to

Identify Strategic Goals

• GDP growth rate, urbanization rate and speed, per-capita GDP
• Diversification of industrial structure
• Goal for social development (main indicators will reach national average by 2020)

Four Strategic Choices

Extend advantages aiming at sustainable

Promote industrial diversification by

Promote social development by

Build up development capabilities through

Strategic Supporting Measures and Major

Needed Support from the Central

• Address backward basic public services
• Set up a pilot zone for harmonious development between man and nature in Hexi Corridor

Main Strategic Measures by the Provincial Government

• Improve communications with main population and industrial cluster zones
• Focus on promoting Gansu and luring

Macro Background

• Main theme of scientific outlook on development
• Marketification and economic globalization

Natural Conditions

• Fragile ecological environment
• Serious shortage of water resources
• Little area suitable

Development Momentum

• Transition from the initial period of industrialization

Positioning of Functions

• Ecological security guarantee
• Economic and cultural

Main problems

• Acute structural problems
• Local economic development is lagging behind
• Incompatibility of

Shift 1
Focus will be shifted from economic growth to scientific

Shift 2
Shift from scale expansion in a few industries to

Shift 3
Enriching the people will be put before strengthening the

Shift 4
Shift from natural resources development to
In pursuing industrial diversification and bringing economic growth onto a sound track, Gansu should, with the support of central fiscal transfer, waste no time in reaching the national average in terms of social development, particularly public services, infrastructure, ecological construction and environmental protection. Specifically, people’s diet, transportation, education, healthcare and environment should reach the national average as quickly as possible. In addition, to perform its strategic functions in the country should also be one of Gansu’s future goals.

In general, Gansu will build itself into a region with many economic growth points and sustainable vigor through 5 to 10 years’ development. The development goals in the main fields are as follows:

- **Sustainable and sound economic growth will be pursued.** During 206 and 2020, a reasonable economic growth rate will be maintained and annual average GDP growth will be kept around 7%. If population migration is taken into account, by 2020, Gansu’s per-capita GDP will amount to RMB 23,000 Yuan, or $3,000 at the current exchange rate, the benchmark of a moderately prosperous society in an all-round way.

- **In terms of industrial restructuring,** a solid foundation will be laid during the 11th five-year plan period, progress achieved during the 12th five-year plan period, and breakthroughs made during the 13th five-year plan period. By 2020, the proportion of the seven energy and raw materials sectors in the industrial added-value will fall from 3/4 to less than 1/2. Sectors like equipment manufacturing, bio-industry, tourism, business and logistics will become new competitive industries.

- **With the support of Central Government’s fiscal transfer payment,** the major indices of social development (urbanization rate excluded), including per-capita education, healthcare and social security, clean drinking water, urban sewage and garbage treatment, and road conditions, will reach the national average by 2020, so that all people in Gansu enjoy the same basic public services as other regions.

- **Urbanization process will be actively and steadily promoted,** and important progress will be made in the new countryside construction.
The national average should not be pursued blindly in terms of urbanization rate. Rather, the human settlement suitable for Gansu’s natural conditions will be selected in a scientific and rational manner. By 2020, urbanization rate will reach 42%, with annual average growth at around 0.8%. Meanwhile, major indices of new countryside construction will reach the national average.

- With the Central Government’s support, great efforts will be devoted to the protection and construction of ecological environment so that ecological degradation will be reversed and important progress made in ecological restoration of some key areas by 2020. In particular, the grassland degradation in the south of Gansu will be fully brought under control with the balance of grass and livestock and restoration of ecological functions. Water resources in the Hexi area will be subject to rational use and scientific distribution, and the trends of desertification will be kept in check to achieve basic harmony between human activities and nature.

2.3 The general strategy and restructuring orientation

To achieve the above strategic goals, in the near future Gansu should adjust its development path. The general strategy in the given period should be a “diversification development strategy of enriching the people and strengthening the province.”

- Grasping the development trend of the nation and the region, Gansu will make necessary adjustments to its past development strategy and path according to the situation of the nation’s macro-development, and achieve balanced socio-economic development through diversified means. The past development path which relied too much on simple scale expansion of energy and raw materials industries will be reversed, and a new development idea featured by enriching the people and performing strategic functions will be identified. Both practical and potential advantages will be brought into full play, and a series of measures for strategic restructuring in the industrial chain extension and the deep-processing value-adding, diversification of industrial
development and development of human resources will be taken according to Gansu’s local conditions. Meanwhile, it will give play to its strategic functions in the country, seek for the restructuring of relationship between the central government and the local ones, and win more support from the nation to reach the national average in terms of its social development in a short time.

Therefore, Gansu needs to propel four transitions: 1) the transition from taking the economic growth as the core to pursuing all-round and scientific development by giving rein to the multi-strategic-functions; 2) the transition from giving priority to the scale expansion of minority of industries to adopting the sustainable development pattern of diversification; 3) the transition from giving priority to “strengthening the province” to pursuing the objective of combining “enriching the people” with “strengthening the province”, with the former as the priority; 4) The transition from relying mainly on natural resources exploration to emphasizing on the personnel resource development.

2.3.1 Transition from taking the economic growth as the core to pursuing the scientific development, striving to give play to the multi-strategic functions

This is a restructuring and even a transition of the development concept. The underdeveloped areas have long been striving for expanding and strengthening the economy to catch up the developed areas in economic strength and per-capital economic indicators. However, due to the economic globalization and different foundation and conditions for development in different regions, there is an inevitable gap in economic development among the eastern, central and western areas. The rapid development and industrial structure upgrading in the eastern coastal areas and the three metropolis economic regions had close relations with their locations, and, to a considerable extent, largely benefited from the economic globalization. The development in those areas conformed to PRC’s strategic and long-term interests. But, it is not always good for the underdeveloped regions to follow the developed ones in economic development.

As PRC has entered a new development phase and changed the strategic guidance, there will be more possibilities for the regions to choose their strategies. It gives no
cause for more criticism for the regions that universally pursued the GDP during the period in which economic growth was regarded as the core. It was politically and economically reasonable that the underdeveloped regions adopted such a pursuing strategy, particularly, when the central government could not effectively regulate the development among those areas for reason of inadequacy of its controlled resources and the decentralization of the right for handling the local affairs. It was exactly reflected in Gansu’s strategy in the past time. Nevertheless, with the changes of macro background and the situation, the underdeveloped provinces like Gansu have been offered more strategic choices, especially in the equalization in trying for social development and public services. Gansu should seek the substantial welfare development, which is not completely equivalent to the GDP growth.

With the guidance of the scientific outlook on development that stresses the new views on evaluating officials’ performances, ideas about controlling major function-oriented zones and equalization of accessing to the public services, Gansu can get rid of the influence of “pursuing strategy” mentioned above, and has more resources to be used to establish the diversification development strategy. The core of the strategy represents the sound and rapid development with Gansu’s characteristics. In other words, the self economic development, the major functions and the social development will be of equal importance. Giving an active play to the major functions in the whole national development will be an important part of restructuring of development strategy of Gansu Province. Meanwhile, it should be recognized that implementation of the diversification development strategy is a process of accumulating and fostering the new advantages for development; we cannot grasp the opportunities without such a process even if we can possibly meet a historic opportunity. The economic takeoff of California, USA, well proved that.

From long-term of view, there will be no great change in the development situation of Gansu if the local economy or the private economy cannot be developed. At present, situation of surplus of energy and raw materials industries is coming into being, resulting in the risk of production surplus and price fall. Suppose the fiscal revenues glide down because of declining in energy and raw materials industries, and local economy cannot be developed, Gansu will be facing more difficulties. Therefore, attention should be paid to the local economic development, instead of only relying on
the expansion of few big enterprises in several industries to pursue the rapid GDP growth.

2.3.2 Transition from giving priority to the scale expansion of few trades to sustainable development pattern featured by diversification

PRC is now the biggest producer of raw coal, steel, metal aluminum, cement, chemical fibre in the world, with production capacities of petroleum processing, ethylene, chemical fibre, being in the front rank of world producers. It is difficult and risky for PRC to continue expanding cosmically the scale of energy and raw materials production. This is severe problem whether it is for the country or for Gansu. In addition, with the expansion by a large margin of these sectors, the import volume of raw materials and ore is getting larger and larger, leading to an increasing risk in resource security. For example, PRC’s import volume of iron ore reached 355 million tons in 2006, becoming the biggest importer of and the largest country demanding iron ore in the world. Because of lack of right in determining the international price, the iron and steel industry of our country will be confronted with the short supply of the iron ore for a long time, and crude oil, alumina will mainly rely on the international market.

The circumstances being so, the several industrial sectors that possess certain advantages, such as iron and steel, petroleum processing and petrochemical industry, non-ferrous metals, are confronted with the problem of macro regulation, and the short supply of raw materials and ores for the further scale expansion. Especially, due to the long distance transportation of raw materials and the finished product markets far away from the producing places, Gansu faces a more severe competitive market compared with the eastern and central regions, which causes big risk in constant scale expansion. Supposing restructuring, innovation and improvement in competitive technology-based products can be conducted, the space for the industries will be getting smaller, and then influence the whole sustainable economic growth of Gansu.

In addition, the existing preponderance sectors of Gansu are all energy-consuming industries with high pollution and high emission, whose constant scale expansion must come into conflict with the objective of energy conservation and emission
reduction. Though advanced technologies could be adopted to reduce the energy consumption and emission, the objective of energy conservation and emission reduction can hardly be achieved if the scale of total amount is expanding constantly,

Accordingly, the focal point of industrial development of Gansu should be shifted from relying mainly on expanding production scale to relying on improving product quality and the competitiveness, and should realize the industrial development of diversification, and expand the market space through utilizing one's own relative advantages and developing the existing industry. Centering on expansion of industrial chain, establishment of the related industries, and the potential superior resources, Gansu should expand the supporting areas according to the relations among the industries.

2.3.3 Transition from “strengthening the province” as the priority to combining “enriching the people” with “strengthening the province”, with the former being first.

Taking “enriching the people” as the priority instead of pursuing the GDP growth and increasing the economic gross represents a fundamental transition. The pillar industries in Gansu that were established in the past have aimed to increase GDP, GDP rate and financial tax revenue. Though some major industries have been built up and some big projects have been carried out, improvement in finance and the living standards of the people, especially the farmers, has not been achieved as expected. Therefore, Gansu should increase manpower and material resources in such industries as the big agriculture and service trade, making the masses of common people receive benefits, so that increasing of the whole province’s economic strength will be combined with promoting the affluence of the people.

The strategic choice of “enriching the people” is the focal point of the development strategy of Gansu Province, which can be implemented with Gansu playing a major role. Some distinctive industries with sound foundation and strong competitiveness should be identified according to the guidance of “the Western Development Project”. Gansu should put the agricultural and rural development in the important position, strengthen such service trades as the tourist industry, logistics industry, etc., actively
organize transferring the rural labor force to industries, and develop private economy, and advance urbanization and especially the development of metropolitan economic zones. In order to identify the distinctive and preponderant industries, the government should properly change the thinking in the past, work out the development orientation of “enriching the people first, the province second” according to the realistic situation of different trades and different levels, and vigorously develop the industries that are propitious to increase employment and labor’s income, and at the same time, create advantageous precondition for accumulation of capital.

To realize the goal of “enriching the people as the priority”, first place should be changed from the central-enterprises–based economy to the local and municipal economy. The municipal economy has played an increasing role in the regional economic development. Since reform and opening up, especially for the resent years, many areas have attached great importance to the metropolitan economic zones, established spatial structure system with regional competitiveness. The measures that have been taken included: jointly building up coordination mechanism for economic development by the core city and the neighboring cities, change the “isolated isle economy” in the planning economy period, which lacked the relations between the big cities and the surrounding big enterprises and mines. In spite of the development of big enterprises particularly the central enterprises may help the local increase GDP and GDP rate; it is difficult for them to create the conditions for the local people to get rich if they cannot properly combine their development with the local economy to become a part of the regional economy with local characteristics.

To realize the goal of “enriching the people”; attention should be paid to the non-public economy, especially private development of economy. In fact, private enterprises have already become the main channel for social employment in Gansu. During the “Tenth Five Year Plan” period, because of such factors as the technological progress, reforming system, etc, the employment of state-owned enterprise dropped by a large margin, causing an increase of urban laid-off and unemployed people. The development of private economy helped the enterprises absorb a large amount of employment. In 2005, up to 1.698 million people were employed by the private enterprises, accounting for 45.3% of the total employed in urban areas. And on the contrary, state-run units and collective units reduced 27,300
employees. In the newly employed in urban areas in the whole province, employees absorbed by non-public economy accounted for 97.5%. Therefore, much attention should be paid to the improvement of the investment environment to promote the rapid development of the non-public economy.

2.3.4 Transition from relying mainly on development of natural resources to emphasizing development of human resources

In the past few decades, the economic development of Gansu was mainly centered on the development of natural resources. All the industrial departments, whether the existing dominant industries (such as petroleum processing, petrochemical, non-ferrous metallurgy, iron and steel, etc.) or the distinctive agricultural products and processing which is getting along, were based on natural resources. Certainly, the natural resources exploitation or development and the raw materials are the inevitable choice in the industrialization for many areas. However, Gansu needs to transform the development path of putting natural resources in the first place for the following obvious reasons: First of all, there are no longer advantages in Gansu in the pillar mineral resources of the national economy and the people's livelihood. For instance, such resource reserves as the petroleum, iron, copper, aluminum, manganese, etc. are very limited, and the cost for exploitation of these resources is high. At present, there is a wide gap in petroleum, rich iron ore, copper, bauxite, tombarthite ore, etc. in terms of the smelt capacity, which have relied mainly on the supply from the outside (details are available in the “Report on the development of natural resources and environmental protection”). Secondly, the economic growth excessively relying on the natural development of resources will bring big contradiction with Gansu’s ecological condition. The province does not possess the ecological bearing capacity required by constant expansion of raw material industry, exploitation of the mineral products, and the strengthened agricultural development. Third, the long-standing neglect of human resource development resulted in the low human resource level and irrational structure that failed to meet the needs of the economic development. The common people have not obtained many benefits from the economic growth. In fact, the raw material industries in Gansu based on mineral resources have brought the local people only limited welfare.
As noted previously, the human resources in Gansu is at quite low level in the whole country, and the manpower structure is very unreasonable. It can be shown as the low education level, high illiteracy rate, less manpower capital of entrepreneur, concentration of the professional and technical personnel in the large central enterprises. This is a crucial factor influencing sustainable development of Gansu. On the one hand, technological diffusion and absorbability will be influenced directly by the low manpower capital storage. On the other hand, due to the less developed economy and the unreasonable structure, surplus labor resources in Gansu is rather abundant, which will become the valuable superior resources in Gansu after their quality and skills being improved.

Thus, taking various kinds of measures to strengthen the development of the human resources is a key link of the adjustment and transition of Gansu’s development strategy. The development of human resources, as a long term process, should be regarded as the accumulation of the capacity and conditions for sustainable development. Probably, human resource development can not make much contribution to the quick rise of incomes for a long time in the future; however, it will help the regions take-off when their capacities and conditions are accumulated to some extent and met with proper historic opportunities. Gansu has a lot of works to be done in basic education, vocational education, employment retraining, concept and idea custom transformation and talent's policy, etc.

2.4 Strategic choice

To realize above-mentioned strategic transitions, Gansu should deal with properly the relationship between strengthening the existing advantages and fostering the new superior industries, between natural resource development and manpower development, and between the ecological functions and socio-economic development. Furthermore, Gansu should take into consideration “increasing employment and enriching the people as the core factor” in the process of fostering the new industries. For this reason, Gansu should consider implementing the following four strategies: 1) strengthening and extending the existing major industries to achieve sustainable competitiveness; 2) accelerating industry's diversification through excavating and giving play to the comprehensive advantages; 3) positively giving play to major
strategic function on ensuring national ecological security and, 4) accumulating capabilities for development with human resource development.

2.4.1 Strengthen and extend the existing preponderant industries to achieve sustainable competitiveness

The existing leading industries of Gansu, especially petroleum processing and petrochemical industry, non-ferrous metallurgy and iron and steel industry, as the main source of the fiscal revenues of Gansu at present, have certain advantages in the northwest region. Faced with the pressures from macro regulation, raw material supply, and energy conservation and emission reduction, the above-mentioned industries still need to be developed to some extent in the near future in order to avoid the economic fluctuation by a large margin. However, the development, no longer taking expanding the output as its main task, should regard sustainable competitiveness as the goal, accelerate the adjustment of product structure, improve product quality, and promote the technological level of production. The work should be emphasized on construction of the downstream industrial chain of the petrochemical industry, the upgrading of products and technology of the iron and steel and iron industry and non-ferrous metallurgy, and the development and utilization of the new energies.

Facing the gradually saturated market and the severe macro regulation, in the course of continuing to strengthen these major industries, Gansu should give special consideration to the possible changes of the macro situation and market condition. Gansu should pay special attention to the declining period that is possible to come, in which the market will be saturated and consequently the competition will be cruel, rather than keeping itself staying in the expansion period of energy and raw materials industries, which came with the first industrialization of heavy industry and characterized by increasing demand, raising price and high profit. Only when the industries can survive in the declining period, can they really possess competitiveness. Of note is that the development momentum of Gansu’s industries which have been well developed in the resent years was closely related to the market environment, where energy and raw material industries expanded as a whole. The main problem of strengthening these industries is how to establish the follow-up advantages as soon as
possible through the capital accumulation in the expansion period, so as to conform to the changes of the market environment and the requisition for macro regulation.

To form the sustainable competitive strength, Gansu should fully consider its geographic conditions, especially the factor of the freight charges, including raw materials (ore) transport and products transport. Under the environment of harsh competition, the factor of the freight charges may influence the existence of enterprises. In order to overcome the unfavorable conditions effecting transportation cost, Gansu should explore various kinds of advantage factors, such as unique distinctive products, advanced crafts and other low-price elements, etc. Among them, it is a key link to strengthen the technological innovation capability of enterprises.

To strengthen the competitive capability of the existing preponderant industries, Gansu should also pay attention to promotion of forming relevant industry's networks which include forming strategic alliances to develop new products to extending of industrial chain, etc. As establishment of industry networks involves different departments, enterprise of different ownership and different levels, it needs the strategic coordination of the provincial government, and especially needs close ties and communications with the parent companies of every large central enterprise, such as Chinese Petroleum and Chinese Aluminum, etc.

In addition, strengthening the existing advantage industry also needs to improve the geological prospecting of relevant resources, particularly the oil gas and coal resource in Qingyang (Including coal bed methane) and non-ferrous metals mines in the central-western section of western Qinling Mountains and Qilian Mountains, so as to verify the data of reserves as soon as possible and increase the capacity of the local resources to ensure development of the relevant industry.

The development orientation of strengthening the main existing industries is:

- Petroleum processing and petrochemical industry. Gansu historically had crude oil processing capacity of 14.5 million tons. The province however now relies on the oil supply from outside due to a lack of its own petroleum resources. As such it is unrealistic to continue expanding oil refining capacity in the province by a large margin. The scale of existing oil refining can ensure
the need of raw materials of the project of 800,000 tons of ethylene. The emphasis of the future development should be the extension of the downstream industrial chain. Ethylene and its downstream product processing can bring a huge industrial chain, including plastic products, fibre and textile products, chemical products, rubber and its related new materials, medicine, dyestuffs, coating, etc. Lanzhou has already taken action to some extent in development of the downstream industry with the cooperation of China Petroleum. The major products to be developed include: high hydroscopicity resin, steel loading meridian tire, special-purpose plastics, TDI and chlorine alkali, plastic processing and the auxiliary, rubber processing, and propylene acyl amine, etc.

- Iron and steel industry. The Jiuquan Iron and Steel Group in Gansu has already exceeded the macro regulation bottom line (over 10 million tons) through such ways as annexation, etc., being ranked among the enterprises that are supported by the state’s industrial policy. However, we should recognize soberly that the Group’s ability to resist market fluctuations is not strong and in an unfavorable position, regardless of the ore ensuring, products sell radius, or the technical level that is still out of the national advanced rank. Facing the difficult situation of a capacity surplus of iron and steel industry of the whole country by a large margin and short supply of the ore, the Group is confronted with a severe challenge. Hence, Gansu should be very cautious in continuing the expansion of the scale of iron and steel industry, and should be even more cautious in developing the products mainly marketed in the eastern regions such as electrical home appliances, automobile sheet and ship board, etc., though we can technologically produce these products and gain profits for the moment. Main material resources and financial resources should be shifted to product upgrading and technological innovation, especially the development of the different products.

- Non-ferrous metallurgical industry. In 2005, the production capacity of ten kinds of nonferrous metals in Gansu reached 1.05 million tons, among them, the output of electrolytic aluminum was about 570,000 tons, but the aluminum material was less than 40,000 tons. At present, the electrolytic aluminum is the main target of the state’s macro regulation. Though the aluminum industry of Gansu has already joined the Chinese aluminum
industrial company, there will still be no possibility of expanding the scale of output under the macro regulation. Therefore, the focal point should be the development of the follow-up industry. The difficulty is that market of aluminum material is mainly in the eastern and central regions, and the volume of the most aluminum materials is relatively large, leading a high cost for long-distance transportation. Thus, aluminum material processing of Gansu must take the way by using high and new technologies. Gansu has an obvious long-term advantage in the nickel industry. However, the nickel industry chain is relatively simple, both horizontally and vertically, so it makes less contribution to the regional economic development compared with such industries as iron and steel, and petrochemical, etc. At present, the Jinchuan nickel base has 110,000 tons of capacity, mainly supplying Taiyuan Iron and Steel Co., Baoshan iron and steel plant the nickel materials for stainless steel production. Jiuquan Iron and Steel Group should strengthen the complete network of stainless steel in the future to form the regional advantage --Production and deep processing of the nickel stainless steel.

• New energy. Wind energy resource in Gansu occupies an important status in the whole country, with the exploitable wind energy amounting up to 26.67 GW. With implementation of the state “green” energy quota, Gansu can develop the new energy resources as a major industry. The wind-powered electricity base at the level of MWs could be built up as soon as possible with the support from the related central governmental departments. In addition, taking advantages of the wide but sparsely populated areas where the land is difficult to be used, Gansu should strive to become the state base of nuclear fuel production and nuclear waste material treatment.

2.4.2 Accelerate industry's diversification through excavating and giving play to the comprehensive advantages

Industrial diversification is a process to form new preponderant industries, and it becomes the keystone and nodus of Gansu’s development strategy. Cultivation of the new preponderant industry in any region must be a relatively long course of adjustment, impossible to be accomplished in an action. For the underdeveloped areas lacking resources for adjustment and space for buffering, the industrial diversification
needs even more time and hard struggle. Certainly, the change of macro-development at the present stage has offered the opportunity for Gansu’s industrial restructuring. On the one hand, with the implementation of the scientific outlook on development, every area of our country is faced with the same pressure of transition of development path and restructuring. On the other hand, with the improvement of the per capita income of our country, a great change is taking place in the demand structure, having offered the market condition for rise of the new industry. For example, “green” food, tourism and entertainment, biological medicine, etc. have enormous market potentials.

The industrial diversification needs to excavate potential advantages and to comprehensively utilize various kinds of favorable conditions. The potential advantages may come from new knowledge of the resource advantages, “new products” in the market, and from some trades which are “taking the road of opportunity” (for example, the layout in the commercial network); it also possibly comes from the accumulation of technology and talent, the low-cost production factors, and the establishment of a new commercial brand. The favorable conditions may include: different policy supports from the central government, industrial transition trend of developed areas and the striving for attracting the attention of the whole society, etc.

With the deepening of development of the market-oriented economy the cultivation of the new major industries should be chosen through market mechanism with government’s guidance and support, instead of relying on the government’s administrative strength alone. In this respect, the government's key task is to build a good market and investment environment, namely, through improving the comprehensive investment environment conscientiously, encouraging and hatching local entrepreneurs to start their undertakings, attracting external capital and talent people and realizing industrial diversification progressively. On the one hand, the government should especially encourage the development of local small and medium-sized enterprises, build the new preponderant industry through the market competition. On the other hand, the government should fully realize the new change of force for local development, actively attract the outside fund, and find the new growth point suitable for the characteristics of Gansu through the large scale of economic circulation. Indeed, it is very essential for the government to put certain
guiding fund to excavate the potential advantages. Gansu should consider establishing an industrial diversification fund, concentrating on supporting one or two new preponderant industries with 2-3 years as a cycle.

The new growth points of key industries in Gansu in the coming 10-15 years include:

- Distinctive agricultural products and agricultural industrialization. The various natural conditions in Gansu are suitable for developing unique agricultural products and its processing industry. They include such famous products and industries as the potato industry in Dingxi; breading, hops and grapes for brewage in Hexi area; grassland animal husbandry in Gannan, etc. By using the experiences in development of potato industry in Dingxi for reference, Gansu should concentrate on building a batch of agricultural industrialization projects with intensive technologies and remarkable benefits; form and expand the advantages in such respects as breading industry, potato industry, vegetables industry, fruit industry, traditional Chinese medicine, beer barley, small food grains other than rice and wheat, lily, day lily, olive, etc.; expand market share progressively; and raise the quality of the products and value. The agricultural industrialization project should be launched in line with the principle in sequence and step by step, concentrating on supporting one or two key industries in one stage rather than reach every aspects of the matter.

- Equipment manufacturing industry. As one of the old industrial bases of PRC, the equipment manufacturing industry of Gansu has rather strong foundations in the following fields: oil refining equipment, petrochemical industry equipment, metallurgical mine equipment, electrical and mechanical equipment, etc., indicating an important orientation of industrial diversification. For example, the Lanzhou Petroleum Group is PRC’s largest base of manufacturing petroleum drilling equipment and oil refining equipment; Lanzhou Electrical Machinery Company is the biggest enterprise in the northwestern region of manufacturing motors and generating equipment; and the Tianshui Xinghuo Machine Tool Plant is an important enterprise in our country for manufacturing horizontal numerical control lathe. Gansu should conform the existing resources and actively advance the technological innovations of existing enterprises, so that they are able to expand and
strengthen advantages in such areas as petroleum drilling equipment, refining chemical equipment, numerical control lathe, electric motor and electrical device, mine and metallurgic engineering equipment, vacuum equipment and wind-powered electricity equipment, etc. It also should introduce strategic investors and private capital to participate in and share the equipment manufacturing companies, and to combine the enterprises that produce similar products and have quite close interrelation. It needs to strengthen enterprise's technological transformation, and transform the equipment manufacturing industry with information technology.

• Biological industry. With the special geographical location and the natural conditions, Gansu is an eminent located for plant germ plasma resources and gene pool, having gestated a lot of peculiar plant resources, According to the investigation, there are 1,527 kinds of medical plants, animals and minerals in the whole province, among which 276 belong to national key variety. In addition, Gansu has a quite completed R&D system, having obtained many scientific findings in vaccine, genetic engineering medicine, natural medicine, animal's transgenosis, crops improved variety etc. Therefore, the biological industry should be one of the potential preponderant industries, and the key fields are biological medicine and new medicine (Including vaccine and biological traditional Chinese medicine), the agricultural biological technology industry (like technology of taking off poison from poisonous plant, and plant cell engineering) and the industrial biology.

• Tourist industry. Propelling the tourist as a key industry is not only an important measure for regulation of industrial structure and for realizing diversification, but also an important path for enriching the people, and an important carrier for establishing and propagating the new image of Gansu at the same time. The experience of tourist industry development of California of U.S.A. has fully explained this (See international case research). In developing tourist industry, the government needs to consider its comprehensive, long-term benefit instead of the short term return as the decision basis.

• Trade and business logistics industry. The service trade, as a strategic commanding point of modern economic development, can greatly reduce the pressure of the resource environment, and increase employment. Quickening
the development of service trade is the important approach to boost the economic structure regulation and to accelerate the transformation of economic development pattern. Being the capital of Gansu Province and the important commercial center in the northwestern region, and with the quite strong geographical location advantage, Lanzhou can promote the development in the neighboring cities and counties, and offer good primary conditions for developing logistics service and commercial chain. In addition, with the opening of the Qinghai-Tibet railway, Lanzhou is in the front of the supply base of Tibet Autonomous Region. Lanzhou should pay attention to the construction of various kinds of professional chain stores in the field of circulation, catch the opportunity and build up the commercial logistics network, so that the network advantage could be established. Accordingly, efforts should be made to build and improve such logistics services links as home-delivery center of the logistics, regional freight transport center, warehousing and transport center, etc. Furthermore, attention needs to be paid to the application of e-commerce and the rearrangement and specialized transformation of assets of logistics and commercial chain enterprises.

2.4.3 Positively give play to the priority strategic function of ensuring national ecological security

It is an important component of the development strategy of Gansu to give play to the strategic function of ecological security. As Gansu is a relatively fragile province in ecology system in PRC, it is difficult for many areas in the province to bear the high strength economic activities, even worse in areas of Hexi, Gannan and Loess Plateau. How to realize harmonious development between man and the nature, as a core question of sustainable development of Gansu, concerns not only existence condition of Gansu, but also the ecological security in the northwest and even the northern areas.

It should be aware that the development and welfare of the specific areas of the country as an organic integrity might not always be realized through its own economic growth. People gradually reach the consensus that a different area in a country has different function in the development course of the country. By
exchanging the different functions (such as ecological compensation), some areas can obtain the resources of welfare for their development. The thinking of “major function zone” proposed in the “Eleventh Five Year Plan” has already offered the new strategic choice for regional development. Though the Zones at the state level still in the course of planning, and concrete measures and scheme are being explored still at the experimental stage, the strategy will undoubtedly be put into effect gradually because the policy orientation accords with the requirements of the scientific outlook on development.

Under such a general policy frame, Gansu should actively explore the system and mechanism innovation, give play to the major function in the national ecological security, play the exemplary role in harmonious development between man and nature, and implement important action project to obtain the necessary resources for accelerating social development. In view of the particularity of development condition, Gansu should take the tactics of initiative, instead of simply waiting for the state plan to be published. As the resources for regulation is limited and the means for regulation are still in experiment stage, it can be predicted that the “major function zones” at the state level, which are being planned by the central government, wouldn’t cover much wide areas for the moment. Therefore, Gansu should actively make use of a variety of available resources and channels, give play to the major function of ecological security as soon as possible, and make a marked advance.

On the one hand, it is necessary to do so according to the ecological situation of Gansu. Gannan area is facing a very severe situation of grassland degradation and declining of water conservation. In Hexi area, the existence conditions have already been seriously influenced by the glacier degradation and the increasing desertification in the drainage basins of the inland rivers. If Gansu can not carry out a comprehensive and large – scale renovation to restore the ecological environment, higher and higher coast must be paid to do the same thing in the future, and the ecological degradation will be possibly taking place in some areas that is difficult to be reversed and will influence human existence. This is so severe and important that it became a problem of Gansu for which Premier WEN Jiabao showed his special concern during the “Two Conference” held in 2006. On the other hand, if Gansu can go ahead of other provinces and regions, it may offer a foundation of the “plan of the state major
function zones” for the “Twelfth Five Year Plan” period even for the longer term.

There are some complicated causes behind the ecological problem in Gansu (See also “Ecological Protection and Construction”). First, the natural foundation is rather fragile, resulting in the poor ecological capacity to resist perturbation in a lot of areas. Second, the lasting population increase and the extensive and backward production mode have made too big pressure to the ecological environment, causing the serious ecological degradation. Third, there exist some problems in policy and system, aggravating the ecological degradation. Therefore, it is difficult to get an effective result only by taking one or two measures of renovations; instead, it needs to make comprehensive efforts in such respects as ecological construction approach, population management, reform of production mode, poverty alleviation, system and mechanism, etc.

To deliver ecological security, besides continuing implementing the existing ecological construction projects, it needs to set up as one or two important comprehensive action plans aiming at the most serious problem areas. In this respect, special attention should be paid to Gannan and Hexi, which are of great importance to ecological security, of Gansu and the Nation. For this reason, Gansu may setup of two important action plans, namely, “The Water Sources Protection Project in the Upper Reaches of the Yellow River” and “The Hexi Corridor Comprehensive Reform Experimental Zone for Harmonious Development between Man and Nature”, ( See also “Support measures and key action Plans”). Additionally, efforts should be made to prevent the soil erosion in Loess plateau.

2.4.4 Accumulate capabilities for development with human resources development.

The sustained social economic development of Gansu is restricted by the two vital factors, that is, the poor human resource base and irrational structure. Therefore, increasing the strength of human resources development and accumulating the sustainable development capability constitute an important component of regulation of Gansu’s development strategy. These are closely related to the improvement of the investment environment, and the foundation of strategy of “enriching the people”.

96
Gansu should be well aware that human resource development is an “energy” accumulation process to prepare the conditions for grasping the potential opportunity. As it cannot produce an immediate comprehensive effect on the socio-economic development, it should be regarded as the process of long-term “accumulation”.

The manpower capital structure showed that Gansu lacks entrepreneurs. However, increasing the Human capital of entrepreneurs mainly relies on cultural tradition and on the investment environment. Assuming the investment environment is improved, not only will local entrepreneurs come to the fore in larger numbers, but also the outside investors would be attracted. Hence, with regard to the development strategy of the human resource, the important thing is to improve the quality and skills of the labor force and to attract and appropriately utilize the skill set of the scientific and technological personnel.

Since implementation of the Western Development Strategy, Gansu has recognized the importance and urgency of developing its human resource capability. Gansu has begun to take a series of measures and put in place policies to propel the human resource development and has achieved positive results. The quality of the labor force has considerably improved and the employment opportunities for the surplus labor force in the rural areas have developed rapidly. However, the human resource development in Gansu is just at its initial stage and is manifested in such aspects as the lower per capita school life expectancy, high illiteracy and semi-illiteracy rate and lack of talented personnel at various kinds of level. Although the provincial government has realized the importance of development of human resources, there is no effectual institutional arrangement to promote this work.

It is generally deemed that human resource development in broad sense includes three levels. First, it means the development of the general human resources such as labor force floating, training and employment. Second, it means the development of human resources of the professionals, such as higher education, special skill, etc. And third, it means development of talented personnel such as the fostering of various kinds of the heads in certain areas. In recent years human resource development in Gansu has made markedly progress in basic education, labor floating, basic employment. At present, the situation of employment in Gansu is considerably steady, with a large
value of export of labor services, and the primary education is developed quite rapidly. However, from a long-term point of view, there are some problems such as the unqualified human resources, incompetence for adapting the changing market, seriously inadequate talented personnel, etc. Therefore, a transition should be made from general human resource development to the professional one, and attention should be paid to improving the quality of the workforce and fostering the professional techniques.

**Section 3 Supporting Measures and Major Action Plans**

Given PRC’s current fiscal system and its development level, Gansu cannot single-handedly adjust its development strategy and therefore requires great support from the Central Government. Of course, instead of entirely counting on the support of the Central Government for the adjustment of its development strategy, Gansu should take the initiative and launch the diversification strategy of enriching the people and strengthening the province at an early date.

3.1 Special Support Needed from the Central Government

It is the strategic goal of the nation’s development in the new period to build a moderately prosperous society in an all-round way and a socialist harmonious society, the core of which is to make sure all regions and strata can share the benefits of economic growth equitably. Gansu province requires special attention and support from the nation in building a moderately prosperous society in an all-round way.

As a multi-ethnic province with poor natural conditions and underdeveloped economy, Gansu has the GDP per-capita that has been ranking the last but one nationwide over the past few years which is just slightly better than Guizhou Province. In terms of its composite indicator, its living standard per-capita has been listed No.3 from the bottom, with only Tibet and Guizhou behind. Among the 83 districts and counties in the whole province, 48 are state-level impoverished counties with about 1.6million people still living below the poverty line. In addition, ethnic minorities account for 9% of Gansu’s total population, quite close to 10%--the benchmark of minority autonomous regions. Due to the slight gap, over 2million people of ethnic minorities
in Gansu province fail to enjoy special support from the Central Government. As a result, the Central Government should pay particular attention to the development of such a province in building a moderately prosperous society in an all-round way and a harmonious society. Without addressing Gansu’s problems, we cannot truly attain our strategic goals nationwide.

The analysis of this study shows that Gansu’s development problems are caused by a combination of factors. One important factor is poor natural conditions, which cannot be easily changed by man. What’s worse, many areas of Gansu province face tremendous population pressure, leading to acute conflict between man and land. It is a province that needs the support and attention most and it faces more difficulties than any other province except Guizhou in southwest PRC While its population (26 million) is nearly 5 times that of Qinghai, more than 4 times that of Ningxia, and bigger than Xinjiang, Gansu’s per-capita resources are far below them. And its per-capita financial support from the Central Government is relatively low compared with Qinghai, Xinjiang and Ningxia.

Therefore, the distinctiveness of Gansu merits more attention from the Central Government and the whole society. Over a period of time, as a typical example of underdeveloped provinces, Guizhou has drawn wide attention from the whole society and the Central Government. In contrast, while Gansu is on a par with Guizhou in terms of development level and difficulties, its underdevelopment has been masked by the performance of several large central enterprises. Due to shift in the nation’s development phase and strategic goals, it is high time the Central Government paid more attention to Gansu’s underdevelopment. Special support should be given to Gansu to help adjust its development strategy and realize comprehensive and sustainable socio-economic development.

3.1.1 Help Gansu improve poor public services

Equalization of accessing to basic public services is a major strategic task put forward at the 6th Plenary Session of the 16th Central Committee of the Communist Party PRC (CPC), and is essential to the building of a socialist harmonious society. Over the past few years, Gansu’s various public services have been lagging behind and ranking
increasingly behind. Its basic education, social security and public safety come in No.28, No.26 and No.27 respectively in the country’s league table; and investment in infrastructure and environmental protection the last. This should not only arouse the attention of Gansu, but that of the state. Given its weak financial strength, Gansu cannot improve its public services in a short time by relying on its own efforts. Therefore, the Central Government should step up support for Gansu to ensure equal access to basic public services nationwide.

As required by the building of a moderately prosperous society in an all-round way, by 2020, the gap between Gansu’s per-capita financial strength and the national average will be reduced significantly, the available public services will be roughly equal to those of other areas, and public finances will cover the rural areas. To attain this goal, the Central Government needs to increase transfer payments and take into account per-capita financial strength in doing so. In 2005, Gansu received only RMB 4.358 billion Yuan general transfer payment, or 14% of the total it obtained from the Central Government, exerting very limited impact on Gansu’s development. The Central Government should straighten out special transfer payments, initiate a special transfer payment for turning into major function-oriented zones, and standardize distribution methods and procedures and improve local supporting measures. The Central Government should also push forward the legislative process for transfer payments, providing institutional guarantee for building a moderately prosperous society in an all-round way and a socialist harmonious society.

3.1.2 Step up support for Gansu’s major infrastructure construction and environment control

In the building of major transportation lines, the contribution of the Central Government should be raised to help Gansu improve its transport infrastructure. Despite large-scale construction since the Western Development Strategy was implemented, Gansu’s transportation network is still lagging behind even in northwest PRC, and is in bad need of the Central Government’s support to accelerate the construction of transportation infrastructure. As the main passageway leading to Xinjiang, Gansu has to sustain big transit traffic flow. But due to complicated topographical conditions, high construction costs and poor economic strength, the
construction of Gansu’s transportation network is not progressing as quickly as other regions, and therefore needs more support from the Central Government. What’s more, based on PRC’s current construction scale, quite a few towns and townships will not have access to tar roads by the end of the 11th five-year plan period. It is suggested that the state should expand the scale of construction of roads leading to towns and townships during the 11th five-year plan period to address this problem.

Owing to the features of its industrial structure, Gansu faces a tough challenge in fulfilling the targets in energy conservation and emission reduction. All Gansu’s large state-owned enterprises (SOEs) in the energy and raw materials sector, established with heavy investment from the Central Government during the planned economy period, have made an immense contribution to the country’s overall economic development. During the shift to market economy, these enterprises have gone through a rough time. Only in the past few years have they gained some degree of market competitiveness. They are more than willing to fulfill their obligations in conserving energy and reducing pollutant discharge, but their technologies fall short. For that reason, the Central Government should grant discount to Gansu’s large SOEs for technological upgrading in energy conservation and emission reduction, and help them adopt those key technologies as soon as possible.

3.1.3 Set up a “comprehensive pilot zone for coordinated development between man and nature in Hexi Corridor (Gansu Corridor)”

Hexi area is an important economic and cultural passage in northwest PRC, but faces grave crisis for sustainable development. Without handling properly the relationship between man and nature, this zone may gradually lose ecological conditions for human survival and thus turn into the second Loulan kingdom, which disappeared forever in desert. In view of its importance geopolitically and economically, the sustainable development of this zone deserves more attention from the Central Government. To set up a pilot zone is an important means to explore the mechanism of the coordinated development between man and nature, and to improve its sustainable development capacity.

The issue of Hex’s ecology has attracted attention from all strata of the society over
the years. A lot of research has been conducted on several inland rivers, and a number of ecological projects have been implemented with the state support, mitigating the ecological deterioration. However, the results show that to harmonize relationship between man and nature requires not only scientific understanding and implementation of projects, but also institutional innovation. It involves exploration and reform in many aspects including administrative system, water right system, ethnic issues, catchments management, population management, fiscal system, investment and financing system, and urbanization pattern. Such pilot reform cannot be completed by Gansu itself and needs great support from the Central Government.

The main goal of the pilot zone is to explore the means of mutual promotion between ecological construction projects and institutional innovation. Through the pilot zone, a long-term mechanism on harmony between man and nature in Hexi Corridor will be established to enhance its sustainable development capacity and ensure the prosperity and smooth operation of the economic and cultural passage. This pilot zone is not only of great importance to Gansu’s development and stability, but also significant to providing experience for improving guidance and control over restricted development zones of the four major function-oriented zones.

**3.1.4 Carrying out an experiment on the new cadre evaluation system**

The cadre evaluation system should be reviewed. Taking the scientific outlook on development as guidance, the Central Government should conduct trial program of the new evaluation system according to Gansu’s characteristics and its main functions in the country’s overall development. The trial program should play down the evaluation on GDP growth; rather, it should focus on the building of its key functions and on its performance in social development.

We should be aware that a province like Gansu plays a more important role in safeguarding the country’s ecological security and the security of northwest PRC’s economic and cultural passage, and showing its demonstration effect in building a moderately prosperous society in an all-round way, rather than in contributing more economic growth to PRC. Furthermore, Gansu’s natural environment cannot sustain intensive economic growth. Under such circumstances, a new index for performance
evaluation should be put on trial to take away the cadres’ burden for having to deliver high-speed economic growth, so that the scientific outlook on development can be comprehensively and better implemented.

3.2 Major Supporting Measures for the Diversified Strategy of Enriching the People and Strengthening the Province

3.2.1 Initiate the projects of riverhead protection at the upper reaches of the Yellow River and Hexi Pilot Zone

To actively perform its key functions in the country’s development is an important component of Gansu’s development strategy. Gansu province should seek the support of the Central Government in resolving key ecological problems which take a heavy toll on the whole country or the western area, and launch special initiatives for ecological control. On the one hand, it should play its role in safeguarding the country’s ecological security. On the other hand, it should make sure the common people concerned can benefit by performing its key functions. In this regard, besides the projects for reclaiming farmland to forests or grassland and harnessing small watershed on the Loess Plateau, it should also initiate and implement the projects for protection of riverhead at the upper reaches of the Yellow River and the Pilot project for harmony between man and nature in Hexi Corridor.

The Project for Protection of Riverhead at the Upper Reaches of the Yellow River: The five counties including Maqu, Luqu, Xiahe, Zhuoni and Lintan, and Hezuo city in the Tibetan Autonomous Prefecture in the south of Gansu, are important water replenishment area at the upper reaches of the Yellow River. But as a result of climate change, overgrazing and deforestation over the past few years, the ecological environment has been deteriorating significantly. The desertification and degradation of grassland, decreasing wetland and ecological functions, serious wind erosion on sand and soil erosion lead to a drastic weakening of water conservation functions and enormous drop in water supply to the Yellow River. Maqu section is a case in point. Since 1990s, its water supply to the Yellow River has been falling by 25.3%.

This problem, which concerns water supply in the Yellow River basin, has attracted
wide attention from the central leadership, related departments and all walks of life. In illustrating the major function-oriented zones, the 11th five-year plan outlined important water replenishment areas for the Yellow River in the south of Gansu. In the zoning program for major function-oriented areas to be introduced, this area will be listed as restricted development zone. Gansu province has also integrated this area into one of the 10 key projects in the 11th five-year plan period. Of course, as an important supporting action of Gansu for safeguarding the country’s ecological security, the project for protection of riverhead of the Yellow River will not just run through the 11th five-year plan period, but will be carried out as a middle-to-long-term task.

Since western development strategy was put into practice, the Central Government and Gansu have carried out a series of projects for ecological protection and construction in the south of Gansu. However, due to historical arrears of work, big population pressure, underdeveloped economy and limited input, the ecological degradation has not been reversed in the water replenishment area of the Yellow River in the south of Gansu. Therefore, both central and local governments need to invest more, incorporate ecological restoration into Gansu’s medium- and long-term development strategy and push forward this major initiative.

Gansu’s relevant departments have completed the Ecological Protection and Construction Program for Important Ecological Function Zones of Water Replenishment for the Yellow River in the South of Gansu. Its main goal is to balance grass and livestock, restore vegetation, boost water conservation capacity and improve water replenishment capacity, providing guarantee for the sustainable development of the Yellow River area in terms of ecological security. Gansu should persuade relevant state departments to ratify the program at an early date, determine corresponding input amount and mechanism to ensure the program is implemented to the letter, so that the water replenishment capacity in this area can be restored by 2020.

- The Comprehensive Pilot Zone for Coordinated Development between Man and Nature in Hexi Corridor

Hexi Corridor is a unique eco-geographical unit, mainly consisting of oases which depend highly on the ice and snow of the Chilien Mountains. Over the past decades, as a result of climate change, ice and snow of the Chilian Mountains has retreated
significantly, with glaciers today shrinking 2% to 4% from the 1960s and snow line rising by 30 meters. Meanwhile, human activities have contributed to degrading piedmont grassland and falling forest coverage, and declining water conservation function, aggravating the runoff decrease of several inland rivers. And water shortages have increasingly sharpened the conflict between agriculture and industry, upper reaches and lower reaches, and water use for the economy and ecological use. These problems pose a grave challenge to the sustainable development of Hexi Corridor. In particular, the oases in Minqin are degrading at an alarming rate!

To perform its main functions of safeguarding the country’s ecological security, Gansu should seek the Central Government’s approval to set up a comprehensive pilot zone for the harmony between man and nature in Hexi Corridor (hereinafter referred to as Hexi Pilot Zone). Hexi area’s ecological issues are complex and involve various aspects of coordinated development between man and nature, including those concerning projects for water use and protection, policies and mechanisms and multi-ethnic harmony. That is why comprehensive reform and experiment revolving water resources is required, including the channels of ecological construction, mechanisms for water resource distribution, administrative system, water right and exchange mechanism and others.

Hexi Pilot Zone should center on scientific and rational use of water resources and the building of a water-saving society, and aim to step up reform on water right distribution and trading, watershed management and ecological construction mechanism and implement a lot of corresponding ecological construction projects. The overall goal should be to put in place a mechanism for harmony between man and nature, boost Hexi area’s sustainable development capacity and ensure the stability, development and smooth operation of the economic and cultural passage. The main tasks include: building a water-saving society centering on the reform of water right system; improving water resource management system and building a water-saving mechanism featuring government control, market guidance and public involvement; fostering a long-term mechanism for water conservation through exploration and trial of a mechanism for water-saving agriculture, industry and society with the reform of water right system as the core based on the bearing capacity of water resources; assessing the water demand for the security of ecological system and guaranteeing
ecological water use and ecological security according to law.

Over the past few years, the Central Government has implemented a host of projects for ecological control in Hexi area, including the Black River control, ecological and environmental control at Shiyang river valley, project for ecological migration and water diversion project. But due to complexity of the problems, particularly those concerning institutional factors, the ecological degradation in this area has not been reversed, and shift in the source of oases and southward encroachment of desert continue to take their toll. Fundamentally, to halt Hexi’s ecological degradation does not only require ecological projects, but, more importantly, institutional innovation. Therefore, it is an essential component of Gansu’s development strategy to set up such a pilot zone with the Central Government’s support to explore new mechanisms and systems for promoting harmony between man and nature.

3.2.2 Step up Efforts to Reinforce Infrastructure Construction and Improve Access to the Outside World

Infrastructure is not only the basis and guarantee for social and economic development, but also an important symbol of the development level. Developed countries always strike people as having high level of infrastructure. For a region, infrastructure is also a bridge for better access to the outside world, greatly reducing the time cost for communicating to the outside. In an information age and globalizing world, as market competition grows increasingly fiercer, it matters much to the development of a less developed region to bring down the time cost for links to core economic areas or important markets. Despite the marked improvement of Gansu’s infrastructure since the western development strategy was implemented, it is still lagging behind overall, the last one among the five provinces in northwest PRC. Therefore, it is an important goal of Gansu to make breakthroughs and significant improvement in infrastructure construction in the coming decade and beyond, laying a solid foundation for Gansu’s strategic adjustment. At the provincial level, the strategy includes the following tasks:

- Efforts will be stepped up to enhance the construction of main transportation routes. Due to its long and narrow geographical feature from east to west, Gansu has tremendous work to do in transportation route construction. Once
the routes are built, they will serve as bridges for links not only within the province, but in the whole country. In terms of improving Gansu’s geographical position, the projects of three main routes will be a top priority of infrastructure construction in the coming decade. First, up to now, only one highway connecting Ningxia and Inner Mongolia has been open to traffic in Gansu section, but the Gansu section of highway running from Lianyungang in Jiangsu to Horgas in Xinjiang cannot be put to use by the end of the 11th five-year plan period according to schedule, which directly affects the links between Gansu and densely populated areas to its east. The top priority of the infrastructure should be to accelerate the construction speed of this section of Lianyungang-Horgas highway with support from the Central Government. Second, in order to improve links with densely-populated Sichuan, the construction of Longnan-Sichuan highway need to be put on top agenda and be started at an early date so that it can be open to traffic by 2015. Third, more support should be sought from the Central Government to speed up the constratruction of Lanzhou-Chongqing railway so that it can play its role as soon as possible.

- Efforts should be made to improve rural areas’ access to transportation. Road conditions in Gansu’s rural areas are still lagging behind. In 2005, Gansu’s road mileage for per unit national land area was only half of the national average. As all villages are about to have access to roads in the provinces of the east and part of the central areas, Gansu can only ensure all its towns and townships access to roads on the condition of rescinding and merging some towns and townships. Therefore, it is another focus of Gansu’s infrastructure construction to improve rural areas’ access to roads, which is the basis and guarantee for the improvement of public services in rural areas. The improvement of rural transportation conditions should be put before the construction of inter-district highways.

- Endeavors should be made to facilitate widespread use of novel communication facilities and means. New information technology and means are important factors for regional development. Internet has completely transformed people’s means to obtain information and to learn, and promoted the shift in business patterns. In underdeveloped areas, the spread of internet gives the general public, in a great leap forward, the same chance to have
access to information as developed areas. An increasing number of cases show that internet gives people in remote areas more business opportunities. Currently, Gansu’s internet penetration rate is less than 5%, ranking No.3 from the bottom, just before Tibet and Guizhou. The popularization of the internet, particularly in the rural areas, should be regarded as an important element of Gansu’s infrastructure construction in combination with human resource development, in order to improve Gansu’s links with the outside in a leapfrog way. It would be of great significance just like the project ensuring every village access to roads.

3.2.3 Further Deepen Reform and Opening-up, Improve Investment Climate and Promote the Development of Non-public Sector

A sound investment environment is the key to Gansu’s industrial diversification. Most of Gansu’s current competitive industries are SOEs. More often than not, these enterprises have to develop according to the internal corporate governance, such as the company’s internal plan, and thus fail to drive the development of the whole market in Gansu. The awareness of either government departments or the general public has not been fully adapting to the requirements of market competition. One important strategic measure of Gansu’s diversification strategy of enriching the people and strengthening the province is to foster a sound comprehensive investment environment and promote the development of non-public sector.

Reform and opening-up need to be deepened to create a good investment environment. Gansu still has a long way to go to build an investment environment that is compatible with market mechanism. According to the research report on the development of non-public sector, Gansu still has a lot of problems with its investment climate, unable to lure investor. Related survey shows that 32% of the surveyed enterprises are in favor of Gansu’s soft environment. This stems not only from lack of improvement in market system, but from poor efficiency of competent government agencies and socialized services, and low competence of labor force. It manifests itself in: mismatch of policies such as uncoordinated or even conflicting policies between the different segments and superior and lower departments; denial of justice by some administrative departments, including malpractices and abuse of
power; lack of transparency and clarity in the measures to implement laws and policies; irregular administrative approval, which lead to prevalent repetitive and cross law enforcement; underdeveloped producer services and insufficient capacity in credit guarantee, technological support, management consulting, information service, self-employment guidance and employee training.

Improvement of investment climate should start from the reform of the government itself. A project for innovation in government management should be set up to accomplish the primary goal of building up a brand-new image. It should focus on honest and clean administration, transparency, and high efficiency. First, a sound administrative environment should be created by putting a halt to disobedience of orders and defiance of polices, poor services, low efficiency, bribe-taking and foot-dragging by some departments and personnel. Second, relevant law, regulations and policies should be reviewed and revised according to the spirit of the Central Government to ensure they are not conflicting. The policies and measures should be made detailed and specific, and thus more viable and practical. Third, administrative law enforcement should be regulated to put in place a uniform and transparent tax collection system and method. If law enforcement cannot be regulated in a comprehensive way in a short time, consideration should be given to the establishment of special investment zones imposing tough control over random law enforcement, checks and charges.

In addition, combined with human resource development, job training and skills training should be strengthened to improve the competence of labor force. Through educational campaigns and role models, modern civic awareness should be enhanced to improve social credit and market order.

3.2.4 Focus on the Promotion of Gansu and Attraction of Investment, Combined with the Development of Tourism Industry

Enough attention should be paid to the development of tourism industry, in combination with which projecting Gansu’s new image and attracting investment from outside should be put on top agenda and an important project for promotion of Gansu through tourism industry should be initiated. The experience of California in
the U.S. shows that promoting itself systematically is one important factor behind its economic success. Tourism industry can not only bring income, but can make tourists become potential investors if the investment climate is sound. Therefore, Gansu should abandon its potential internal-oriented thought, think global, and take the promotion of itself as an important systematic project. While building up an open-minded new image, Gansu should also create a sound investment environment internally.

One important measure for developing Gansu’s tourism industry is to build its tourism brand. Tourism, in the final analysis, is to enhance tourists’ experience, and the brand is an important weapon to attract tourists. Given its unclear tourism brand and obscure position in the national tourism market, it is an urgent task to select and build a tourism brand representative of Gansu’s image. Cross-provincial and cross-district tourism cooperation plans should also be facilitated. Its tourism resorts are fragmented in space, hence the difficulty in organizing a travel route inside province. But the cross-provincial and cross-district cooperation in organizing the route can overcome that problem. Gansu provincial government should take the initiative in facilitating cross-provincial and cross-district tourism cooperation.

3.2.5 Actively Adjust Urban Layout and Promote the Construction of Urban Economic Zone and Industrial Clusters

Control over the major function-oriented zones has made cities think differently about the impetus of urbanization. Urbanization paths should be adjusted according to the conditions and features of different function-oriented zones. In restricted and prohibited development zones, cities/towns should mainly bear the responsibility of providing public services. While in prioritized and optimized development zones, they should mainly facilitate economic development during urbanization process. As globalization and information age are gaining momentum over the past few years, people are fully aware that it is of great importance to identify and build regional “portal cities”, and build urban economic zones and industrial clusters revolving around these cities. Although Gansu is short of conditions, including lack of central cities and hinterland conditions, to build a metropolitan economic zone at the national level, it possesses the conditions to build an influential economic zone with Lanzhou
at the core in northwest PRC

- In terms of space structure, attention will be focused on the construction of three city clusters or belts to improve the functions of core cities. They will include Lanzhou-Xining urban economic zone, Hexi Corridor city belt, Guanzhong-Tianshui city belt. Lanzhou’s comparative advantages in science and technology, commerce and trade, finance and information should be brought into full play so that its flow of capital, technology, talents and information can drive forward the development of surrounding areas. Regional resources should be reorganized to jointly build a Lanzhou-Xining regional cooperation framework. Tianshui’s development should not be limited to itself. Instead, it should be integrated into the industrial belt of Guanzhong and fuel the development of Longnan.

- The construction of Lanzhou business center should be further facilitated to build itself into the most important business and logistics center in northwest PRC

- A diversification development strategy for regional urbanization should be mapped out, combining both centralized and decentralized development. In sparsely populated Hexi area, attention should be focused on centralized development, with priority being given to the development of core cities. Meanwhile, efforts should be made to enhance the strength and influence of small- and medium-sized cities. Longnan and Gannan should give priority to the development of counties, and develop key towns in a selective way. In densely populated Longdong, emphasis should be put on decentralized development. Top priority should be given to the development of prefecture-level cities and counties. Besides, every county should focus its attention on the development of 3 to 5 central towns.

3.2.6 Facilitate Human Resources Development, and Transform the Economic Growth Mode through Science and Technology Innovation

As environmental control is increasingly tougher, the previously competitive industries which consume a lot of resources and cause big pollution in less developed regions are facing tremendous pressure. To facilitate the transformation of growth pattern, efforts should be stepped up to depend more on science and technology
innovation and bring into full play the role of human capital in economic growth. However, Gansu has not done enough in human resources development, and enterprises’ capacity of technological innovation remains weak overall. In particular, although most central enterprises and research institutes in Gansu possess some R&D capabilities, they fail to produce spillover effect on this region or interact with local economic development. Meanwhile, many local enterprises have problems such as lack awareness of independent innovation, inflexible innovation mechanism, insufficient input and weak capacity in innovation, and rely heavily on others’ technologies. Gansu should do the following work well in human resources development and technological innovation:

- Efforts will focus on modern civic awareness and labor skills, and extensive rural labor force training should be carried out. Training bases for rural labor force transfer will be established by relying on local vocational schools, agriculture broadcasting schools and training organizations, combining farmer training bases with employment bases. Training bases for rural practical talents will be set up, integrating agricultural technology popularization, science and technology development, and education and training. The systems for labor preparation, employment access and occupational qualification certificate will be improved so that skilled laborers can get more income.

- Various means will be adopted to attract technological personnel to contribute to Gansu’s development. In this respect, we should give full play to the role of the technological personnel no matter where they are from. To just wish to retain talents is not enough. Various mechanisms should also be put into place so that talents from outside can serve the development of Gansu. Channels should also be opened up so that a large number of technological personnel in Gansu’s central enterprises and organizations can play their role in Gansu’s local economic development. In terms of training local talents, training channels should be expanded to build and strengthen a highly-skilled talents training system, with enterprises and the industry as the main players and vocational schools as the basis, featuring cooperation between schools and enterprises, support from the government and the society and involvement of enterprises.
• Various policy resources will be utilized to bring together all elements of technological innovation. An enabling environment for enterprises’ independent innovation, particularly policy environment, should be established through institutional and cultural innovation. By opening wider to the outside world, Gansu’s technological activities and competitive pillar industries and promising industries can absorb capacity, information and various other elements from outside. Thus the communications inside and outside the system will be accelerated, vigor of innovation elements boosted and technological innovation inspired.

A strategic union of industry, universities and research institutes should be established in the sectors of machinery and new materials by bringing together innovation elements with support of national policies. It is an important part of the state’s work to explore effective mechanisms and patterns for a combination of industry, universities and research institutes and to build a strategic union for technological innovation in several areas. Gansu possesses some degree of advantages in some areas of new materials and equipment manufacturing, such as new materials of non-ferrous metal and fine chemicals, rare earth materials, oil drilling and production and refining equipment, electrical appliances, mine and metallurgical equipment. Attempts should be made to foster a union of industry, universities and research institutes in these two areas to bolster technological innovation capacity with the Central Government’s support.
Sub-report 1

Study on Development Strategy of Characteristic and Advantaged Industries in Gansu

WEI Liqiao
Abstract

The development of characteristic and advantaged industries in Gansu is one of the most important parts of the future development strategy. Starting from the trends of industrial development and based on a deepened understanding of the reality in Gansu, the report provides insights into the principle of defining characteristic and advantaged industries in the market economy. According to the qualitative SWOT analysis and quantitative cluster and hierarchy analyses, the series of characteristic and advantaged industries is identified. Based on the Coordination Game Theory, the Discrepancy Strategy is put forward as the overall guideline for characteristic and advantaged industries in Gansu. The Alternate Position Strategy includes horizontal (regional) discrepancy (regional differences and links), and vertical (chain) discrepancy (establishment of industry bases, parks, and clusters). The basic strategy is sustainable industrial development. Moreover, guarantee measures are put forward: based on the building of new energy bases, it is important for basic industries to be “reasonably ahead of others” and make breakthroughs in key areas; it makes sense to enhance the overall capability of enterprises with a focus on “reform, entrepreneurship and innovation” and develop a new mode of service-oriented government.
The development of characteristic and advantaged industries in Gansu is one of the most important parts of the future development strategy of Gansu. The 11th CPC Congress of Gansu has clearly identified the cultivation of characteristic and advantaged industries as the most important pillar for the next five years of development. Especially, in China’s 11th Five—Year Plan for Vigorously Developing the Western Region, “to promote characteristic and advantaged industries through unfailing efforts” has been highlighted. Therefore, different regions and sectors in Gansu have come to plan and work for the development of such industries. In this sense, this study bears practical and long-term significance.

Industries can be defined both in broad and narrow senses. In the broad sense, industries refer to all sectors in the national economy ranging from manufacturing, circulation to culture and education. Industries can be defined as large as a sector and as small as a specific industry. In the narrow sense, since the secondary industries take a special position in the industrial evolution and are closely related to economic growth and industrialization, industries, therefore, sometimes specifically refer to the secondary industries. According to Asia Development Bank’s framework of objectives and the requirements of the client, the subjects in this report are the industries in the narrow sense, namely the characteristic and advantaged industries in Gansu. Other industries like tourism and modern logistics, are only referred to in related conclusions and shall not be further elaborated and analyzed.

On the basis of a deepened understanding of the industry in Gansu, Starting from the trends of industrial development and based on a deepened understanding of the reality in Gansu, the report provides insights into the principle of defining characteristic and advantaged industries in the market economy. According to the qualitative SWOT analysis and quantitative cluster and hierarchy analyses, the series of characteristic and advantaged industries is identified. Based on the Coordination Game Theory, the discrepancy strategy is put forward as the overall guideline for characteristic and advantage industries in Gansu. The Alternate Position Strategy includes horizontal (regional) discrepancy (regional differentiation and links), and vertical (chain) discrepancy (establishment of industrial bases, parks, and clusters). The basic strategy is
Sustainable Development. Moreover, guarantee measures are put forward: based on the building of new energy bases, it is important for basic industries to be “reasonably ahead of others” and make breakthroughs in key areas; it makes sense to enhance the overall capability of enterprises with a focus on “reform, entrepreneurship and innovation” and develop a new mode of service-oriented government.

Section 1 General Development Trends of the Industries in Gansu

The development of the industries in Gansu can be summarized into three phases: the embedded layout, a balance in planned economy and transitional restructuring. The first phase was marked by the 16 projects carried out in Gansu out of the nation’s 156 key projects in the 1st Five Year Plan period. Those projects laid the foundation for modern industries of Gansu, initialized the industry, and built the main forces of industrial workers. The second phase was signified by the building of Three Lines: 142 enterprises of machinery, electronics, metallurgy, chemical engineering and military industry were migrated to Gansu from the eastern and coastal areas. The categories were enriched and the regional industry structures were balanced. A comparatively full-fledged industrial system was established in the planned economy. The third period was marked by the reform and opening up policy. With market as the guide, the planned and balanced industrial system was shattered. The adjustment and restructuring of the Three—Line enterprises were carried out. Currently, the new industrial layout has emerged with the following sectors as the main forces: petroleum chemical engineering, non-ferrous metal, electric energy, machinery and electronics, building material, food, and medicine. The industrial bases like Lanzhou, Baiyin, Jinchang and Jiayuguan are also built up. Such developments are not only a case in point of the transformation of economic institutions, but also a result due to the choice of the market in the past decades. Since the 9th Five Year Plan, Gansu made the transition from early industrialization to the medium stage. In 2001, Gansu Provincial CPC Committee and the government put forward the strategy of “Build the Province by Industries” and subsequently the development of industries has always been in the spotlight of Gansu’ economic growth. At present, the transitional restructuring is far from being concluded. The inertia of industrial expansion intertwined with underlying problems that call for immediate solutions, constitutes the reality for identifying the
characteristic and advantaged industries.

1. The Vertical Analysis on Gansu’s Industries

With the acceleration of industrialization, the industrial developments in Gansu are constantly making headways in terms of scale, structure, pattern and level. Some industries have shaped their unique characteristics.

1.1 Expanded Scale

The industry scale is continuously expanding. The secondary industries take a very important position in Gansu’s economy as the leading forces of development. In 2005, the industrial added-value (AT) of Gansu was multiplied by four times compared with that in the year 1995. The sales income increased by three times and the pre-tax profits by 3.5 folds. Currently, the secondary industries have become the pillar of Gansu’s economy, the main source of government financial income and a major pool of labor. (See Graph 1-1, 1-2 and 1-3)

Figure 1-1 Percentage of Secondary Industries in Total GDP of Gansu

![Graph 1-1 Percentage of Secondary Industries in Total GDP](image1)

Figure 1-2 Percentages of Pre-tax Profits by Industries in Provincial Income

![Graph 1-2 Percentages of Pre-tax Profits by Industries in Provincial Income](image2)
1.2 More Rational Industrial Structure

With the acceleration of the pace of industrialization, both the decision-making body and the operational level have come to the understanding that an industry structure with resource bases, unique advantages, huge markets, good profit and efficiencies is basically the rational structure. If we develop the industries following the market and resource signals and abandon the restrictions on light-heavy industry ratio (See Graph 1-4), the quality distribution, ways of links and evolution of the industries will be more smooth, resulting in the elevation of technological structure, product structure, organizational structure and management mechanism. Some products in some industries occupy important shares both in the western and national market. (See Table 1-1)
Figure 1-4 Percentages of Light and Heavy Industries in Total Industrial Outputs (light: blue and heavy: pink)

Table 1-1 Ranking of Major Industrial Products in Gansu (2005)

<table>
<thead>
<tr>
<th>Rank Category</th>
<th>Output</th>
<th>Percentage of the National Total</th>
<th>Percentage in the Northwest Market</th>
<th>Ranking in the Northwest Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>raw coal (100 million ton)</td>
<td>0.36</td>
<td>1.63</td>
<td>13.90</td>
<td>3 (after Shaanxi, and Xinjiang)</td>
</tr>
<tr>
<td>volume of power generation (100 million kilowatts)</td>
<td>506.17</td>
<td>2.02</td>
<td>26.73</td>
<td>2 (after Shaanxi)</td>
</tr>
<tr>
<td>Cement (10 thousand tons)</td>
<td>1415.99</td>
<td>1.32</td>
<td>24.56</td>
<td>2</td>
</tr>
<tr>
<td>Volume of processed crude oil (10 thousand tons)</td>
<td>1225.17</td>
<td>4.28</td>
<td>29.92</td>
<td>2 (after Xinjiang)</td>
</tr>
<tr>
<td>Steel (10 thousand tons)</td>
<td>458.44</td>
<td>1.30</td>
<td>40.58</td>
<td>1</td>
</tr>
<tr>
<td>Finished Steel Products (10 thousand tons)</td>
<td>452.25</td>
<td>1.20</td>
<td>38.63</td>
<td>1</td>
</tr>
<tr>
<td>Sulfuric Acid (10 thousand tons)</td>
<td>122.69</td>
<td>2.70</td>
<td>50.63</td>
<td>1</td>
</tr>
<tr>
<td>Iron Alloy (10 thousand tons)</td>
<td>49.00</td>
<td>6.00</td>
<td>/</td>
<td>1</td>
</tr>
<tr>
<td>Metal</td>
<td>Production (10 thousand tons)</td>
<td>1st Place</td>
<td>2nd Place</td>
<td>3rd Place</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>Lead</td>
<td>6.00</td>
<td>/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>22.60</td>
<td>/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper</td>
<td>23.79</td>
<td>/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nickel</td>
<td>8.28</td>
<td>90.00</td>
<td>99.00</td>
<td></td>
</tr>
<tr>
<td>Aluminum</td>
<td>56.95</td>
<td>13.00</td>
<td>/</td>
<td></td>
</tr>
</tbody>
</table>


### 1.3 Elevated Level of Development

The industry development strategy focuses on the markets and resources both home and abroad. We have to participate the regional an international co-operations in larger scope and wider areas. By means of merge and acquisition, the big conglomerates and corporations like American National Oil well, Kazakhstan Europe-Asia Financial Group, Australia Western Mining Corporation, CNPC, CHINAL, Baogang, Taigang, Shenghua, Huaneng have reached a new level, which enables the industries like petrochemical, non-ferrous metal, metallurgy and machinery in Gansu to acquire more constant raw-materials channels and more advanced technology resources by reaching long-term supply contracts with them. Meanwhile, we shall strive to conclude the sales agreements to ensure stable marketing channels both home and abroad. The micro unit decision-making bodies shall exercise fully the function to coordinate the production factors according to the market requirements. The major forces in resource distribution across regions by such companies and factories like Lanzhou Chemical Company, Jiuquan Steel Group, Jinchuan Company, Lanshi, Huamei and 404 Factory shall be made full play. The economic, technical cooperation and communication in various forms shall be encouraged and supported among small
and medium sized enterprises and private enterprises. In the mechanism level, the reform on SOEs shall be carried out to stimulate the industry restructuring. For the crucial, medium and large sized SOEs, the ownership shall take on diversified forms. Both the estates and the resources shall be restructured in big strides. Besides, the privatization of the SOEs in city levels shall be accelerated. By the end of 2005, more than 90% of the SOEs in cities have withdrawn from the series of state economy.

1.4 Changing the Extensive Growth Pattern

During the 10th Five Year Plan Period, Gansu has stepped up its investment in the technological restructuring of the strong industry enterprises. Since 2002, centering on circular economy, energy saving, reduction of pollution discharge and technology upgrading, the growth pattern has been partly transformed. The independent innovation ability has been improved and the control–pollution projects are proceeded at fast pace.

1.5 Emerging Strengths of Unique Industries

The three traditional industries of petrochemical, non-ferrous metal and metallurgy in Gansu have maintained strong development momentum in the past twenty years since reform and opening up policy. Gansu is the largest petrochemical base in the western region. After the realization of the production capacity of ten million-ton oil refining and 700 thousand-ton Ethylene by Lanzhou Chemical Company, it is proceeding towards the direction of large-scale, first–class, sophistication, intensification and series. The non-ferrous metal industry in Gansu also occupies an important position in the country. The products like aluminum, copper, zinc, nickel and lead are continuously growing, among which the production of nickel and platine group metals covers more than 90% of the National Total. Gansu is also the largest cooper production base in the northern part of China. Many techniques and craftsmanship have reached first-class level both home and abroad. Moreover, Gansu is the largest iron steel and base of the Northwest part of China. Two systems of carbon steel and stainless steel have been shaped and the comprehensive production capacity has reached the level of six million tons per year of iron, steel and materials respectively. The structure among them is becoming more and more reasonable and
the Percentage of sheet materials has been greatly improved. Jiugang has been selected as one of
the enterprises favored by the nation’s industry policies. Lending the coal resources in Mongolia
in the north and the rich metal mines in Qinghai in the south, plus the economic cooperation with
The Republic of Kazakhstan, the outlook is quite bright. Besides, the newly-emerged industries in
Gansu like the processing of agriculture products, Chinese traditional medicine and high-tech
industries have presented strong growth trends. The competitiveness of the equipment
manufacturing industry is also upgraded in the process of restructuring.

2. Horizontal Analysis of Gansu’s Industries

The phenomenon of gradually narrowed sustained scope, gradual inferior position and
gradually weakened competitiveness are co-existing.

2.1 Gradually Reduced Underpinning Role of Pillar Industries

Examining the pillar industries of Gansu in every Five Year Plan Period since reform and
opening up policy, we can see the sustained scope for Gansu’s industries is getting narrower. (See
Table 1-2). To probe further, the first point is the shrinking of industry categories to the
resource-based industries with the extent that the development of industries is mainly supported
by those based on the processing of the raw materials. In the 10th Five Year Plan period, the
industrial AT of the petrochemical, non-ferrous metal and metallurgy industries in Gansu
accounted for 52.1% of the total industrial AT. (See Table 1-3) It must be indicated that although
the selection of industries in the 11th Five Year Plan period is similar with that in the 1980s,
however, the industry level and operational rules are completely different. The second aspect is
the weak links with the upper and lower reaches, and the firm industry chain system is far from
being established. On one hand, the products like copper, aluminum, zinc, nickel and ethylene are
basically sold outside Gansu and China, with less than 25% of the deep-processing inside the
province. On the other hand, crude oil and alumina are nearly introduced, which restricted the
enlargement of the scale.
### Table 1-2 Selected Pillar Industries of Gansu in Different Periods

<table>
<thead>
<tr>
<th>Periods</th>
<th>Pillar Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980s</td>
<td>Petrochemical, nonferrous metal, metallurgy, light textile, building material, machinery, electronics and food industries</td>
</tr>
<tr>
<td>8th Five Year Plan</td>
<td>Petrochemical, nonferrous metal, metallurgy, building material, machinery, electronics and food industries</td>
</tr>
<tr>
<td>9th Five Year Plan</td>
<td>Petrochemical, nonferrous metal, metallurgy, building material, and pharmaceutical industries</td>
</tr>
<tr>
<td>10th Five Year Plan</td>
<td>Petrochemical, nonferrous metal, metallurgy, pharmaceutical and high-tech industries</td>
</tr>
<tr>
<td>11th Five Year Plan</td>
<td>Petrochemical, nonferrous metal, metallurgy, equipment manufacturing, pharmaceutical and processing of agricultural products and byproducts industries</td>
</tr>
</tbody>
</table>

### Table 1-3 Percentages of Industrial Added-Values from Three Traditional Pillar Industries in the Provincial Total in 10th Five Year Plan Period
(Petrochemical, Nonferrous Metal and Metallurgy)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>Total (unit:100 million Yuan)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrochemical</td>
<td>2001</td>
<td>108.10</td>
<td>108.66</td>
<td>120.30</td>
<td>170.92</td>
<td>203.10</td>
<td>711.08</td>
<td>28.99</td>
</tr>
<tr>
<td>(unit: 100 million Yuan)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonferrous Metal</td>
<td>2001</td>
<td>52.19</td>
<td>52.59</td>
<td>67.31</td>
<td>93.20</td>
<td>121.05</td>
<td>386.34</td>
<td>15.75</td>
</tr>
<tr>
<td>(unit: 100 million Yuan)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metallurgy</td>
<td>2001</td>
<td>20.12</td>
<td>20.40</td>
<td>29.32</td>
<td>45.33</td>
<td>65.48</td>
<td>180.65</td>
<td>7.36</td>
</tr>
<tr>
<td>(unit: 100 million Yuan)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2001</td>
<td>180.41</td>
<td>181.65</td>
<td>216.93</td>
<td>309.45</td>
<td>389.63</td>
<td>1278.07</td>
<td>52.10</td>
</tr>
<tr>
<td>(unit: 100 million Yuan)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Industrial Added-Value (unit: 100 million Yuan)

<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50.75</td>
<td>46.65</td>
<td>48.40</td>
<td>53.91</td>
<td>56.81</td>
<td>52.10</td>
<td></td>
</tr>
<tr>
<td>355.51</td>
<td>389.38</td>
<td>448.23</td>
<td>574.00</td>
<td>685.80</td>
<td>2452.92</td>
<td></td>
</tr>
</tbody>
</table>

Source: *Gansu Annals* (2002-2006)

### 2.2 Inferior Position

In the past twenty years since reform and opening up policy, the annually average increase rate of the industries in Gansu is 4.9% lower than the national average; the ranking of the industries had dropped from the 16th in 1978 to 26th in 2005. In 1978, the total amounts of Gansu’s industries accounted for 2.2% of the country, but in the year 1999, the Percentage was 0.92%, and in 2005, the figure was 0.89%. (See Graph 1-5) Although the advantaged industries still maintain a large market share in the Northwest region and national market, the Percentage is nevertheless dropping. In the past five years, except for the industries like petroleum processing, coking and nuclear fuels, the Percentage of the industries like refining and calendaring processing of black metals on the national market is also dropping. (See Table 1-4)

**Figure 1-5 Trends of Gansu Industries’ Percentage in the National Total**

![Graph 1-5 Trends of Gansu Industries’ Percentage in the National Total](image)

**Table 1-4 the Percentage of Gansu’s Advantage industries in the National Total 2000-2005**

unit: 100 million Yuan, %
### Table 1-5 Indicators and Weight of Industrial Competitiveness

<table>
<thead>
<tr>
<th>Industry</th>
<th>2000</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gansu</td>
<td>National</td>
</tr>
<tr>
<td>Nonferrous Metal refining and calendaring</td>
<td>38.14</td>
<td>512.69</td>
</tr>
<tr>
<td>processing industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petroleum processing, coking and nuclear</td>
<td>23.04</td>
<td>787.99</td>
</tr>
<tr>
<td>fuel industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death Metal refining and calendaring</td>
<td>15.24</td>
<td>1299.29</td>
</tr>
<tr>
<td>processing industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Produce and Supply of thermo electrical power</td>
<td>32.17</td>
<td>2328.62</td>
</tr>
<tr>
<td>Chemical materials and chemicals manufacturing</td>
<td>17.63</td>
<td>1415.81</td>
</tr>
</tbody>
</table>

Source: *Gansu Annals (2006)* and *China Annual Statistics (2006)*

### 2.3 Weakened Competitiveness

According to the indicators and weight indicated in Research Report on the comprehensive competitiveness of provincial economy in China (See Table 1-5) and some related statistics, the ranking of the competitiveness of Gansu’s industries in the country in the past few years is figured out (See Table 1-6). From it, we can see that the inferiority is strengthened, exhibiting the vulnerability in fighting against market competition. Indicators both in profit and efficiency are hovering at the bottom of the country and both are ranked after the 26th. The violation in industry growth is strong, showing the unstable industrial bases for constant economic development. There are the strong trends in terms of the increase rate of industrial AV and the Percentage of industrial AV in industrial enterprises above designated size. This is definitely attributed to SOEs reforms, investment on projects and technological advancement, but there are also the reflections on problems like the traditional development paths and bankruptcies. In the Northwest region, the Industrial Competitiveness of Gansu had dropped from the 3rd in 1998 to 4th in 2004, showing clearly the weakened position. (See Table 1-7)
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>a Industrial Added-Value</td>
<td>0.113</td>
</tr>
<tr>
<td>b Increase Rate of Industrial Added-Value</td>
<td>0.108</td>
</tr>
<tr>
<td>c Industrial Added-Value Per Capita</td>
<td>0.103</td>
</tr>
<tr>
<td>d Total Industry Assets</td>
<td>0.108</td>
</tr>
<tr>
<td>e Increase Rate of Total Industry Assets</td>
<td>0.093</td>
</tr>
<tr>
<td>f Total Contribution Rate of Industry Assets</td>
<td>0.093</td>
</tr>
<tr>
<td>g Percentage of Industrial AV from Industrial Enterprises above Designated Size (IEADS) of the Total Industrial AV</td>
<td>0.096</td>
</tr>
<tr>
<td>h Productivity of All Industries</td>
<td>0.099</td>
</tr>
<tr>
<td>i Expense-Profit of Industry Costs</td>
<td>0.093</td>
</tr>
<tr>
<td>j Sales of Agriculture Products</td>
<td>0.094</td>
</tr>
<tr>
<td>Total</td>
<td>1.000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Industrial Added-Value</th>
<th>Increase Rate of Industrial Added-Value</th>
<th>Industrial Added-Value Per Capita</th>
<th>Total Industry Assets</th>
<th>Increase Rate of Total Industry Assets</th>
<th>Total Contribution Rate of Industry Assets</th>
<th>Percentage of Industrial AV from IEADS of the Total Industrial AV</th>
<th>Productivity of All Industries</th>
<th>Expense-Profit of Industry Costs</th>
<th>Sales of Agriculture Products</th>
<th>Comprehensive Standing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>25</td>
<td>10</td>
<td>27</td>
<td>24</td>
<td>9</td>
<td>30</td>
<td>20</td>
<td>26</td>
<td>30</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>1999</td>
<td>25</td>
<td>20</td>
<td>27</td>
<td>26</td>
<td>30</td>
<td>28</td>
<td>14</td>
<td>27</td>
<td>30</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>2000</td>
<td>26</td>
<td>29</td>
<td>28</td>
<td>25</td>
<td>8</td>
<td>30</td>
<td>13</td>
<td>29</td>
<td>30</td>
<td>29</td>
<td>30</td>
</tr>
<tr>
<td>2001</td>
<td>26</td>
<td>19</td>
<td>27</td>
<td>25</td>
<td>11</td>
<td>30</td>
<td>6</td>
<td>28</td>
<td>31</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>2002</td>
<td>26</td>
<td>21</td>
<td>27</td>
<td>23</td>
<td>12</td>
<td>28</td>
<td>6</td>
<td>26</td>
<td>29</td>
<td>28</td>
<td>25</td>
</tr>
<tr>
<td>2003</td>
<td>27</td>
<td>24</td>
<td>27</td>
<td>24</td>
<td>25</td>
<td>28</td>
<td>8</td>
<td>27</td>
<td>30</td>
<td>16</td>
<td>28</td>
</tr>
<tr>
<td>2004</td>
<td>26</td>
<td>10</td>
<td>27</td>
<td>25</td>
<td>24</td>
<td>28</td>
<td>6</td>
<td>29</td>
<td>29</td>
<td>19</td>
<td>25</td>
</tr>
</tbody>
</table>
In terms of the general rules of economic development, the sole emergence of gradually narrowed sustained scope for the industries is not terrible, which is maybe attributable to the results of industry enlargement and industry centralization. The sole emergence of gradual inferior position of industries is not terrible, either. That’s maybe because of the booming of new industries and the withdrawal of the old ones. In this way, the sustained scopes can be widened, stimulating the elevation of the overall position of the industries. However, the coexistence of them will inevitably result in the gradually weakened Competitiveness of industries. It means that in the market economy, nationwide, the development of the industries in Gansu has been lagged behind, or even in the process of recession.

### 3 Comprehensive Understanding

3.1 The basic trend of the development of the industries in Gansu is that vertically it is developed
rapidly while horizontally it is lagged behind. The degree in the vertical line is less than the extent of being lagged behind. Therefore, the gap with the eastern provinces and the nation’s average is enlarged. However, it doesn’t mean that the future of Gansu’s industries has to follow the path; in addition, the trend can not be simply translated into the backwardness of the industries in Gansu. Rather, it shall be interpreted as the lack of development, with both the potentials and strengths to be tapped. How to proceed to the sustainable development of the industries in Gansu unswervingly will always be a subject to research.

3.2 The basic trend constitutes an important part of Gansu as a whole being marginalized.

Marginalization means a region or a province, in some periods, has been dragged into the margins of center of gravity of larger areas and far from the core development zone. The phenomenon of marginalization in our country, is both and process and result of the enlargement of regional gaps. Since Song Dynasty, Gansu province has been in the marginal place both economically and socially. After revolution, the studded programming and planned balance had for some time presented Gansu in the key areas of construction of national economy and industry scheme. The situation of being marginalized had been changed to some extent. However, since the reform and opening up policy, with the implementation of the Gradient Development strategy, in addition to the absence of the advantages of the eastern provinces in market economy and the lagging behind of the systems and mechanisms, the marginalized position is retrieved. Although the implementation of Western Development Strategy after 2000 has focused on the issue, the trend of being marginalized has not yet been terminated. The basic trend of the development of industries in Gansu is just an example.

3.3 The reasons in deep level for the trend are the backwardness of the systems and mechanisms.

The most crucial one is the ownership structure problem due to the slow development of non-public economies. The policy environment and the activation of the vitality of the non-public economies are not good. Besides, the reform on SOEs in Gansu is proceeding slowly, resulting in the extremely high Percentage of SOEs in Gansu’s industries. The SOEs have strong features of
planned economy and lack in vitality. Secondly, the market degree in Gansu is generally weak; therefore, there are few choices in the market competition. In addition to the comparatively isolated geological locations, the industries in Gansu have not yet adapted to the packed development in the integrated market both home and abroad. The development of many industries is just concentrating on the isolated regional market. The direction is sort of inward. They have no choice but to withdraw as long as they are violated by the strong factors of external industries. Thirdly, the macro regulation system of the central government is not complete. Since the reform and opening up policy, sever constrained policies by the government, especially the policies on finance, credit, industry, and price, are not tailored to the specialty. After the release of the policies, the coastal areas are scarcely affected while the inner land provinces are hampered. In the economic transition period, the former can quickly leap beyond some stages of capital accumulation while the latter were consumed a lot. In Gansu, the situation was even worse. Lacking in flexibility of policies, different results emerged in Gansu and coastal provinces.

Section 2 SWOT Analysis and Identification of Characteristic and Advantaged Industries

SWOT analysis lists strengths, weaknesses, opportunities and threats in matrices based on surveys to come up with ideal strategies and solutions. Keeping in line with the local industrial development and taking into account of its relevant, open and dynamic feature, this fashion helps formulate a reasonable strategy for industries in Gansu with a wide perspective.

1. Opportunity

1.1 Global economic integration boosts industrial convergence

The global economic integration provides a broader regional platform for Gansu to develop an external-oriented economy based on local resources, strengthens local connection with the
national economic system, verifies resource supply and funding channel, and facilitates the
development in the international division of industries, especially for sectors with rather solid
strengths such as petrochemical, non-ferrous and metallurgical industries. Meanwhile, the
acceleration of industrial convergence underpins industrial restructuring, upgrading and
optimization in Gansu by introducing advanced structures, technologies and management models.

1.2 China Western Development Program clarifies the direction for industrial progress

The national incentive policy has made it clear that the characteristic industry is the key to
accelerating industrial progress in western China, identifying the new direction for Gansu. Aside
from these incentives, the China Western Development Program contributes to better
infrastructure and more efficient contacts with the outside world, giving full play to consortiums
and corporations in the local industrial development.

1.3 The reform of old industrial bases such as Northeast China could also be
applied in Gansu, providing new opportunities for upgrading the traditional
industries.

Similar to Northeast China, Gansu has many old industrial cities like Lanzhou, Jinchang, Baiyin,
Jiayuguan and Yumen. Fitting the local environment, the reform policies of old industrial bases
could also be adopted in Gansu to restructure large state-owned enterprises (SOEs), arrange
bankrupt companies and reform technologies, creating good conditions for the industrial
development.

1.4 The initiatives for moderately prosperous society and new socialist
countryside give impetus to industrial development in Gansu.

According to The Provincial Initiative for a Moderately Prosperous Society, Gansu will achieve
prosperity in all respects in 2020, with per capita GDP jumping from current 1000 USD to 3000
USD. This very period, according to foreign and domestic experiences, will be the peak time for
industrial restructuring, with external and internal inputs pushing forward centralized, integrated and advanced industrial development. The Initiative for Building New Socialist Countryside recently promulgated by the provincial government, points out that agriculture industrialization is one of the most important components of a new socialist countryside. It can be predicted that with the acceleration of agriculture industrialization, other emerging industries such as the agri-products and by-products deep-processing and traditional Chinese medicine producing are on the rise. Meanwhile, rural infrastructure construction is also speeding up, giving momentum to the construction and machinery sectors.

2. Threat

2.1 The advantages of traditional industries in Gansu are being diluted, which adds to the difficulty for industries in Gansu to become more powerful and stronger.

With gradually narrowed sustained scope, some industries like petroleum, nonferrous metal and metallurgy can scarcely maintaining their territories while those of others are generally narrowing. It must be noticed that with the completion of market economy system and the strengthening of market segmentation, any industry will be confronted with fiercer completion if it wants to reclaim the lost territories. Meanwhile, the technological revolution around the world greatly promoted the technical level. It is almost impossible to reclaim its lost territory without more advanced technological capability. This requires a lot of investment while in this respect, Gansu has no edge. Therefore, it is even more difficult for industries in Gansu to become stronger and more powerful.

2.2 The crash and conflicts of the similar industries both home and abroad are the constraining factors of the development of industries in Gansu.

Although the petrochemical enterprises in Gansu have ten-million-ton oil refining capacity and more than 800 hundred varieties of chemical products, the further improvement of the productivity, however, is largely dependant on the crude oil supply. Given the fact that the ten-million-ton oil
refining bases established by the central government are structured in Zhenghai, Maoming, Shanghai, Gaoqiao, Jinling and Qilu, the advantages held by Gansu are diluted. Some Fortune top 500 enterprises including Shell, BP and Dupont have gradually established the petroleum industrial parks in the Yangtze River Delta, Pearl River Delta and Bohai Sea Ring with the characteristics of centralization and intensification. This reveals the regional migration of chemical industry. Nonferrous metal industry in Gansu staggers in the crude processing stage. Although the production energy and output of aluminum in Gansu are both ranked the second in the Northwest part of China, the supply and processing problem are rather remarkable. On one hand, there is a lack of alumina, on the other hand, the deep-processing of sheets, materials and foils are not accordingly furniture. Thus, the space for improvement is greatly narrowed. Metallurgy industries in Gansu are much curbed by the iron and steel industry policies. It is regulated that the produce of iron and steel industry is principally not to be enlarged in important environment-protection areas, water shortage areas and big cities, and the large-scale iron and steel enterprises are expected to be migrated to the coastal areas. As a result, the produce of iron and steel in Jiangsu, Hebei, Shandong, Liaoning and Shanghai covers more than half of the output of the country. Consequently, the iron and steel enterprises in coastal areas have the comparative advantages like the intensified industrialization, huge market, convenient transportation, good environment and international resources. With the acquisition and merge of Ba Yi Steel Factory of Xinjiang by Shanghai Bao Gang Enterprise, the advantages of Jiu Gang as No.1 in the Northwest part of China are greatly flatted.

2.3 The development of industries in the neighboring provinces poses challenges for Gansu.

After the promulgation of the strategy of Development of Western Region, the economy in Gansu is developing rapidly while the neighboring provinces are developing faster. Compared with the six neighboring provinces, during the tenth Five-Year Plan period, in the respect of GDP per capititates increase rate is only higher than that of Xinjiang. The increase rate for the fixed assets investment is the lowest. (See Table 2-1)In 2005, the increase of GDP in Gansu is the third last, the increase rate for the fixed assets investment is the lowest and the increase rate for the industrial
added-value is the second last. (See Table 2-2) Obviously, the development of Gansu is much lagged behind. From the trend analysis, the increase of GDP and fixed assets investment of Gansu will still remain the third last. (See Table 2-3) It can be predicted that due to the increase momentum of the neighboring provinces, the rise of the neighboring provinces is irrevocable. In the long run, the development of industries in Gansu will face more challenges.

Table 1-6 Increase Rate of Major Economic Indicators of Gansu and Neighboring Provinces during the 10th Five-Year Plan Period

<table>
<thead>
<tr>
<th>Provinces</th>
<th>Shaanxi</th>
<th>Gansu</th>
<th>Qinghai</th>
<th>Ningxia</th>
<th>Xinjiang</th>
<th>Inner Mongolia</th>
<th>Sichuan</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>11.5</td>
<td>10.7</td>
<td>12.0</td>
<td>10.9</td>
<td>9.8</td>
<td>16.6</td>
<td>11.2</td>
</tr>
<tr>
<td>Investment for Fixed Assets</td>
<td>19.2</td>
<td>14.6</td>
<td>20.9</td>
<td>23.0</td>
<td>17.2</td>
<td>44.3</td>
<td>19.8</td>
</tr>
</tbody>
</table>

Source: 11th Five-Year Plans of different provinces and related studies

Table 1-7 Increase Rate of Major Economic Indicators of Gansu and Neighboring Provinces in the Year 2005

<table>
<thead>
<tr>
<th>Provinces</th>
<th>Shaanxi</th>
<th>Gansu</th>
<th>Qinghai</th>
<th>Ningxia</th>
<th>Xinjiang</th>
<th>Inner Mongolia</th>
<th>Sichuan</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>Absolute Value</td>
<td>3674.8</td>
<td>1928.1</td>
<td>543.2</td>
<td>599.4</td>
<td>2609.0</td>
<td>3822.8</td>
</tr>
<tr>
<td>Increase rate</td>
<td>12.6</td>
<td>11.7</td>
<td>12.2</td>
<td>10.3</td>
<td>10.9</td>
<td>21.6</td>
<td>12.6</td>
</tr>
<tr>
<td>Investment of Fixed Assets</td>
<td>Absolute Value</td>
<td>1980.5</td>
<td>874.5</td>
<td>367.2</td>
<td>444.7</td>
<td>1352.3</td>
<td>2687.8</td>
</tr>
<tr>
<td>Increase rate</td>
<td>28.3</td>
<td>15.7</td>
<td>15.4</td>
<td>16.8</td>
<td>16.4</td>
<td>48.6</td>
<td>30.7</td>
</tr>
</tbody>
</table>
### Table 1-8 Increase Rate of Major Economic Indicators of Gansu and Neighboring Provinces during the 11th Five-Year Plan Period

<table>
<thead>
<tr>
<th>Provinces</th>
<th>Shaanxi</th>
<th>Gansu</th>
<th>Qinghai</th>
<th>Ningxia</th>
<th>Xinjiang</th>
<th>Inner Mongolia</th>
<th>Sichuan</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>11</td>
<td>10</td>
<td>&gt;10</td>
<td>&gt;10</td>
<td>9</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>Investment of Fixed Assets</td>
<td>20</td>
<td>15</td>
<td>10</td>
<td>14-16</td>
<td>&gt;16</td>
<td>18</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: 11th Five-Year Plans of different provinces and related studies

### 3 Strength

3.1 The comparative advantages on nonferrous metal and black metal are prominent. In particular, the scale of the copper nickel of Jinchuan is ranked the second in the world, only after that of cupric sulfide nickel mine of Canada. The newly-exploiting four hundred thousand ton tungsten and over one million ton molybdenum-tungsten in Zhangye and the already estimated 500 ton gold in Yangshan of Wen County will greatly guarantee the resource equipment. All these mineral resources will form the supporting forces for the development of industries in Gansu. (See Table 2-4, 2-5)

### Table 1-9 Nonferrous Metal and Black Metal Resources in part of Gansu

<table>
<thead>
<tr>
<th>Mineral Resources Region</th>
<th>Copper (unit: ten thousand ton)</th>
<th>Lead (unit: ten thousand ton)</th>
<th>Zinc (unit: ten thousand ton)</th>
<th>Iron (unit: one hundred thousand ton)</th>
<th>Vanadium (unit: ten thousand ton)</th>
<th>Chrome (unit: thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>------</td>
<td>------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>2929.0</td>
<td>1314.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shaanxi</td>
<td>16.6</td>
<td>13.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gansu</td>
<td>198.0</td>
<td>118.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qinghai</td>
<td>50.4</td>
<td>102.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ningxia</td>
<td>——</td>
<td>——</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xinjiang</td>
<td>82.8</td>
<td>19.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ranking</th>
<th>6</th>
<th>4</th>
<th>3</th>
<th>7</th>
<th>4</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nationwide</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: China Annual Statistics (2005)

**Table 1-10 Adequacies of Major Mineral Resources in Gansu**

<table>
<thead>
<tr>
<th>Adequacies</th>
<th>Mineral Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>Nickel, cobalt, platinum, tungsten, magnesite deposit, gypsic, asbestos, bentonite, cement scale, etc.</td>
</tr>
<tr>
<td>Basically Adequate</td>
<td>Iron, Vanadium, lead, Zinc, antimony, gold, refractory clay, fluorite, mirabilite, barite, satellite sulfur, glass-silicon raw material, facing stone and etc.</td>
</tr>
<tr>
<td>Lacking</td>
<td>manganese, chromium, copper, silver, tin, molybdenum, graphite, talcum, petroleum, LPG and etc.</td>
</tr>
<tr>
<td>Seriously Lacking</td>
<td>Titanium, aluminum, rear-earth, strontium, diamond, phosphor, boron, potassic salt, mineral salt, grammite, diatomite, kaolin clay and etc., within which except rare-earth, phosphor, mineral salt and potassic salt, other resources reserves have not been verified.</td>
</tr>
</tbody>
</table>

Note: Studies on the Exploitation and Use of Land Resources in Gansu Province and related
3.2 The resources of agriculture byproducts with characteristics are abundant.

The produce of potatoes, mass seed, Chinese traditional medicine, breeding grass and the barley used for making beer are all ranked the first. The output of meat lamb, lilies for food, grapes for making wines and hops all rank top five. In the respect of quality minor cereals, fruits and vegetables, Gansu also has the regional advantages. Based on these advantages, the establishment of the centres like the country’s No.1 potato processing base, Chinese traditional medicine production and processing base, the base for producing and processing barley and hop, agriculture mass seed base, regional fruit base, meat lamb production base and base for plateau summer vegetables provide broad space and room for the development of agriculture byproducts processing and pharmaceutical industry. (See Table 2-6)

Table 1-11 Comparative Analysis on Some Indicators of Brewery Material Industries in Gansu

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Average (unit:10000 mu/666.7 ha)</th>
<th>National percentage</th>
<th>Output (10000 ton)</th>
<th>National percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barley for beer</td>
<td>143.00</td>
<td>23%</td>
<td>54.00</td>
<td>36%</td>
</tr>
<tr>
<td>Hop</td>
<td>4.63</td>
<td>46%</td>
<td>0.87</td>
<td>48%</td>
</tr>
<tr>
<td>Grapes for wine</td>
<td>10.43</td>
<td>12%</td>
<td>4.00</td>
<td>6%</td>
</tr>
</tbody>
</table>

Source: Development Plan for Key Gansu Agricultural Industries (2005-2010)

3.3 The industries like petroleum and chemicals, nonferrous metal and metallurgy have nearly formed the industry chain and the room for deep processing is broad.

They will not only support, motivate and radiate the whole industry strata, but also have the outstanding market stability and strong demand. They serve as the tranquilizer of the national economy and social development, strengthening the ability to fight against industry violation,
3.4 The technology and facilities of the core enterprises in industries like petroleum and chemicals, nonferrous metal, metallurgy, equipment manufacturing, and medicine are either nationally advanced or internationally advanced, but this just disperses in a few enterprises in these fields. The technology in the fields like the refining of the nonferrous metal, the application of nuclear technology, petroleum and chemicals, the digging machinery for petroleum, the equipment for oil refining and chemical manufacturing, the vertical digital machine tool and medicine enjoys reputation not only in China. With the completion of Lanhua’s 600 thousand-ton Ethylene Reconstruction Project, Yinguang 100 thousand-ton TDI Extension Project, Lanzhou 150 thousand-ton aluminum Project, Jinchuan 400 thousand-ton Copper Project and Jiugang stainless steel Project, the equipment of these enterprises will be elevated to the level of the 21st century.

3.5 The establishment and strengthening of Lanzhou as the commerce, trade and logistic center smoothes the circulation channel.

Lanzhou is one of the hubs of communication of China and the commerce, logistic and transportation hub of the Northwest part of China. Since the establishment of Lanzhou Commerce and Logistic Center approved by six state ministries in 1994, the development of commerce, trade and logistics in Lanzhou is proceeding towards the direction of comprehensiveness and multifunction. In the future, with the commencement of the goods transportation line of Qingzang Railway, the set-up of Lanzhou container station, the starting of Lanyu Railway Station and the completion of Zhongchuan Airport Extension Project, the scope of the industries of Gansu will be broader and the communication will be more convenient.

4 Weakness

4.1 The development of the industries in Gansu adopts the extensive pattern and the efficiency is low.

In 2005, the resource consumption for GDP in Gansu is 85% higher than the national average,
energy consumption for per ten thousand yuan industrial AV is 90% higher and the power consumption for per ten thousand yuan GDP is 86% higher. These manifest that the development of the industries in Gansu is still experiencing the stage of high resource consumption. The advantages in resource and materials have not been transformed into the industrial advantaged of the deep-processing added. The output of copper and aluminum in Gansu occupy 6.4% and 10.35% of the country’s total respectively but the output of the related products only occupy 1.52% and 0.94% of the country’s total respectively. The transformation and processing rate for copper and aluminum are only 28% and 7% respectively.

4.2 The problem of lack of capital and capital outflow are coexisting.

Lack of flow capital has become the paramount curbing factor for the development of the industries in Gansu. 65% of the loans for the enterprises in Gansu can not be timely withdrawn. The Percentage of sell on credit can even amount to 80%. In Gansu, there are not many channels for the reasonable capital manipulation and the financing channel is even narrower. The nation’s investment accounts for 58.4% of the total investment, which is 25% percent higher than the national average. At the same time, the outflow of capital in Gansu is serious. Till the end of 2005, the reserve of the province’s deposit is 289.586 billion Yuan, the loans reserve is 192.346 billion Yuan. The discrepancy is 100 billion Yuan and the increase scale of deposit is greater than the decrease of loans.

4.3 The cost of the development of industries is increasing.

Since the period of the 10th Five-year Plan, the demands for raw materials have been increasing at a remarkable pace, resulting in the tension between the supply and demand in coal, electricity, oil and other raw materials. The price of petroleum and coal has been remaining at a high level and that of the finished oil, power supply and alumina have been nudged up and the cost of manufacturing is accordingly increasing. The industry structure in Gansu determines that the finished products can be supplied in the market only by means of intermediate or long-distance transportation, which greatly increases the cost in circulation. To be environmentally friendly, the entries to start industries are elevated. No matter the initiation or the extension of projects requires
the investment and expenditure. Furthermore, the increase of wage, welfare, social security and medical security all add to the increase of operational cost.

4.4 **Compared with the eastern provinces, the atmosphere of the development of industries is tight, which are reflected in the following aspects: the cooperation, combination, centralization and dispersal among industries and products are lagged behind, the cost of capital flow is high and the returns on the key factors of production are low.**

The policies on the development of private sectors are not flexible enough, some measures are not well-regulated and the services are backward. Besides, the environment is vulnerable and the gas, water and solid waste pollutions are serious. The systematic problems curbing the development of industries still exist and governments at different levels have the problems like lack of consciousness of good service and low efficiency.

5 **Conclusion**

By different combinations of S、W、O、T, we draw four modes and strategy combinations. (See Table 2-8)

<table>
<thead>
<tr>
<th>Internal Factors</th>
<th>S</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy</td>
<td>●Comparative Strength of Some Mineral Resources</td>
<td>●Extensive Mode of Growth And Low Efficiency</td>
</tr>
<tr>
<td></td>
<td>●Abundant Characteristic Agricultural byproducts</td>
<td>●Lack of Capital And Capital Outflow</td>
</tr>
<tr>
<td></td>
<td>●Broad Deep Processing Space for Some Industries</td>
<td>●Increase of Development Cost</td>
</tr>
<tr>
<td></td>
<td>●High-level Technical Equipment of Some Industries</td>
<td>●Inflexible Development Environment</td>
</tr>
<tr>
<td></td>
<td>●Commerce And Logistic Center Have been Nearly Established</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>S-0 Combination Strategy</td>
<td>W-0 Combination Strategy</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>● Economic Integration</td>
<td>● Suit to the trend of integration and based on the comparative strengths of technology and resource</td>
<td>● Suit to the trend of integration and change the mode of growth</td>
</tr>
<tr>
<td>● Implementation of Develop the West Strategy</td>
<td>● Widen the industry space guided by the Develop the West Strategy</td>
<td>● Utilize the policies to enlarge the industry financing</td>
</tr>
<tr>
<td>● The Extension of the Policies on the Reconstruction of Old Industrial Bases in the Northeast Part of China</td>
<td>● Learn from the policies on the reconstruction of old industrial bases and proliferate the traditional advantaged industries</td>
<td>● Stick to the technological updating and cut down the cost</td>
</tr>
<tr>
<td>● Construction of Moderately Prosperous Society And New Socialist Countryside</td>
<td>● Know of the new demands, utilizing the hub of logistics, develop new emerging industries</td>
<td>● Know of the new demands and create new environment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>T</th>
<th>S-T Combination Strategy</th>
<th>W-T Combination Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Loss of the Territory of Traditional Industries</td>
<td>● To develop the characteristic industries based on the resources</td>
<td>● Change the Pattern of Growth and Enlarge Traditional Industries</td>
</tr>
<tr>
<td>● Fierce Cramming form Similar Industries both Home and Abroad</td>
<td>● Extension of the Industrial Chain And Regain Lost Territory</td>
<td>● Enlarge the Industry Financing and Fight against Peer Cramming</td>
</tr>
<tr>
<td>● The Development of the Neighboring Provinces</td>
<td>● Strengthening the provincial link and boost the connected development</td>
<td>● Improve the Environment and Decrease the Development Cost</td>
</tr>
<tr>
<td></td>
<td>● Accelerate the technical updating and fight against cramming and competition</td>
<td>● To Make Large the Newly Emerging Industries And Embrace Neighboring Challenges</td>
</tr>
</tbody>
</table>

From the above table, we can see that S-0 Combination Strategy emphasizes on the combination of external environment opportunities and the internal favorable conditions. While the W-T Combination Strategy highlights both the overcoming of the internal weaknesses and avoidance of
As for the reality of Gansu Province, both of the combinations are not to be applied and shall be excluded. Although S-T Combination and W-O Combination both shun from the extremes, they have their highlights as well. S-T Combination only notices the regional comparative advantages, shunning and minimizing the external threats, and has no vision to embrace opportunities and overcome internal curbing factors. W-O Combination stipulates the internal improvement by utilizing external opportunities while it neglects its own strengths and external threats. The complicated combination mix with a comprehensive consideration of S-T and W-O combination is more suitable for the reality of Gansu, absorbing and giving consideration to O, T, internally and externally. That is because the development of industries in Gansu can’t only pay attention to the favorable conditions, neglecting the unfavorable ones. Similarly, the development of industries in Gansu can’t only emphasize the weaknesses, neglecting the comparative advantages. Equally, it can’t only highlight the opportunities and forget the challenges.

As for this point, *Lu Hao*, the secretary of provincial Party committee once pointed out, “Gansu Province is a province with great difficulty and potentials in development. The advantages and disadvantages are both comparatively very remarkable.” We agree with this argument and further elaborate it in the following way: The disadvantages of the development of industries in Gansu are very prominent, but the four major weaknesses are not uncontrollable. With the transformation of the pattern of development, the weaknesses can possibly be turned into strengths. As for the three Threat factors, they have the characteristic of externality and as far as Gansu Province is concerned, they are not to be controlled. However, by pursuing new opportunities and some ways like industry updating, economic integration and the reconstruction of old industrial bases, they can be reasonably avoided or hampered. While the embrace of strengths and opportunities are the lasting supporting forces for the development of industries in Gansu. Therefore, the strategy choice for the development of industries in Gansu shall be the complicated mix including WO combination and ST combination. In other words, Gansu is expected to strike combination boxing. Based on the analysis of various factors, the mix strategies shall be guided by a
principal one and pursue its internal relations and connections.

2 Definition of Gansu’s Characteristic and Advantaged Industries

Since the implementation of Western Development Strategy, the policies and mentalities on the development of characteristic and advantaged industries in the west of the country have been strengthened and clarified. In the west, without the support of the development of characteristic and advantaged industries, the function of infrastructure can’t be made full use of, job opportunities can’t be increased, people’s income can’t be increased and the financial income can’t be accumulated. The key factors for the development of characteristic and advantaged industries in the western regions are market, enterprise, resource and bases. Market is the guide, enterprise is the main body, resource is the foundation and bases are the crucial factors.

In order to define the characteristic and advantaged industries of Gansu, we have to first of all give consideration to the factual background. Gansu Provincial Committee and government estimate that Gansu is now transforming from the first phase of industrialization to the middle stage. Inevitably, the industry quality is not high, the system is not complete and the development is weak in this period. Characteristic and advantaged industries, according to the country’s initial vision, refer to the advantageous industries with characteristics, namely, the characteristic industries stemming from the advantageous industries. For a province or a region, advantageous industries are always connected with key industries. Therefore, the specific contents of key industries and advantageous industries are the industry context of characteristic and advantaged industries in the province.

The natures and traits of the characteristic and advantaged industries must also be taken into account. In the regards of nature, the basic natures of advantaged industries can equally be applied to the characteristic industries. These are comparative advantage standard, industry link standard, flexible income standard, productivity standard, technology advancement standard and environment standard. Characteristically, the traits are reflected by differentiation. One is the absolute differentiation, namely the uniqueness of the industry. The other is the relative
differentiation and that is the emergence of comparative advantages and relative characteristics identified by the degree of development with different standards. For example, hugeness versus smallness, intensification versus extensification, delication versus crudeness, strength versus weakness, dispersal versus centralization, etc. In the time to come, the traits of the characteristic and advantaged industries will be basically reflected by the way of relative differentiation.

Consequently, given the vacancy of a standardized definition of a characteristic and strong industry, specifically in Gansu, we give the title to those industries that have stronger resource aptitudes and competition edges in regional market. These industries have broader market outlook, more sophisticated supply channels of key resources, better industrial links, newer technological management, higher output( profit and financial income), less resource consumption and less pollution. This definition shall be the yardstick to identify and select a characteristic and strong industry.

Section 3 Selection of the Characteristic and Advantaged Industries in Gansu

1. Selection Principles

1.1 Principle of Comparative Advantages

The full play of comparative advantage is the paramount value to be attached for the industries being restructured. On one hand, the transformation from the traditional industries to the characteristic and advantaged industries shall be accelerated according to the differentiation on the comparative cost. On the other hand, the dynamics of advantages shall also be anticipated and the newly emerged industries of great potentials shall be constantly cultivated.

1.2 Principle of Diversified Development

By means of the development of industries with or without links within the region, the variety and category of industry shall be enlarged and multiplied. On one hand, the supporting forces shall be
strengthened on the basis of industry links (upper and lower reaches), extension of industry chains and the tapping on the potential favorable resources. On the other hand, we shall develop private economy, individual economy and mixed economy, sticking to the reforms on the ownership of SOEs and boosting the variety of industries by diversifying the property rights.

1.3 Principle of Applicability of Technology

The competitiveness of an industry shall be strengthened by attaching great importance to the restructure and technological updating. The original strengths of the traditional advantageous industries can be maintained and enlarged by means of technological updating and the development of the newly emerged industries can be prolonged by starting from a high technological level. By means of elevation of technological abilities and the decreasing of material, resource consumption and pollution, the sustainable development can be achieved. By mastering the advanced technology, the skillful workers can possibly be transformed to technical experts, turning the original advantage in quantity to the strengths both in quality and quantity.

1.4 Principle of Market Orientation

This refers to the organic combination of user-orientation, competitor-orientation and price-orientation. The development of industry shall tailor to the specific demands of the end-user and satisfy the needs of the users. In the respect of competitor-orientation, comprehensive analysis on the peer competitors shall be made and the SWOT analysis on the regional market division, industry chain division and the industry portfolio division shall also be made, embracing the context of peer competitions both home and abroad. It is also important to precisely position in the market and tackle both competition and cooperation relationship. The profit and efficiency of industry will finally be concluded into the principle of price-orientation. The development of industries shall be centered on how to acquire the advantage in price.

1.5 Principle of Enriching the People and the Province

The development of industries shall be guided by the principle of enriching the People and the Province, abandoning the traditional way of increasing the financial income and taxes only. The
principle of Prosperity of People in the first place and Prosperity of Province in the second place in the development of industries will fully stimulate the booming of the industries which have the great capacity to receive the workforces and increase the income of employers and employees.

1.6 Principle of Functional Zones

The adjustment of the industries shall be centered on the positioning of the main functional areas and the market order shall be regulated. Given the characteristics of the co-existence of restricted areas to exploit in the larger areas and the key development areas in the smaller scope, the development of characteristic and advantaged industries can be realized with the western part of Gansu-Qinghai-Lanzhou-Xinjiang Economic Zone and Lanzhou Metropolis Ring as the key. Without detriment to the construction of functional areas, the development of characteristic and advantaged industries and functional areas shall be mutual and reciprocal.

2 The Reality

The development of industries has to encounter different stages: the newly emerged industry, potential industry, leading industry, pillar industry and ultimately the sunset industry. Starting from the reality of the industries in Gansu, the waning and waxing between leading industry and pillar industry point to where the **characteristic and advantaged industries in Gansu go**.

Leading industries refer to those with less weight and higher increase rate, normally over 10%. These industries, in certain time and period, have the function of impetus and direction for the industry restructuring and economic development. They have broad market outlook and strong technological innovation ability. They are innovative, sustainable, stimulating, scaled and potential. As regards to pillar industry, in certain periods, they occupy important and strategic positions with more than 8% of added value, besides, they have good input - output ratio. Based on the analysis on the weight of various industries and the increase rate, the ranking of the industrial AT can be noticed from Table 3-1 (See Table 3-1)

**Table 1-13 Weight and Increase Rate of Industrial AV of Different Industries**
<table>
<thead>
<tr>
<th>Industry</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petroleum processing, coking and nuclear fuel processing industry</td>
<td>19.02</td>
<td>14.64</td>
<td>-11.58</td>
<td>15.95</td>
<td>24.69</td>
</tr>
<tr>
<td>Death Metal refining and calendaring processing industry</td>
<td>6.66</td>
<td>5.81</td>
<td>0.21</td>
<td>7.45</td>
<td>46.75</td>
</tr>
<tr>
<td>Nonferrous Metal refining and calendaring processing industry</td>
<td>15.79</td>
<td>13.79</td>
<td>0.32</td>
<td>15.78</td>
<td>30.96</td>
</tr>
<tr>
<td>Chemical materials and chemicals manufacturing</td>
<td>3.26</td>
<td>3.32</td>
<td>16.98</td>
<td>3.43</td>
<td>18.24</td>
</tr>
<tr>
<td>Exploitation of petroleum and natural gas</td>
<td>5.78</td>
<td>11.97</td>
<td>137.89</td>
<td>10.28</td>
<td>-1.71</td>
</tr>
<tr>
<td>Producer and Supplier of electrical power and heating</td>
<td>11.35</td>
<td>11.54</td>
<td>16.79</td>
<td>10.46</td>
<td>3.74</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Non-Metal Mine products manufacturing</td>
<td>4.81</td>
<td>4.95</td>
<td>18.21</td>
<td>4.30</td>
<td>-0.58</td>
</tr>
<tr>
<td>Nonmetal Minerals Mining and Dressing</td>
<td>1.36</td>
<td>1.26</td>
<td>6.42</td>
<td>0.47</td>
<td>-57.31</td>
</tr>
<tr>
<td>Coal Selection Beverage Manufacturing</td>
<td>2.56</td>
<td>2.69</td>
<td>20.70</td>
<td>3.08</td>
<td>31.04</td>
</tr>
<tr>
<td>Tobacco Processing</td>
<td>2.29</td>
<td>2.07</td>
<td>3.83</td>
<td>1.76</td>
<td>-2.69</td>
</tr>
<tr>
<td>Food Processing Pharmaceutical Manufacturing</td>
<td>2.29</td>
<td>2.38</td>
<td>19.38</td>
<td>3.26</td>
<td>56.76</td>
</tr>
<tr>
<td>Leather, fur, feather, and plush manufacturing</td>
<td>0.40</td>
<td>0.45</td>
<td>29.23</td>
<td>0.40</td>
<td>1.73</td>
</tr>
<tr>
<td>Costume and other fibre products Manufacturing</td>
<td>0.32</td>
<td>0.32</td>
<td>14.87</td>
<td>0.29</td>
<td>3.72</td>
</tr>
<tr>
<td>Metal Product Industry Special</td>
<td>1.39</td>
<td>1.43</td>
<td>18.18</td>
<td>1.03</td>
<td>-17.57</td>
</tr>
<tr>
<td></td>
<td>1.69</td>
<td>1.42</td>
<td>-3.48</td>
<td>2.56</td>
<td>106.33</td>
</tr>
</tbody>
</table>
In terms of the Percentage, petrochemical, nonferrous metal and metallurgy are the strong powers of Gan’s industries. Since 2001, the industries occupying the highest Percentage are petroleum processing, coking and nuclear fuel processing with the figure constantly hovering from 15% to 20%. Next are the nonferrous metal refining and calendaring processing industries, and the Percentage is between 14% and 19%. The third variety is the produce and supply of thermo electrical and the Percentage is between 9% and 12%. No.4 is the Death Metal refining and calendaring processing industry with the figure between 6% and 12%. Fifth is the exploitation of petroleum and natural gas and the Percentage is between 5% and 12%. The sixth is the chemical materials and chemical manufacturing with the Percentage hovering between 3% and 8%. In terms of industry increase rate, besides the rapid growth of petrochemical, nonferrous metal and metallurgy industries, the industries of coal selection, processing of agriculture byproducts, pharmaceutical manufacturing and equipment manufacturing also maintained a high speed of growth. Among them, the increase scope of chemical materials and chemical manufacturing reached 137.89% in 2004 and that of exploitation of petroleum and natural gas amounted to 106.33% in the year of 2002. In 2003, the increase scope of Special Equipment manufacturing climbed to 106.33%. Consequently, in terms of ranking, the order of the characteristic and advantaged industries in Gansu is petroleum processing, coking and nuclear fuel processing industry, exploitation of petroleum and natural gas, chemical materials and chemical manufacturing, Death Metal refining and calendaring processing industry, nonferrous metal refining and calendaring processing industry, Nonmetal Minerals Mining.
and Dressing, Non-Metal Mine Products manufacturing, produce and supply of thermo
electrical, Coal Selection, Beverage manufacturing, tobacco processing, food processing,
pharmaceutical manufacturing, leather, fur, feather, and plush manufacturing, costume and
other fibre products manufacturing, and metal product industry.

3 Quantitative Selection

At present, Gansu is experiencing the industry adjustment and transition. Since the economic
quantitative analysis can only be applied to the pure market economy background, the quantitative
selection of the characteristic and advantaged industries in Gansu shall be based on the following
two points: One is the mutual verification by various mathematical formulas in economy, the other
is the necessary modification on the result of quantitative analysis referring the result of analysis of
the nature. As for the mutual verification, cluster Analysis and hierarchy analysis shall be adopted.

3.1 Cluster Analysis

According to the selection principle of characteristic and advantaged industries, giving
consideration to the possibility of acquiring the statistics, thirty-six industries in Gansu are
targeted. In the fields like regional advantage, factor consumption, production output and
efficiency, the degree of technology advancement, and social impact, ten indicators are utilized
including location entropy, contribution rate, profit–tax ratio, comparative productivity and others
for acquiring the original data. These indicators were directly used or calculatively applied. The
software for calculation is SPSS 13.0 for windows and related formulas. The result was dealt with
layer cluster Analysis. The conclusion reveals that petroleum processing, coking and nuclear
fuel processing industries are in the position of absolute advantage. Metal Refining and
Calendaring processing industries and nonferrous metal Refining and Calendaring
processing industries can be positioned as the characteristic and advantaged industries.
Among the remaining 32 industries, there are also some potential industries with good profit,
high efficiency and less risks, which can be cultivated into newly emerged characteristic and
advantaged industries. (See Appendix I)
3.2 Hierarchy Analysis

Equally, according to the selection principle of characteristic and advantaged industries, the quantitative standards are grouped into four sorts with totally seven indicators. In this analysis, an AHP progressive model was established. The next step was the selection of 16 industries out of 36 and the 16 industries were regrouped into seven to be evaluated by the seven indicators. Subsequently experienced experts from academic and governmental sectors were invited to score based on the comparison and analysis result. The scores were then calculated into the comparative importance weight and overall layer ranking by the Mathpro software. Finally each column of statistics on overall layer ranking was dealt with standardization excluding quantitative method. The comprehensive evaluation for each industry was then attained by weight aggregate. The final ranking for the seven industries is nonferrous metal industry, metallurgy industry, petrochemicals, energy industry, construction materials, pharmaceutical manufacturing, equipment manufacturing and food industry. (See Appendix II)

3.3 Accumulation of Cluster Analysis and Hierarchy Analysis

Because of the adoption of different quantitative methods, the ranking of petrochemical industry, nonferrous metal industry and metallurgy industry varies but they are all ranked the top three in different systems. Therefore, they can be positioned as the characteristic and advantaged industries. While, the ranking of construction material industry, food industry and equipment manufacturing industry experienced much fluctuation, and are generally ranked high. Therefore, they can also be considered as the characteristic and advantaged industries to be cultivated.
4 Conclusion

The economy management team, decision-making body in the enterprises and the theorists tend to define the characteristic and advantaged industries in different perspectives like enterprise, field and industry development. This requires the clarification of the relationship among them. First of all, enterprises are the main forces of the market and independent micro units of a field or an industry. The development of a field or an industry is preconditioned by the development of enterprises and is the result of the development of enterprises, containing the development of the industries. As a legal person, an enterprise is allowed to adopt many operational and development strategies and is not necessarily to be restricted within one field or one industry. Objectively speaking, the relationship among them is generally not totally reversible. Secondly, fields are the divisions of the industries of national economy. The report in this sense adopts the 2002 industry division standards and the construction of industries is grouped in different fields. A field, in nature, is the division and specification of industry and industries are the aggregation and grouping of fields. An industry can be composed of one field or different fields.

Based on the results of the nature and quantitative analysis, in terms of industry, the characteristic and advantaged industries are petroleum processing and coking industries, metal refining and calendaring processing industries, nonferrous metal refining and calendaring processing industries, chemical materials and chemical manufacturing, exploitation of petroleum and natural gas, non-metal mine products producing, nonmetal minerals mining and dressing, beverage manufacturing, food processing, pharmaceutical manufacturing, Chinese traditional herb and medicine processing, leather, fur, feather and plush manufacturing, general equipment manufacturing, special equipment manufacturing, communication and transportation equipment manufacturing, electrical machinery and equipment manufacturing industry, telecommunication equipment industry, computer and other electronics manufacturing, and nuclear fuel manufacturing. The summarized industries are petrochemical industry, nonferrous metal industry, metallurgy industry, pharmaceutical industry, equipment manufacturing, processing of agriculture byproducts, construction materials, high-technology industry and
nuclear fuel processing industry. Plus travel industry and logistics industry which are not discussed in this special subject, the series of the characteristic and advantaged industries in Gansu is conceived. (See Table 3-2) And for this column, we have both the horizontal and vertical verification, (See Appendix III)

### Table 3-2 Characteristic and advantaged industries in Gansu

<table>
<thead>
<tr>
<th>Field</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petroleum processing and coking industries, oil and gas exploration industries, nonferrous metal refining and calendaring processing industries, chemical materials and chemical manufacturing, Exploitation of petroleum and natural gas, non-metal mine products Producing, nonmetal minerals mining and messing, beverage manufacturing, food processing, pharmaceutical manufacturing, Chinese traditional herb and medicine processing, leather, fur, feather, and plush manufacturing, general equipment manufacturing, special equipment manufacturing, communication and transportation equipment manufacturing, electrical machinery and equipment manufacturing industry, telecommunication equipment industry, computer and other electronics manufacturing, and nuclear fuel manufacturing</td>
<td>Petrochemical industry, nonferrous metal industry, metallurgy industry, pharmaceutical industry, equipment manufacturing, processing of agriculture byproducts, construction materials, high-technology industry and nuclear fuel processing industry</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Apparent</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrochemical industry, nonferrous metal industry and metallurgy industry</td>
<td>Equipment manufacturing, processing of agriculture byproducts, pharmaceutical industry, construction materials, tourism, high-technology industry, logistics, and nuclear fuel processing industry</td>
</tr>
</tbody>
</table>

| Industries for the prosperity of People | Processing of agriculture byproducts, construction materials, tourism, high-technology industry, and logistics |
According to the verification result, the following conclusions can be reached:

4.1 **The supporting role of characteristic and advantaged industries will be bigger.** The strong and characteristic reflections of petrochemical industry, nonferrous metal industry, and metallurgy industry are quite prominent recently. In the near future and long run, the strong and characteristic reflections will emerge in pharmaceutical industry, equipment manufacturing, processing of agriculture byproducts, construction materials, high-technology industry, nuclear fuel processing industry, tourism and logistics, resulting in the enlargement of the supporting scope for the characteristic and advantaged industries.

4.2 **The quantity of the Rich People’s industries and Rich Province’s industries is basically the same, but the power differs greatly.** Rich people’s industries perform outstandingly in the regards of absorbing the job-seekers and the increase of employees. They also contribute greatly to the income of the employers. However, the growth of the revenue from tax (public finance) is not obvious. These industries include processing of agriculture byproducts, construction materials, high-technology industry, travel industry and logistics. While the situation of the Rich Province’s industries is just the reverse, they contribute greatly to the growth of revenue from tax (public finance) but are weak or almost not functional in stimulating the employment. These industries include petrochemical industry, nonferrous metal industry, metallurgy industry, pharmaceutical industry, equipment manufacturing and nuclear fuel processing industry. Just as mentioned above, it is no doubt that at present, the position of the Rich Province’s industries is high while that of the Rich People’s industries is low, viewed from the scale, structure, technology, layer, human resource, market share and etc. However, with the
change of the guiding principles of the industry development, the position is not static but dynamic, with the trend of enriching people in the first place and rich the province secondly.

4.3 In the market of Northwest region, the development of the characteristic and advantaged industries is not paralleled. The industries of petrochemical, nonferrous metal and nuclear fuel processing have their unique advantages and are not to be replaced. For a comparatively long period, the market demand is strong. But to make them stronger and more powerful, we are still confronted with the resource and technology strains. The metallurgy industry has the regional advantage and the competitively is strong. The regional market is expected to be prosperous for a long period. But examined in the larger scope, they face the threats to be reshuffled or squeezed by the peers. Except for some varieties, the overall competitiveness is not strong in the industries of medicine, equipment manufacturing, and building materials. In addition, they all belong to the industries with not-too-fierce competition and the market entry is not strict. Inevitably they will face greater competition pressure if they are to be developed significantly. The high-tech industry is special but not excellent and the process of industrialization is not ideal as expected. The China Industry Report in 2006 indicates that in 2004, the ratio of industrial AV of the high-tech industries of Gansu was ranked the third last in the western provinces and the fourth last nationwide, only higher than that of Xinjiang, Qinghai and Shaanxi. Breakthroughs must be realized in industrialization if it is to develop into a strong industry. The processing of agriculture byproducts is similar or the same as the industry in many provinces in the west. The competition is fierce and battles on resource and price rises from time to time. A lot of efforts are to be made before an industry is cultivated into a characteristic and strong industry.

4.4 In the national market, the series of characteristic and advantaged industries of Gansu Province appears to be uneven in specialty and Excellency. Compared with the reality that the percentage of population, GDP and industry quantity covers 2%, 1%, and 0.89% of the country’s total respectively, the industries of petrochemical, nonferrous metal, and nuclear fuel processing present a strong advantage trend, with employment, scale, estate and profit
indicators accounting for about 4% of the country’s total. The metallurgy industry presents a weaker advantage trend, occupying 1.2%—3% of the country’s total. The advantage of agriculture byproduct processing industry is just ordinary, accounting for 0.8%—2.5% of the country’s total while equipment manufacturing, construction materials industry and pharmaceutical industry have no advantage, only occupying 0.3%—0.7% of the country’s total.

Section 4  Development Strategy of Characteristic and Advantaged Industries in Gansu

The strategic plan for the development of Gansu Characteristic and advantaged industries is what call Strategies. Its basic point is to lay particular emphasis on the planning, application, suggestion and vision. It is neither the reduction of administrative will and the governmental action annotation, nor the development scheme of Characteristic and advantaged industries for the government. Instead, it just tries to provide and suggest a possible way of development of Gansu Characteristic and advantaged industries.

1. Strategic Planning for Developing Characteristic and Advantaged Industries in Gansu–Discrepancy Strategy

According to the SWOT analysis, we attain the strategic mode of the development of Gansu’s industries, namely the combination fix and the series of characteristic and advantaged industries. We all agree that the development of characteristic and advantaged industries in Gansu must strike combination boxing, then, how to perform this well is the direction of the strategic plan for the development of characteristic and advantaged industries in Gansu.
1.1 Discrepancy Strategy as the Overall Strategy of Developing Characteristic and Advantaged Industries in Gansu

Alternate position means that under the market economy condition, each party concerned can possibly shun from the fierce competition and direct conflicts or crashes. Under the circumstance of cooperative competition, parties can operate smoothly and attain win-win. Discrepancy strategy means that the development of characteristic and advantaged industries in Gansu shall be based on the factors like industry chain differentiation, market division, specialty division and the time and space difference in demands. The major way to adopt is the differentiation competition. It is important to position accurately, obtain motivation and cultivate the competition advantages to achieve the goal of making the characteristic and advantaged industries stronger and more powerful. It is the overall strategy on the development of characteristic and advantaged industries in Gansu, aiming to establish the general direction for the development in the future and grip the crucial factors.

1.1.1 Discrepancy strategy is Inevitable for Gansu to Develop Characteristic and Advantaged Industries.

It firstly owes to a deepened understanding of the reality in Gansu. No matter in the industry structure of the western region or the nation’s, the series of the characteristic and advantaged industries in Gansu reveals that only petrochemical, nonferrous metal, and nuclear fuel processing present prominent advantages and the metallurgy industry exhibits certain edges. Deducting the specialty of nuclear fuel processing industry in terms of production, operation and market, what we take the lead in the industry series both in the west and nationwide only accounts for one third of the series. That is to say, the characteristic industries in Gansu, viewed in the broader regional market, are still very weak. Another path therefore must be explored if we want to make the characteristic industries in the weak position stronger and more powerful. Meanwhile, it must also be noticed that accompanied with the progress of economic integration, the expertise division of
the industries is deepened. The division extends from the industries to the industry chains and product manufacturing. The chain division and link division result in the difficulty of cloning. The integration extends paralleled with the differentiation within the industry and products, bringing new growth space for the industries. Accompanied with the economic integration, the regional cooperation has been elevated into the level of industry adjustment. The regional division and the market division of industries have been gradually connected. However, the market division is characteristic of the differentiation which is hard to be replaced. This creates the conditions for the development of industries deep rooted in the regional market division, which provides the possibility of other paths for the development of characteristic and advantaged industries in Gansu in terms of differentiation and alternative.

**Secondly it is based on a sound undertaking of the rules of market competition.** One kind of competition among industries is the ruthless, cut-throat one while the other is the flexible competition with differentiation. The former is characteristic of strong devotion, proliferation, promotion and extension of capital, scale, technology, and market, requiring the strong foundation and a predominant position. The latter is to seek opportunities in the loops and vacancies. The industries in Gansu, obviously, are not equipped with the former conditions. Therefore, it can only follow the second pattern, striking the tactics of small versus huge, weak versus strong and inferior versus superior. The ancient wisdom of Tianjin Horseracing shall be adopted, making use of various differentiations in time, space and position to accomplish the final victory. In addition, no matter the decision-making body of the industry or the region, as being mutually influenced and affected, shall be controlled by the macro-regulation. In this way, it is easier for the decision-making body to reach cooperative agreements in the market competition, benefiting all the parties. Given the condition, mechanism and environment for the differentiated competition, it is by all means necessary to adopt the discrepancy strategy.

**Thirdly it is based on a thorough understanding of the main functions of the region.** The series of the characteristic and advantaged industries in Gansu presents the feature of the exploitation on the mineral resources and agriculture byproducts resources as the main force,
limited by the holding ability of environment and resource. If an industry is to be developed at a large scale, the conflicts and antinomy with environment and resources are inevitable. The key point of discrepancy strategy is exactly the shrinking from the conflicts and antinomy, maintaining the development in a harmonious and gentle way. According to the internal requirements of the main functions of a region, the industries shall be guided from the prohibited areas to reasonable grouping and migration. The development of industries and the protection of environment and resources shall be perfectly situated, striking a harmonious and balanced development under the natural and economic law.

Therefore, the discrepancy strategy will be the effective strategic choice for the characteristic and advantaged industries in Gansu, serving as the overall strategy. In the market economy, its goal shall be the maximization of the comparative advantages of industrial factors, the elevation of the industry competitiveness to the greatest extent, the transition of industry growth pattern to the greatest degree and the adaptability with environment and resources in the best way.

1.1.2 The Basic Direction of Discrepancy Strategy

The discrepancy strategy of industries includes horizontal (regional) discrepancy, vertical (chain) discrepancy and direction (market) discrepancy. Horizontal (regional) discrepancy means that from a comprehensive contrast analysis inside and outside the region, the industries with more comparative advantages can be selected as the key industries for development. It is connected with the enlargement of market share and division, acquiring the competitive advantages in the regional development. Vertical (chain) discrepancy starts from such aspects as products, spare parts, craftsmanship procedures, related service and various links in an industry. A comprehensive contrast analysis shall be made among industries to select the aspects with more advantages as the key for development. It also focuses on the enlargement of market space and the fulfillment of market vacancies to attain competitive advantage within an industry. Direction (market) discrepancy means on one hand, the market demand trends are anticipated, enabling delicate analysis and division for the demands and the enlargement of industry development. On
the other hand, the comparison on the opportunity cost of competition is made to find out the best way for diversified competition. Since the direction (market) discrepancy is functional on the basis of market which is an invisible hand in the reality, it lurks in the horizontal (regional) discrepancy, vertical (chain) discrepancy and is reflected by them.

The ultimate goal and result of alternate position is the acquiring of the position. The accurate positioning is the result and external reflection of precise discrepancy. Therefore, after the verification on the development realities of some industries both home and abroad, we can find out that the contents of alternate position development in Gansu are reflected by the result of discrepancy, namely, the direction of acquiring the position. According to the results of market prediction and technological economy analysis, the actual direction of the series of the characteristic and advantaged industries in Gansu is

**Petrochemical Industry**  The horizontal (regional) referees are Lanzhou, Yumen and Qingyang. The vertical (chain) referees are the development of the high value-added industries like super absorbent resin, All Steel Radial Tine for Heavy Truck, special use plastics centered on the deep processing of ethylene and the forming of TDI, chlorine alkali chemical, plastic processing, rubber processing, paint, Acrylamid series, Fluorine chemical, coal chemical, natural gas chemical and characteristic inorganic chemicals.

**Nonferrous Metal Industry**  The horizontal (regional) referees are Lanzhou, Baiyin, Jinchang and south of Gansu Province. The vertical (chain) referees are advanced aluminum, aluminum alloys and plates, the alloys for air-conditioner, aluminum alloys for decoration paints, PS aluminum plates for publishing use, rods and bars of aluminum and aluminum alloy, rods of copper tubes, copper sheets, nickel powder, nickel wire mesh, nickel fibre, nickel alloy, high-quality rare earth illumination material and new rare earth energy-saving lamps, rare earth permanent magnet electric machinery, nickel metal hydride batteries and rare earth decontaminant for emissions.
**Metallurgy Industry**  The horizontal (regional) referee is Jiugang Group and vertical (chain) referees are quality carbon steel, stainless steel, low-alloy steel, high-quality material and stainless steel sheets, carbon steel cold-rolled strip, galvanized sheets, color metal sheet, large helical welded tube and deep processing of stainless steel.

**Medicine**  The horizontal (regional) referees are Lanzhou, Dingxi, Jinchang and south of Gansu Province. The vertical (chain) referees are the new medicines with vaccine, genetic engineering medicine and Chinese and Tibetan medicine as the key, cultivation and industrialization of quality species and resources, modification technology on genetic transferring, Embryo biological engineering, united breeding of quality genes, R&D and industrialization of biogen, biological leaching technology, cultivation of lecithin, soybean peptide and isoﬂavones.

**Equipment manufacturing industry**  The horizontal (regional) referee is Lanzhou, and Tianshui. The vertical (chain) referees are special delicate digital machine tool and tools, wind power generation equipment, electric machine, vacuum equipment, new kind of environmentally-friendly equipment, telecommunication and military equipment, cars and spare parts.

**Agricultural product processing industry**  Horizontal (regional) referees are Hexi, Dingxi, Pingliang and south of Gansu Province. The vertical (chain) referees are the processing of high-quality potato product series, delicate starch, modiﬁed starch, denatured dextrin, high-quality casual food, hop extraction, deep processing of olive, sophistication of fruit wines, grass seeding and industrialization, scaleful breeding of cows and goats and processing of sirloin and beef.

**Building Materials**  The horizontal (regional) referee is mainly Lanzhou. The vertical (chain) referees are new kinds of 干法cement, new building materials, new wall body materials, heat preservation materials, waterproof materials, decoration materials and plastic steel doors and windows, the plastics tube materials and tube pieces, new glass sheet and porcelain in building and restrooms.
High-tech Industry  the horizontal (regional) referees are Lanzhou, Baiyin and Tianshui. The vertical (chain) referees are the new materials, information manufacturing, bio-medicine, civil nuclear technology, industry automation instruments, wind power supply, solar energy for generating electricity, exploration on the renewable resources like biological and energy-saving building materials, exploration and exploitation on the technology for the safe production of coal, coaled methane resources, the exploration and exploitation technology of petroleum, nuclear electric equipment and nuclear fuel equipment.

Nuclear fuel processing industry  The horizontal (regional) referees are No.404 Factory and No. 504 Factory of nuclear industry. The vertical (chain) referees are nuclear fuels and components, isotope instruments, nuclear instruments, nuclear irradiation and processing, treatment of nuclear fuels, nuclear medical treatment technology and equipment.

With the change of time, the positioning will also experience fluctuation. The description in the way of industry sequence is to explain that on one hand, the result of discrepancy is the acquiring of position; on the other hand, it intends to provide the original statistics for each specific strategy to be verified in the following sections.

1.2  Industrial bases, industrial parks and clusters as factors of the vertical (chain) discrepancy.

It is noticed that vertical (chain) alternate position starts from such aspects as products, spare parts, craftsmanship procedures, related service and various links in an industry. A comprehensive contrast analysis was made among industries to select the aspects with more advantages as the key for development. It also focuses on the enlargement of market space and the fulfillment of market vacancies to attain competitive advantage within an industry. Then, how to be specific in the series of characteristic and advantaged industries in Gansu? How to attain the competitive advantage in the similar kinds of industries during the acceleration of market integration? How to reflect the discrepancy strategy? We hold that industrial bases, industry parks and centralized
industry groups are the industry carriers of vertical (chain) alternate position. This constitutes the direction of striking the combination boxing.

1.2.1 Enhancing the building of industrial bases

It is clearly stipulated in the nation’s 11th Five—Year Plan for Vigorously Developing the Western Region that the development of characteristic and advantaged industries shall aim to the gradual forming of a few processing bases of characteristic resources and development bases of advantaged industries. The two bases put emphasis on the resource aptitude of the former and the market competitive advantage of the latter. The combination of both constitutes the important content of the development of characteristic and advantaged industries. The majority of the advantaged industries in Gansu are the old industrial bases characteristic of acquiring resources. The industry sectors like petrochemical, nonferrous metal, metallurgy and equipment manufacturing affiliated to the old industrial bases have certain foundation and competitive advantage and shall be the key for construction. Meanwhile, the pharmaceutical and agriculture byproducts bases which present very strong development momentum in recent ten years shall also be paid great attention. Therefore, strategically, on one hand, we shall abide by the nation’s structuring of the bases stipulated in the 11th Five—Year Plan for Vigorously Developing the Western Region, of which 15 belong to Gansu.(See Table 4-1)On the other hand, the local bases shall also be constructed. The combination of both is expected to enable Gansu to have the first-class industrial bases of the Northwest part or even larger scope in industries like petrochemicals, nonferrous metal industry, metallurgy, equipment manufacturing and medicine in the following five to ten years.

Table 1-14 Industrial Bases to be Built In Gansu as Prescribed in the 11th Five-Year Plan for Vigorously Developing the Western Region

<table>
<thead>
<tr>
<th>Important Energy and Chemical Engineering Bases</th>
<th>Coal production and coal-electricity integration bases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal production and coal-electricity integration bases</td>
<td></td>
</tr>
<tr>
<td>Large petroleum processing bases</td>
<td></td>
</tr>
<tr>
<td>Renewable energy bases</td>
<td></td>
</tr>
<tr>
<td>Exploitation and Processing Bases for Advantaged Mineral Resources</td>
<td>National petroleum reserve bases</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td></td>
<td>Comprehensive exploitation and utilization of non-ferrous metal</td>
</tr>
<tr>
<td></td>
<td>Exploration, research and production of rare earths</td>
</tr>
<tr>
<td></td>
<td>Iron and steel</td>
</tr>
<tr>
<td>Processing Bases for Major Characteristic Agricultural and Livestock Products</td>
<td>Brewing industry</td>
</tr>
<tr>
<td></td>
<td>Traditional Chinese medicine (TCM) industry</td>
</tr>
<tr>
<td></td>
<td>Fruit and vegetable processing industry</td>
</tr>
<tr>
<td></td>
<td>Starch processing industry</td>
</tr>
<tr>
<td>Major Equipment Manufacturing Bases and National-level R&amp;D and Production Bases</td>
<td>Heavy-duty engineering machinery and equipment</td>
</tr>
<tr>
<td></td>
<td>Digital machine tools and digital intelligent instruments and meters</td>
</tr>
<tr>
<td></td>
<td>Major medical instruments and equipment</td>
</tr>
<tr>
<td>R&amp;D and Production Bases of Key Products of High-Tech Industries</td>
<td>Bio-tech industries</td>
</tr>
</tbody>
</table>

Source: *11th Five—Year Plan for Vigorously Developing the Western Region*

Dismantling of the 15 industries of the nation’s plan to the series of characteristic and advantaged industries, plus the construction of the local bases, constitute the industrial bases of characteristic and advantaged industries in Gansu. (See Table 4-2) **The industrial bases programmed by the nation shall be given priority since they are important platforms to boost the strength and scale of characteristic and advantaged industries in Gansu.** Market shall play the major role in the construction of industrial bases. Enterprises are the main economic entries of the industrial bases, seeking market space and vacancies centering on the industry chain. They undertake no social and administrative functions which are the responsibilities of the management committee of the industrial park. The tasks and goals shall be materialized by the behaviors of the enterprises.
<table>
<thead>
<tr>
<th>Industry</th>
<th>Location</th>
<th>Major Enterprises</th>
<th>Products</th>
<th>Medium-term plan on output or scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrochemical</td>
<td>Lanzhou</td>
<td>PetroChina Lanzhou Petro-chemical Company</td>
<td>Processing of crude oil, ethylene, polyolefin, synthetic rubber, soda, synthetic ammonia, TDI, titanium dioxide and other products with a total of more than 800 varieties</td>
<td>Processed crude oil: 20 million tons Ethylene: 800 thousand tons Polyolefin: 1.13 million tons Resin: 260 thousand tons TDI:100 thousand tons</td>
</tr>
<tr>
<td></td>
<td>Qingyang</td>
<td>PetroChina Qinghua Company</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jiuquan</td>
<td>PetroChina Yumen Company</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Huayuan Titanium Dioxide Company</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Gansu Yasheng Group</td>
<td></td>
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<tr>
<td></td>
<td>Pingliang</td>
<td>Zhongxun Coal Chemical Company</td>
<td></td>
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<tr>
<td></td>
<td>Baiyin</td>
<td>Gansu Yinguang Company</td>
<td></td>
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<tr>
<td></td>
<td>Jinchang</td>
<td>Jinchang Chemical Engineering Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ferrous</td>
<td>Jinchang</td>
<td>Jinchuan Group</td>
<td>Nickel, Copper, Aluminum, Lead, Zinc, Rare Earths, Tungsten, gold and nickel-cobalt alloy new materials, nickel carbonyl,</td>
<td>Total production of over 2.2 million tons of ten sorts of</td>
</tr>
<tr>
<td>Metal</td>
<td>Baiyin</td>
<td>Baiyin Company</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Gansu Rare Earth Company</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>CHINAL Honglu Aluminum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Company/Group</td>
<td>Metal/Mineral Product</td>
<td></td>
<td></td>
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<tr>
<td>--------------</td>
<td>----------------------------------------------------</td>
<td>----------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lanzhou</td>
<td>CHINAL Lanzhou Aluminum</td>
<td>Non-ferrous metal, among which:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHINAL Liancheng Aluminum</td>
<td>Nickel: 150 thousand tons</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gansu AL</td>
<td>Copper: 500 thousand tons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longnan</td>
<td>Chengzhou Mining and Technology Group</td>
<td>Nickel-Copper materials:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Baohui Group</td>
<td>200 thousand tons</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Xingyu Group</td>
<td>Aluminium: 1 million tons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zhangye</td>
<td>Xiaoliougou Tungsten Mine</td>
<td>Aluminium material: 300 thousand tons</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Lead-Zinc: 350 thousand tons</td>
<td></td>
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<tr>
<td>Gannan</td>
<td>Gesaer Gold Company</td>
<td></td>
<td></td>
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<tr>
<td>Prefecture</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lanzhou</td>
<td>Jiuquan Iron &amp; Steel Corporation (JISCO)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yuzhong JISCO Factory</td>
<td>Iron: 7 million tons</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Northwest Ferroalloy Company</td>
<td>Steel: 7.8 million tons</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Lanzhou Carbon Group</td>
<td>tons (including 900 thousand tons of stainless steel)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jinchang</td>
<td>Hexibu JISCO Iron Factory</td>
<td>Steel material: 7.2 million tons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>Location</td>
<td>Company</td>
<td>Products</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
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<td>----------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Medicine</td>
<td>Lanzhou</td>
<td>Lanzhou Biology Institute</td>
<td>Finished Chinese Traditional Medicine, bio-products, Tibetan Medicine and health-care products</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dingxi</td>
<td>Fuzheng Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Longnan</td>
<td>Duyiwei Group</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Lanzhou</td>
<td>Lanshi Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tianshui</td>
<td>Xinghuo Machine Tool Factory</td>
<td>Large oil exploitation and refining equipment, special digital precision machine tools and pneumatic tools, intelligent high and medium pressure switch cabinets, new large-and-medium-sized HV electric machines, spindle servo electric machines, vacuum equipment, computer-controlled seed-processing equipment, buses and cars</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jiuquan</td>
<td>Aokai Seed Mechanics Company</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Wuwei</td>
<td>Ronghua Group</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Huangtai Group</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>The cultivation area of TCM herbs amounting to 2 million mu (133,333 ha)</td>
<td></td>
</tr>
<tr>
<td>Products and Byproducts</td>
<td>Location</td>
<td>Company Name</td>
<td>Products and Byproducts</td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Zhangye</td>
<td>Mogao Group</td>
<td>Brewar’s malt, hop polyphenols, grape wine, dehydrated vegetables, yophilized vegetables, tomato sauce, potato starch, corn starch, casein, dairy beverage, meat products, fruit juice, Chinese liquor, processing of fruit and clover</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Binhe Group</td>
<td>Gaotai Tomato Sauce Factory</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jiuquan</td>
<td>Zhongye Company</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Yasheng Group</td>
<td></td>
<td></td>
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<tr>
<td>Jiayuguan</td>
<td>Hongfeng Company</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Dingxi</td>
<td>Jindali Potato Company</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Tengsheng Company</td>
<td></td>
<td></td>
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<tr>
<td>Gannan Prefecture</td>
<td>Hualing Casein Company</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Lanzhou</td>
<td>Huanghe Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Longnan</td>
<td>Jinhui Group</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Lanzhou</td>
<td>New Building Material Company of Lanzhou Chemical Company</td>
<td>Cement, new building materials, new wall paints, thermal insulation material, water-proof material, plastic steel doors and windows, plastic pipes, glass sheet, coloured wall glazed tiles, and high-quality ceramic tiles</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lanzhou Hongjian New Building Material Company</td>
<td>Cement:20 million tons, of which 70% will be new-dry-process cement</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Lanzhou Glass Sheet Factory</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Qilian Mountain Cement Group</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Baiyin</td>
<td>Baiyin Xinleya Company</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Jiuquan</td>
<td>CNEC 404 Factory</td>
<td>Nuclear fuels and components,</td>
<td></td>
</tr>
<tr>
<td>nuclear fuel</td>
<td>Lanzhou</td>
<td>CNEC 504 Factory Institute of Modern Physics of CAS Lanzhou Irradiation Center</td>
<td>isotope instruments, nuclear instruments and meters, nuclear irradiation and processing, nuclear fuel reprocessing, and nuclear medical treatment</td>
<td></td>
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<td>----------------------------------</td>
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<td>---------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>high-tech industry</td>
<td>Lanzhou</td>
<td>Yuzhong Industry Belt of Jinchuan Group Lanzhou High-tech Development Zone Petrochemical Industry Zone in Xigu District of Lanzhou Heping Industrial Zone in Yuzhong County, Lanzhou</td>
<td>New materials of non-ferrous metal, fine chemical materials, inorganic mineral materials, genetic engineering, fermentation engineering, non-ferrous engineering, new electronic components, integrated circuit, software, special electronic processing equipment, wind power generators, solar energy equipment, water-conservation agriculture, and biological agriculture equipment and products</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Baiyin</td>
<td>Baiyin High-tech Industry Zone of CAS</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Jinchang</td>
<td>Jinchang National Base of New Material</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The bases should be built on scales conducive to the development of related industries, and with differentiating characteristics and expertise. The industrial bases especially in petrochemical, nonferrous metal, and metallurgy industries, shall try to seize the development opportunities in the process of extension of industry chains based on the previous advantages. The petrochemical industrial bases centered on Lanzhou, Jiuquan (Yumen) and Qingyang shall give priority to the research and development of the high-quality oil products and the down-stream ethylene products, increasing the ration and proportion of special resin and strengthening the competitiveness in the fields like organic chemical raw material, synthetic resin and synthesize
rubber, etc. Nonferrous Metal industrial bases centered on Lanzhou, Jinchang, Baiyin and south of Gansu shall accelerate the construction of the consistence of raw materials, exploring the resources home and abroad. The processing products with high technology shall be developed to realize more than half of the local processing of aluminum cupreous and the world-class base of nickel platinum. The metallurgy industry centered around Jiuquan Steel Group in Jiayuguan shall accelerate the pace to explore the high value-added products like carbon steel cold rolled strip, stainless sheets and helical-welded tube, achieving the transformation from the steel refining base to the special steel base. The nuclear fuel processing industrial bases shall take the advantage of market competition to acquire broader space for development. The resources shall be integrated in the industrial bases for equipment manufacturing, processing of agriculture byproducts and construction material. The market positioning shall be specific, utilizing the comparative advantage in certain aspects to improve the market share. Following suit to other regions, similar industries and the static enlargement of scale are forbidden. There are also quite a few other provincial bases with varieties. Some are motivated by the government but not competitive and restricted by scale and specialty. They shall be integrated and gradually merged into the regional bases after selection.

1.2.2 Build Characteristic Industrial parks

The development and construction of various industrial parks in Gansu can be dated back to the end of 1980s with a total number of 94 in different levels. After regulation and restructuring, there are now 34 remained. Besides, there are a lot of centralized industry areas with features in cities and counties. In terms of industry constitution, the parks and centralized industry areas are situated in the industries like processing of non-ferrous metal, petrochemical, delicate chemicals, coal chemical, carbon, aluminum alloy, new materials, processing of metal products, electrical instruments, machinery, building materials, medicine and bio-medicine, processing of agricultural products and byproducts, food, textile, etc, among which many are the characteristic and advantaged industries of Gansu. Viewed from the perspective of industry cost, a centralized layout for the infrastructure and pollution issues in the parks saves the cost in construction and curbing
pollution. Seen from the effect of industry, many industrial parks are the growth points of local industries, serving as the window of technology, knowledge, management and opening up policy. In Gansu, a number of characteristic and strong industrial bases are situated in the parks and centralized areas with favorable conditions. The construction of industrial bases, industry parks and centralized industry areas are coherent. But the majority of industrial bases are not located in the parks and centralized areas. The establishment mode, promotion and operational pattern of parks and centralized areas also differ from industrial bases. Generally speaking, the construction of parks is lagged behind with a lack in innovation and the managerial systems. The old parks and the new ones are mixed. Because of the lack in scientific planning and effective coordination mechanism, there are not many strong industrial parks with characteristics. Therefore, the construction of industrial parks in Gansu shall Endeavour to realize the transition from the development parks to the characteristic parks in ten years. **A characteristic park is based on the characteristic and advantaged industries in the region with advantaged enterprises taking the flagship role, enables appropriate concentration of industries according to the division of labor in the industrial chain so as to foster the development of clusters, and serves as an industrial area specialized in particular fields.** The key points for the transition shall be:

- **Continue to define the guiding principles of the parks.** According to the reality of the construction of the industrial parks in Gansu, the key point is the creation of the characteristic parks. The guiding principles are scientific development, regulation and restructuring. We shall not only fix the attention on the development of industries, but also on the development of characteristic and advantaged industries. Not only shall we pay attention to the development of industries, but also we should emphasize the harmonious development among industry resource, employment, income and environment, striking a comprehensive development of all the employers and employees in the parks. The new development view shall be applied in the regulation and restructuring, equally, regulation and restructuring shall be merged into the whole development. New modes shall be established and expanded in the process of development. The new patterns shall highlight the characteristic and advantaged industries, promote industry link, and elevate industry concentration and links. The new patterns shall be preconditioned with
centralization. They shall not only highlight the local advantages on resources, but also attend the economic radiation of the neighboring areas. The experience on the construction of industrial parks without public finance devotion shall be recommended. The good practices of the transformation from sole merchandising to selected merchandising, the combination of financing and attraction of customers and the reduction of development cost shall also be guided.

- Expedite the making of general planning for the parks and the blueprint for industrial development, and give special attention to the development plan of characteristic industries hosted by parks in the region. The general plan shall not only include the infrastructures, but also the contents of the directions of industry development, the division of industry functional areas and the adaptability to the major functional areas. The industry development plan shall be based on the general plan. Besides the contents of industry direction, layouts and policies, the project models shall also be included to support the development of industries, enabling the best materialization of the industry development plan. The general plan and the development plan for the 34 provincial industrial parks shall terminate recently. Those of the centralized industry areas of different levels shall also be made as soon as possible. Only by leaping high and start early, can they be the propeller of the development of characteristic and advantaged industries.

- Break fresh ground in management and operation mechanisms. Establish and complete “small government, big society and good service” management system, continuously improving the policy, legal and market environment. Work concerning land supply, programming supervision, environment evaluation and technological progress shall also be done well. From the provincial level, the situation of mixed management, blurred division and unclarified responsibility must be changed. We must have the courage to create the management system and establish the authorities organization to promote the development of industrial parks and centralized industry areas, leading them to accelerate the development of characteristic and advantaged industries. We shall also have the courage to implement the censorship mechanism for the provincial industrial parks. On the basis of the evaluation standards, the last one must be eliminated. The excellent centralized industry areas shall be promoted into a provincial industry.
one, breaking the tenured situation. Meanwhile, the balanced layout of provincial industry
gardens must be shattered. More provincial industry gardens shall be arranged in such favorable
regions like Lanzhou-Baiyin Economic Zone and Hexi Region since they maintain rapid
development, realizing the combination of the favorable factors of park economy, regional
economy and industry economy.

● **Consolidate the parks with vision.** At present, the industrial parks in Gansu are mainly
developed by government promotion and policies which aim to attract enterprises. However,
efforts should focus on sustainable development if the parks are to go further. That means the
enterprises not only move in but also take root in the parks, just as the parks will stay in the
regions. It is important to forge stable interdependent relations among enterprises, industries, the
parks, and the regions. The aim is to prevent the parks from coming to a premature end, migration
or being reduced to a mere skeleton. The parks must become part of the regions geographically
and industrially. Based on the interests of parties concerned and taking advantage of available
social connections, it makes sense that for the regions, the parks and enterprises, cooperative ties
could be forged in terms of their institutions, networks and clusters. Such ties should bind the
regions both to the parks, and their tenants, namely the enterprises in the parks. In this way, the
parks will be well integrated into the economic, social and cultural developments of the regions,
which deny haphazard immigration and imitation. Therefore, it is imperative that Gansu work out
feasible measures to consolidate the park-enterprise and park-region ties, and enable a bigger role
of the parks in the regions.

1.2.3 Develop New Industrial Clusters

Industry cluster is the core of modern industrial economy system. As a kind of industry link in the
evolution of industry development, lacking in them are nevertheless the strains and shortcomings
of the development of Gansu’s industries. Currently, there are few industrial clusters in the true
sense. There is the tendency of establishing industrial clusters by big enterprises, resulting in the
unfunctional phenomenon of the small and medium sized enterprises and the constant blockage of forming flexible industrial clusters. The establishment of industrial clusters is a necessity for implementing the Base and Park strategies, thus enabling the establishment of better cooperative relationship between bases and parks, industry innovation system, the network of research and development and sales. The industrial clusters in the eastern regions greatly elevate the level and result of construction of industrial bases and parks. The development pattern shall be adopted by Gansu as well. The development shall be based on market promotion aided by government guidance and maintain a rational development. With ten years or so, a group of competitive industrial clusters with good specialty division and complete supporting systems shall be established in the key characteristic parks and major industrial bases.

**Firstly, get rid of misunderstanding and see the truth.** Currently, quite a few governmental decision-making bodies and industry management teams regard big corporate groups as the industrial clusters. As a matter of fact, they are strictly different. Industrial clusters are mainly composed of quite a few independent small and medium sized enterprises with high degree of specialty while the scale of corporate groups is big but the quantity is quite limited. The establishment of Gansu’s corporate groups is early but the industrial clusters are just hatching. The industrial clusters have strong sense of market operation and are closely connected with innovation capability and the competitiveness in the region while the corporate groups emphasize the merging and combination of strong micro units. Industrial clusters also differ from the corporate clusters. Industrial clusters include not only the manufacturing enterprises but also the broker, service organizations and scientific research institutes, attaching great importance to the non-manufacturing factors. It must be clearly realized that the simple matching of similar enterprises will not necessarily form the industrial clusters; instead, focuses shall be on the development of small and medium sized enterprises. By adequate growth of small and medium sized enterprises, industrial clusters can be naturally cultivated.

**Secondly, SMEs shall be the major force for the growth of industrial clusters.** The government shall create the conditions for the development of small and medium sized enterprises,
release and implement the plan for the development of small and medium sized enterprises. In addition, related laws and regulations shall be correspondingly released to regulate the market behaviors. The social system for the development of small and medium sized enterprises shall also be set up, promoting the information and financing services. Small and medium sized enterprises are supported and encouraged to participate in the fair competition for market entries. In the key characteristic parks and strong bases, the industries with more small and medium sized enterprises shall be selected to breed the industrial clusters.

**Thirdly, SOEs shall make reason concessions for the vitality of competition.** Currently, despite a large number of small and medium sized enterprises in Gansu, the big and super SOEs are in an extremely favorable and dominant position. In market competition, it is very likely that the strong takes all. Nevertheless, industrial clusters require a full-fledged environment for market competition. In this case, it would be sensible to let those SOEs make reasonable concessions to the growth of SMEs so that industrial clusters could take shape and in turn benefit the SOEs. To this end, the government should call on parties concerned to calculate and evaluate the profit margin, the industrial chain, synergies, and market shares among other issues.

**1.3 Regional Differentiation and Links as Factors of the Horizontal (Regional) Discrepancy**

Horizontal (regional) discrepancy means that from a comprehensive contrast analysis inside and outside the region, the industries with more comparative advantages can be selected as the key industries for development. It is connected with the enlargement of market share and division, acquiring the competitive advantage in the regional development. Meanwhile, as analyzed before, the diversified competition is going on with the backup of acceleration of economic integration. Therefore, integration and differentiation are the two interlocking factors in the regional development of characteristic and advantaged industries. Starting from this, regional differentiation and regional links are naturally the reality bases of horizontal (regional) discrepancy. This constitutes another direction of striking the combination boxing.
1.3.1 Enhance Regional Differentiation by Further Industrial Labor Division

In terms of regional differentiation, four levels have been formed: province, provincial economic zones, cities, and counties (districts). Provincial economic zones are naturally established mainly with internal economic links as its foundations, especially the industrial links. It is not practical to require the development of characteristic and advantaged industries at each level to conform to those of the province. Instead, each shall establish their own brand names. The confliction between economic factors and administrative factors, the antinomy between market-motivated tendencies and the old mechanisms and systems must be given the consideration. Economic factors and market-motivated tendencies shall be given the priority to solve the problem, materializing the industrial diversification and differentiation. Based on the market demands and guided by the industry segmentation, with ten years, the sophistication of the characteristic and advantaged industries in the middle and Hexi economic zones must be realized by the industrial development in city and county (district) levels, highlighting the development of the characteristic and advantaged industries of the provincial economic zones. The characteristic and advantaged industries of the economic zones in the Southeast part of Gansu must take on new advantages and the development of the characteristic and advantaged industries in ethnic groups must have new breakthroughs.

Following the analytical method in this report, the constitution of the characteristic and advantaged industries in the city level is at first worked out after on-spot investigation and comprehensive consideration of the difficulty degree of acquiring the statistics. Based on the result, the next step is the supplementation of the analytical conclusions on industries, deducting the influences of non-economic factors. The direction of the characteristic and advantaged industries in the four economic zones can be attained. Furthermore, it is evidenced by the practices of the characteristic and advantaged industries in the county (district) level. From Table 4-3, we can see the characteristic and advantaged industries highlighting regional differentiation. From it, we can see the higher the regional level is a more macroscopic division of the strengths and characteristics we can get. And the instruction will be more effective. While the lower the regional level is, a
more specific division of the strengths and characteristics we can attain. And in this regard it is easier to be operated.

<table>
<thead>
<tr>
<th>Regional level</th>
<th>Characteristic and advantaged industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provincial Level</td>
<td>Petrochemical, non-ferrous metal, metallurgy, medicine, equipment manufacturing, processing of agricultural products and byproducts, building material, high-tech, processing of nuclear fuel, tourism and logistics</td>
</tr>
<tr>
<td>Central Economic Zone</td>
<td>Petrochemical, non-ferrous metal, metallurgy, equipment manufacturing, processing of agricultural products and byproducts, Chinese traditional medicine and bio-medicine, high-tech, building material, and food</td>
</tr>
<tr>
<td>Hexi Economic Zone</td>
<td>Metallurgy, non-ferrous metal, petrochemical, processing of nuclear fuel, food, building material, processing of agricultural products, processing of mineral products, high-tech, equipment manufacturing, brewing industry and tourism</td>
</tr>
<tr>
<td>Economic Zone in Southeast Gansu</td>
<td>Equipment manufacturing, non-ferrous metal, processing of agricultural products and byproducts, pharmaceutical industry, building material, petrochemical and tourism</td>
</tr>
<tr>
<td>Economic Zone of Ethnic Minorities</td>
<td>Processing of agricultural products and byproducts, processing of leather and wool textile, processing of special commodities for ethnic groups, building material, refining and coining, and Tibetan Medicine</td>
</tr>
<tr>
<td>Lanzhou</td>
<td>Petrochemical, non-ferrous metal, metallurgy, equipment manufacturing, processing of agricultural products, Chinese traditional medicine and bio-medicine, high-tech and modern logistics</td>
</tr>
<tr>
<td>Baiyin</td>
<td>Non-ferrous metal, rare earth material, fine chemical industry, minerals industry, resources circulation industry, machinery and special equipment manufacturing, non-metal mine product industry, processing of characteristic agricultural and livestock products, and Yellow River cultural tourism</td>
</tr>
<tr>
<td>Dingxi</td>
<td>Processing of potatoes, modern pharmaceutical industry, livestock grass processing, processing of aluminum, building material, and food</td>
</tr>
<tr>
<td>Counties</td>
<td>Industry Focus</td>
</tr>
<tr>
<td>----------</td>
<td>----------------</td>
</tr>
<tr>
<td>Jiayuguan</td>
<td>Metallurgy, food, and building material</td>
</tr>
<tr>
<td>Jinchao</td>
<td>Non-ferrous metal, petrochemical, building material and processing of agricultural products and byproducts</td>
</tr>
<tr>
<td>Jiuquan</td>
<td>Processing industries of mineral and agricultural products, high-tech, equipment manufacturing, processing of nuclear fuel, and tourism</td>
</tr>
<tr>
<td>Zhangye</td>
<td>Mineral and chemical engineering industries, processing of agricultural products and byproducts, and non-ferrous metal</td>
</tr>
<tr>
<td>Wuwei</td>
<td>Brewing industry focuses on grape wine, bi-chemical industry focuses on the deep processing of corn starch, livestock grass industry focuses on the white yak and tourism</td>
</tr>
<tr>
<td>Tianshui</td>
<td>Equipment manufacturing, processing of agricultural products, pharmaceutical industry, building material and tourism</td>
</tr>
<tr>
<td>Longnan</td>
<td>Non-ferrous metal, building material, medicine, and processing of agricultural products and byproducts</td>
</tr>
<tr>
<td>Pingliang</td>
<td>Coal chemical industry, livestock grass processing industry, fruit and vegetable processing industry, building material and machinery manufacturing</td>
</tr>
<tr>
<td>Qingyang</td>
<td>Oil and gas chemical industry, processing industry of agricultural products, building material and folk handicrafts</td>
</tr>
<tr>
<td>Linxia</td>
<td>Processing of agricultural products and byproducts, processing of leather and wool textile, processing of special commodities for ethnic groups, and refining and coining industry</td>
</tr>
<tr>
<td>Gannan Prefecture</td>
<td>Tourism, livestock product processing, gold and Tibetan medicine</td>
</tr>
<tr>
<td>Minxian County in Dingxi</td>
<td>Hydropower industry, refining and processing industry of mineral resources</td>
</tr>
<tr>
<td>An’ ding District in Dingxi</td>
<td>Processing industry of green food and modern pharmaceutical industry</td>
</tr>
<tr>
<td>Zhouni County in Gannan</td>
<td>Hydropower industry, livestock products processing, processing of mineral resource and processing of Fungus</td>
</tr>
</tbody>
</table>
According to the reality of industrialization in different levels, the main points for further industrial division of labor are:

- **Differentiation, specialization and develop in parallel.** Differentiation enables the sustainable development of the selected industries which are totally different from those in other levels. Therefore, the products and services are also alienated, for which the consumers and investors have special hobbies. In this way, the development of the characteristic and advantaged industries in this specific level accumulates more factor resources and obtains long-term interest while specialty requires the transformation from industry divisions to the division inside an industry. Consequently, it promotes the evolution from department specialty, products specialty to the expertise of spare parts, craftsmanship and services, which provide the internal motivation of industry development. At present, the specialty of some of the characteristic and advantaged industries in Gansu has leaped beyond the stage of department specialty and is in the period of products specialty and spare parts expertise, waiting to evolve to the direction of the expertise of craftsmanship and services. Differentiation promotes specialty while specialty will accelerate the cooperation in and beyond regional levels, making the differentiation more remarkable. In this circulation, both of them will boost the industries to evolve for sophistication.

- **Pillar and non-pillar industries develop in parallel.** Some of the series of the characteristic and advantaged industries are supported by each other in this particular regional level and are in the same direction while others are independent like the industry of nuclear fuel. Although the latter lacks the support in the regional level, as long as the enterprises can adjust to the market and maintain development, this specific series of the characteristic and advantaged industries shall exist. Each regional level shall attach importance to various links of industry and boost the economy by centralization and multiple effects. For the industries which can not be linked with
others but have unique advantages, we must make use of the uniqueness and gradually make them stronger and more powerful. Especially in the identification of the characteristic and advantaged industries in city and county levels, less is better than more. We must highlight the features and advantages, shunting from similarity. In this way, complete and unique industry series can be established. Meanwhile, it shall be enumerated by time sequence. Some shall withdraw as other potentials join in. Just as the ways in Wuwei, South of Gansu, Min County and Anding District of Dingxi, several items are rational.

- “Enrich the People” goes hand in hands with “Enrich the Province”. It must be noticed that the position of Rich Province Industries is strong while that of Rich People Industries is weak. In each level, we must change the mentality. The development shall not be evaluated by increase of GDP, instead, it shall be judged by whether or not to realize adequate employment, the prosperity of people and the increase of dispensable income of people in cities and net income of people living in the countryside. Currently, the tax burden in the western provinces is heavier than that in the eastern part and the average of Gansu is even higher in the west. Given this situation, we must strive to create the quality environment and reduce the tax burdens. The expenditure structure of enterprises must be changed. In cities and counties, we must be give priority to the development of Rich People Industries.

1.3.2 Promotion of Regional Links by Industrial Integration

The regional economic links are mainly reflected by industry links. The regional links of economic zones are market-motivated. In the mature market economy, the administrative regional links are also market-motivated. However, in the transition and adjustment period, the regional economic links are inevitably restricted by administrative divisions. It is obviously detrimental to the resource allocation, scale proliferation and extension of industry of the characteristic and advantaged industries beyond the regions. Therefore, aiming at the broader space of development, the administrative restrictions must be shattered and the regional links strategies shall be adopted.
The regional economic links bridged by the characteristic and advantaged industries must be advanced. Within ten years or even shorter period, the industrial integration of Lanzhou-Baiyin and Jiuquan-Jiayuguan must be realized. The city of Tianshui shall be included into Guanzhong Economic Zone, and the economic links between cities, counties and the neighboring provinces shall be closer. Specifically,

- **Establish the Lanzhou-Baiyin Integration Demonstration Area and the Jiuquan-Jiayuguan Industrial Integration Demonstration Area.** The industrial integration can improve the structure of either industrial based on the relationship of supplementation. The propping-up scope can be further enlarged, effectively allocating the various resources within the region, promoting and radiating the neighboring regions. The conditions for the industrial integration of Lanzhou-Baiyin are mature. We can start from the mobility and integration of industries. The industries can be moved out of the city and into the parks, namely, into the city of Baiyin. We can also program the downstream ethylene chemical industries into the related enterprises in Baiyin which is equipped with the foundation of petrochemical industries. The conditions for the industrial integration of Jiuquan-Jiayuguan are mature. A distance of 20 kilometers shall not constitute any barrier for industrial integration, besides, between Lanzhou and Urumqi, another industry highland can be erected evenly. The integration shall completely abide by the market rules.

- **Enhance the industrial links with neighboring provinces, and include Tianshui into the Guanzhong Economic Zone.** It is clearly stipulated in the nation’s *11th Five—Year Plan for Vigorously Developing the Western Region* that Tianshui is planned into the Guanzhong Economic Zone. The industries given the priority are high-technology, equipment manufacturing, aviation and aerospace, modern agriculture and characteristic tourism. Focuses are the updating of equipment manufacturing, the establishment of the brand names in tourism industry and the packing of agriculture byproducts. Especially, with the completion of the construction of Tianshui-Baoji Highway, Tianshui Airport and Tianshui-Pingliang Railway, the pace of the integration of Tianshui into the Guanzhong Economic Zone will be even faster. “A bit farther
from Lanzhou and a bit nearer to Baoji” shall be the long-term direction for the development of characteristic and advantaged industries in Tianshui. **The cities of Pingliang and Qingyang shall also be closer to the Guanzhong Economic Zone.** Historically these two cities have strong economic links with north of Shaanxi Province and Guanzhong Region. Currently, the links are more frequent. In the future, by means of commodity exposition and other special markets across the provinces, the direction of product eastward can to some extent transfer to industry eastward, integrating with the industries in the north of Shaanxi Province and Guanzhong Region. The Percentage of trade with Northeast part of Sichuan in some counties in south of Gansu and Gannan is higher than that in Gansu Province. The direction of industry link is the Northeast part of Sichuan, which has larger scale and higher level. **The industries in these counties can be studded in the industry chain of the Northeast part of Sichuan, promoting industry updating.**

The opportunities in the completion of the construction of Lanyu Railway and Wuguan Highway shall be made full use of to find breakthroughs in some links. The Honggu District of Lanzhou is only a river separation with Minhe County in Qinghai; in addition, they are linked by bridges. The similar industries in these two parts are aluminum alloy, the processing of agricultural byproducts and development of real estate. They can be mutually supplemented. It is important for Hong to strengthen the links and enlarge the industry scope and territory.

It is not easier to acquire the links and the innovations on thought and actions are required.

- **The mindset of setting barriers must be changed.** The economic barrier must be shattered by industrial integration through the establishment of the atmosphere and the setting up of the favorable conditions for the grouping, survival and development of enterprises and industries. Cooperation effect in the process of integration can prevent the vicious competition. Structure effect make the radiation functions of the strong enterprises and industries the full play. Scale effect can reduce the repetition in the infrastructure construction of projects, attaining the efficiency in scheming. Furthermore, the administrative barriers can be shattered by integration. By reaching the economic agreements among regions, the efficiency and output can be elevated across the regions. Gradually, the regional combination body can be set up to materialize the regional economic integration. Meanwhile, by integration of mechanisms, the economic policies
in different regions can be adjusted. The common market is expected to emerge. Both the visible and invisible hands shall function to shatter the barriers and promote the integration of the economic and social development. The two-step way, is especially suitable for Jiuquan-Jiayuguan industrial integration, fitting well also to Lanzhou-Baiyin Integration Demonstration Area. Equally it is suitable for the possible industrial integration of Tianshui and Baoji.

- **Know the new characteristics of competition in the context of integration.** Integration is not conformity and there are competitions inevitably among industries. Given the different concerns among different regions, the advantaged industries are certainly to be selected as the key. There will be combination of the enlargement of market share and market division. The confliction in the smaller scope will be transformed to the co-existence and supplementation in the larger space, objectively manifesting the way of implementing the discrepancy strategy. By industry transition, the proliferation of products, the processing of spare parts and the circulation of craftsmanship, some new characteristic industries will emerge which are different from those of the neighboring areas, realizing the vertical discrepancy. The product markets can be diversified by industry division, enabling products to confront different regional and domestic markets, promoting the direction of discrepancy.

- Start to plan for the regional industrial integration and set up consultation and coordination bodies.

### 1.4 Sustainable Industrial Development as the Basis for the Discrepancy Strategy

#### 1.4.1 Special dimensions and the basic framework of sustainable industrial development

The Percentage of dependence on the mineral resources and agriculture byproducts resources is higher of the development of characteristic and advantaged industries in Gansu and the industry cycle has its own features. The Sustainability of the industries is a very important subject matter to be researched. More importantly, according to the arrangement and plan of the nation’s strategy on Sustainable Development, the development of industries shall utilize all kinds of land resources
reasonably and effectively, maintaining a harmonious development with the environment. Compounding these two aspects, it has all the reasons to constitute another important direction of striking the combination boxing. The major tasks are: Make full use of the function of basic strategy. According to the requirements of building a resource-saving, environmentally-friendly and harmonious society, promote the organic development between the characteristic and advantaged industries and society, resource and environment. With ten years or even shorter time, we shall establish the framework on sustainable development of the characteristic and advantaged industries in Gansu. (See Figure 1-6)

**Figure 1-6 Framework on Sustainable Development of Characteristic and Advantaged Industries**

1.4.2 Strategic Direction of the Sustainable Development of the Characteristic and Advantaged Industries

- According to the rules of industry cycle, we have to be aware of the periodical transition trends of the series of the characteristic and advantaged industries in Gansu. Any industry will experience four stages: emergence, growth, maturation and recession. The majority of the
series of the characteristic and advantaged industries in Gansu are in the first three stages, having the possibility of a periodical recession or eternal recession. The petrochemical industry is a very mature industry and has stepped into the stage of scaleful development. However, both the resource and market are not firmly controlled. On one hand, we have to endeavor to construct the Urumqi-Lanzhou crude oil pipe, aiming to improve the consistency and continuity of the crude oil supply. On the other hand, we have to accelerate the product deep-processing, prolonging the maturity period. The industries like nonferrous metal, metallurgy and construction materials are also experiencing the mature period. We shall strive to tap the supply channels of resources and accelerate the transition of products. Meanwhile, we have to seek a packed development with the international corporations and groups. The pharmaceutical industry is in the stage of growth, entering the period of various competitions in terms of scale, new products and brand name. More efforts shall be made to R&D and building of brand name. The equipment manufacturing industry is in the phase of recoverable growth. We have to be updated to the new technological innovations and keep close eyes on the new technologies and materials. The processing industry of the agriculture byproducts is also in the period of growth. However, there are the problems like the insufficient supply of raw materials, the ecological supporting capability of the raw materials in Hexi Region and the geological restrictions in Hedong areas. The high-tech industries are still hatching. For the transition to the growth period, we need the support from the government besides a close tracing on the market. The industry of nuclear fuel and the application of nuclear technology are also conceiving since it is not a fully competitive industry and the advantage shall be used to accelerate the transition. They form the life cycle trend analysis of the characteristic and advantaged industries in Gansu. (See Table 1-17)

Table 1-17 Life Cycle Trend Analysis of the Characteristic and Advantaged Industries in Gansu

<table>
<thead>
<tr>
<th>Stage</th>
<th>Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergence</td>
<td>Processing of nuclear fuel, high-tech industry and tourism</td>
</tr>
<tr>
<td>Growth</td>
<td>Processing industry of agriculture byproducts, equipment manufacturing, medicine and logistics</td>
</tr>
</tbody>
</table>
● **With nonferrous metal industry, metallurgy industry and construction material industry as the key, we shall promote the energy-saving and reduction of pollutants and develop circular economy.** The industries like nonferrous metal, metallurgy and construction material all belong to the high consumption industries, the consumption efficiency, compared with the average level both home and abroad, is lagged behind. The companies like Jinchuan, Jiugang and Baiyin shall make good and full use of the nation’s policies on supporting the environmentally-friendly industries in a flexible way. A number of key projects in circular economy shall be implemented. The work on the selection and refining technology of copper, nickel, scarce and precious metal, lead, zinc, iron and tungsten, the separation and purity-selection technology of ores and associated minerals shall be done well to elevate the quality and efficiency of resource development.

● **The industries like nonferrous metal, metallurgy, petrochemical and construction materials shall be the key industries to curb pollution.** The pollutants of the four industries are the main source of waste water, waste gas and solid waste in Gansu. The traditional way of curbing the pollution in the downstream shall be transformed to the reduction of pollution in manufacturing procedures. By means of policy, law and economic intervention, enterprises shall be encouraged to reduce the discharge of waste water, propelling the establishment of discharge-reduction mechanism and the materialization of renewal of litter.

● **The degree of development shall be controlled rationally.** The characteristic and advantaged industries in Gansu almost are all situated around the western part of Gansu-Qinghai-Lanzhou-Xinjiang economic belt while the national plan for the development of the western region has repeatedly stressed the strengthening of development in this belt. Therefore, Gansu section of the western part of Gansu-Qinghai-Lanzhou-Xinjiang economic belt shall be the centralized development regions of the characteristic and advantaged industries. Lanzhou-Baiyin
economic zone, as the center of the section, shall participate in the industry divisions both home and broad in a more active way, breeding new growth points continuously. Moreover, some of the characteristic and advantaged industries of Gansu are not in the belt, for which we shall protect in the first place and subsequently develop in a centralized and moderate way. In reality, though there are still a lot of barriers and problems to tackle, we have to stick to the principles of sustainable development.

2. Relation Analysis of the Main Factors in Discrepancy Strategy

According to the principle of the unification of reality and logics, the network of the relationships of the main factors in discrepancy strategy is set up. (See Figure 1-7) The reality refers to Gansu’s industry realities, including the analyses on static and dynamics of industries, industries themselves and regional environment. The logic refers to the evolution conclusion of the economics explanation based on Scientific Development View. From it we can see two kinds of relationships: hierarchy and segmentation.

**Figure 1-7 Network of the Relationships of Main Factors in Discrepancy Strategy**
In terms of hierarchy, the discrepancy strategy is based on the analysis on the development situations of industries in Gansu and it is the logical conclusion following the market competition rules. It is the strategic reflections on the characteristic and advantaged industries in Gansu. Therefore, it is in the central stage and is named the overall strategy. According to the innovations of the overall strategy, from the direction of vertical (chain) discrepancy, we draw the construction of industrial bases and the exploration of industrial parks. From the direction of horizontal (region) discrepancy, the regional level differentiation and regional links are mainly elaborated. Market discrepancy, as market is an invisible hand, functions in vertical discrepancy and horizontal discrepancy throughout the bases, parks, regions and different layers. There is no need to be reflected in a visible way. If we probe further, we can find out that the nature in industry discrepancy of industrial bases and parks is similar; they are therefore explained in the way of industry centralization. However, the nature of regional level differentiation and regional links in industry discrepancy is different, and we therefore discuss them separately, expressing them as differentiation and integration. Similar to other overall strategies, discrepancy strategy also needs a supporting foundation; we consequently put forward the Sustainable Strategy with special connotations. From the argumentation, we can say it is both the foundation and ultimate goal.

In terms of segmentation, there are altogether four levels: basic, overall, implementation and channels. Considering the gradual shrinking of the scope of the application of the four levels, the lower the level is, the more instructional it is. The higher the level is, the more concrete it is. Besides, the links of the four levels are mainly reflected in the form of sustaining or being sustained instead of being mutually sustained by each other. That is to say, we can hold that the Sustainable Strategy can backup the discrepancy strategy while vice versa is not acceptable. That is because the discrepancy strategy is based on the specialty of Gansu, resulting in the limitation in the scope of application and adaptability. Consequently, the pyramid relationship with Sustainable Strategy as the foundation is in front of us. (See Figure 1-8)
Based on this, the combination mode of the development of characteristic and advantaged industries in Gansu is verified and the question on the strategy of striking the combination boxing is answered.

Section 5  Guarantee Measures of the Development of Characteristic and Advantaged Industries in Gansu

1. Based on the construction of new resource bases maintain a reasonably premature development of the basic industries and highlight breakthroughs on key industries.

The position of the industries reflected by infrastructure in Gansu is weak in Northwest part of
China. (See Table 5-1) From the analysis on the volume of production and consumption of the major resources in recent years. (See Table 5-2), we can notice that the total volume of coal and electrical supply can only satisfy the needs within the province, and in the long-run, it is the same case. It is impossible to form the supply market across provinces. Therefore, it can only adopt the reasonably premature development, servicing as the basic support for the characteristic and advantaged industries. The reasonably premature development has the following connotations: in terms of time, the development of the basic industries shall be ahead of time before the characteristic and advantaged industries are explored in large scale. In terms of space, the supporting scope of the basic industries shall be enlarged. Both the hardware and the software of the sustained industries shall be improved. The development advantage shall be built from in social and humanistic perspectives. In terms of degree, the development speed of the basic industries shall be faster than that of the sustained industries. Reasonably means that the supply capability of the basic industries shall be reasonably received by the characteristic and advantaged industries, tackling well the relationship between bottleneck and idleness. In the future, we have to follow the way of establishing the “western terrestrial Three Gorges”, making good use of the nation’s industry policies on the development of clean energies. Breakthroughs can be made in the exploration of wind power, solar energy and nuclear power. In the medium and long run, new characteristic and advantaged industries shall be cultivated.

**Table 1-18 Infrastructure Situation in Northwest part of China in 2005**

<table>
<thead>
<tr>
<th>Item</th>
<th>Gansu</th>
<th>Shaanxi</th>
<th>Xinjiang</th>
<th>Ningxia</th>
<th>Qinghai</th>
<th>Gansu’s standing in Northwest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Railway Distance(unit:km)</td>
<td>2300.0</td>
<td>3131.2</td>
<td>2761.0</td>
<td>791.9</td>
<td>1091.8</td>
<td>3</td>
</tr>
<tr>
<td>Highway Distance(unit:km)</td>
<td>41330</td>
<td>54492</td>
<td>89531</td>
<td>13078</td>
<td>29720</td>
<td>3</td>
</tr>
<tr>
<td>Sales volume of Post and Telecom (unit:100 million yuan)</td>
<td>136.46</td>
<td>323.54</td>
<td>172.38</td>
<td>47.09</td>
<td>32.06</td>
<td>3</td>
</tr>
<tr>
<td>User of Internet(unit:10 thousand people)</td>
<td>125</td>
<td>314</td>
<td>126</td>
<td>32</td>
<td>29</td>
<td>3</td>
</tr>
<tr>
<td>Number of Post and Telecom Offices</td>
<td>1386</td>
<td>1794</td>
<td>1444</td>
<td>340</td>
<td>219</td>
<td>3</td>
</tr>
<tr>
<td>Production and Consumption Volume</td>
<td>Coal (unit: 10 thousand tons)</td>
<td>Electrical Power (unit: 100 million kilowatts)</td>
<td>Crude oil (unit: 10 thousand tons)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------------------------</td>
<td>-----------------------------------------------</td>
<td>----------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>Production Volume</td>
<td>Consumption Volume</td>
<td>Production Volume</td>
<td>Consumption Volume</td>
<td>Production Volume</td>
<td>Consumption Volume</td>
</tr>
<tr>
<td>2000</td>
<td>1632.71</td>
<td>2505.70</td>
<td>280.27</td>
<td>295.34</td>
<td>250.15</td>
<td>880.88</td>
</tr>
<tr>
<td>2001</td>
<td>1819.05</td>
<td>2581.91</td>
<td>302.44</td>
<td>306.09</td>
<td>227.01</td>
<td>887.10</td>
</tr>
<tr>
<td>2002</td>
<td>2365.51</td>
<td>2829.96</td>
<td>340.33</td>
<td>342.33</td>
<td>253.57</td>
<td>935.32</td>
</tr>
<tr>
<td>2003</td>
<td>2922.60</td>
<td>3249.80</td>
<td>404.87</td>
<td>398.33</td>
<td>255.86</td>
<td>1017.50</td>
</tr>
<tr>
<td>2004</td>
<td>3539.98</td>
<td>3577.29</td>
<td>455.33</td>
<td>452.00</td>
<td>283.63</td>
<td>1154.70</td>
</tr>
<tr>
<td>2005</td>
<td>3619.84</td>
<td>3750.67</td>
<td>506.17</td>
<td>489.48</td>
<td>305.00</td>
<td>1229.20</td>
</tr>
</tbody>
</table>

Source: *Gansu Annals* (2002-2006)
2. With reform and innovation as the key, elevate the qualities of enterprises in a thorough way.

2.1 The reform on SOEs shall be proceeded with development as the direction, restructuring as the channel and mechanism as the guarantee. The realization of the strategic task of the development of characteristic and advantaged industries in Gansu is to a great extent based on the development of the major SOEs. Only by the development of the major SOEs, the development of some characteristic and advantaged industries can be promoted. Therefore, the deepened reform on the SOEs shall equally bear development as the dominant task. By deepening the reform, some SOEs can be made stronger and more powerful, attaining remarkable development. The position of Jinchuan Group and Jiugang Group in the market competition shall be constantly elevated. After the completion of withdrawal mechanism in the reform on SOEs in Gansu and the privatization of the small and medium sized enterprises, the restructuring of SOEs will be the major method of industry restructuring. The rational and flowing market operation system for the nation’s properties shall be established to regulate the ownership transfer transactions. An efficient and transparent capital manipulation platform shall also be set up to create new situation of the co-existence, completion, cooperation and development of the national capital, private capital and foreign investment. For the basic and strategic industries which are crucial to economy and the industries providing important public product or services, the state-owned economy shall control the stocks and open up the management. For the industries and fields which require not the high entry and have a high degree of marketization, both the ownership of stocks and management shall be opened up, striking an equal competition between the SOEs and other enterprises. According to the requirements of establishing the modern enterprise mechanism, the legal person management structure of SOEs shall be constructed and perfected, setting up the president board, supervision body and management levels to regulate decision-making, promotion and dismissal of personnel. We have to strive for the true materialization of the separation between party and administration, administration and enterprise. Not only shall the administrative level in SOEs be eliminated, but also the promotion and
dismission of top management personnel shall be legitimate and transparent, keeping away from the administrative intervention.

2.2 Promotion of industry and employment by starting businesses, giving vitality to the diversified development of industries. Firstly the opportunities of the reform on SOEs in Gansu shall be made full use of. Strong private enterprises shall also be introduced, stepping into the previous industry territory of SOEs. The diversified structure with major industries, minor industries and related services shall be established and a group of competitive private enterprises shall come up. Secondly is the complete implementation of various measures released by Gansu Province to encourage the development of private economies. Meanwhile, the private economy shall be guided to extend from the low level to the high level, combining the enlargement of the Percentage and territory of private enterprises. The third point is that the government shall actively create the flexible environment and social atmosphere for people to start businesses. There shall be more support and fewer restrictions in policy, investment, starting businesses and development. There shall be more services, guidance and fewer intervention and scolding. Higher social status and better treatment shall be given to those successful people who start businesses. Their achievements shall be rewarded and propagated greatly. The fourth point is the cultivation and support for the personnel who can start businesses. The officers are encouraged to leave their posts to start businesses. People in basic units are encouraged to set an example in initiating businesses. And the employees of enterprises are encouraged to start businesses independently. The fifth point is that the fund for starting businesses shall be set up in financial and credit departments, delivering loans in favorable conditions. The last point is the widespread of education on starting businesses and the qualities of personnel shall be exalted.

2.3 A thorough elevation of independent innovation shall be the breakthroughs to promote the industry competitiveness. SOEs shall accelerate the reforms on enterprise property and management mechanisms of modern enterprises, getting rid of the systematic barriers for the investment on R&D. Private enterprises shall make good and full use of the nation’s related policies, actively cultivating its independent technology and brand names,
strengthening the core competitiveness of enterprises. Big enterprises shall enlarge the degree of restructuring using advanced technologies. Technological innovation shall be given the top priority. The cooperation with colleges/universities and research institutes shall be made closer. Moreover, we shall strengthen the investment on R&D. The enlargement of scale and improvement of the capability on deep-processing shall be combined. The independent research, innovation and the adjustment of product structure shall be combined, stimulating the transformation of the pattern of industry growth. The small and medium sized enterprises shall make full play of the vitality in technological innovation and industry supplementation. The characteristics of smallness, specialty, delication, quality, uniqueness and sophistication shall be highlighted. Based on the characteristic and advantaged industries, the technological innovation system with enterprise as the main force, market as the guidance and the combination of manufacturing, academics and research shall be established and perfected.

3 Following the requirements on the development of characteristic and advantaged industries, build up the new mode of a serve-people government.

In the market economy, the influences on the industrial development by local government shall mainly be reflected in guidance and cultivation. Centering on the development of characteristic and advantaged industries of Gansu, the local government shall innovate the service mode in the following two aspects.

3.1 Make full play the function of guidance. Firstly is the programming of the medium and long term development plan for the development of characteristic and advantaged industries in Gansu. Following the requirements on the development of characteristic and advantaged industries, concepts shall be renewed. The programming methods of the new plans shall be continuously explored and innovated. The plan shall not only stress the strategic intention of the nation’s Western Development, but also highlight the specific conditions of the industries in
Gansu. We shall be aware of the gaps to clarify the development path. The strategy, guidance and feasibility shall be highlighted. Meanwhile the plan on the major functional areas of Gansu shall be drafted. It shall be closely connected with the plan on the development of characteristic and advantaged industries, which can be mutually coordinated. Secondly is the release of the industry policies on supporting the development of characteristic and advantaged industries in Gansu. The industry policies shall cover the directional encouraging and restricted policies on the regards like industrial bases and characteristic industrial parks in regional layers and levels. The regulated measures in terms of investment, fiscality, finance, taxation, industry and commerce management shall also be included. The industry policies shall also cover the paths to independent innovation, technology advancement and market environment.

3.2 Widen the service realm and improve the service quality. Firstly is the planning for the development of characteristic and advantaged industries. The market of industrial factors including capital, human resource, technology, property, marketing and logistics shall be cultivated. The factors shall flow and aggregate into the characteristic and advantaged industries, updating the market degree of industry development. The second point is that we shall dare to do actively, dominating the cooperation across provinces. Given the fact that SOEs occupy a high Percentage in the characteristic and advantaged industries in Gansu, regular meeting and discussion mechanism with China Aluminum Group, Sinopec, China Nuclear Group and China Tobacco shall be established. The enterprise cooperation mechanism across provinces with a high degree of market shall be set up. Besides, an open cooperation network shall be built to further elevate and enlarge the cooperation territory, level and space of the development of characteristic and advantaged industries in Gansu. In addition, the technology, management and human resource advantages in SOEs shall be combined with the local edges on resource, manpower, and market. They can be supplemented and mutually developed. Gradually, we shall extend the agreements and co-operations between provincial government and SOEs to the level between the industry supervision bodies and the cities. Reasonable tasks shall be set up to the assured accomplishment. The third point is that big projects shall be the carriers to maintain the sustainable development of characteristic and advantaged industries. Projects are the carriers of industry development and the
platform of the quality division of resources and enlargement of aggregation effect. Seeking projects is a scientific work and the work shall be done with good arrangements. Therefore, the promotion of project construction shall also be guided by the market. The risk evaluation shall be made in details. We shall widen the financing channels and do the preparations work well according to the regulated procedures. The fourth point is that we shall seize the mobility opportunities of the industries in the eastern part, guiding industry connections. The mobility of the eastern industries is a new direction of the industry development in a certain period in recent years in our country. Actions shall be made by Gansu government in this regard. We shall attach great importance and take various measures to encourage the cooperation with the neighboring provinces, regions, eastern, middle and western areas. By means of utilizing the connection between industry mobility and restructuring, elevation of industries, the development of characteristic and advantaged industries in Gansu can be proceeded. Foreign capital shall be introduced in large scale to the characteristic and advantaged industries in Gansu. We shall endeavor to make some characteristic industries and characteristic enterprises the manufacturing bases of multinational companies or part of the international industry chain. The advantages of capital, technology, brand name and marketing channels in foreign capital shall be used to assist the characteristic and advantaged industries in Gansu to enter international market.

(The participants of the research in this report are: Wei Hong, Zhang Fan, Jian Fukui, Xu Shengyun, Cui Genshan, Zheng Bowen, Li Lili, Jin Sha, Xia Wuning, Yue Xiaona and Qi Deyan)

Appendix 1 Selection and Calculation Procedures of Cluster Analysis

1. Selection of Indicators

According to the selection principle of strength and characteristics, giving consideration to the acquirability of the statistics, we target the 36 industries which are composed of the SOEs and the selected non-SOEs listed in 2006 Annual Gansu, excluding other mine seeding industry, chemical
fibre manufacturing, rubber manufacturing industry and processing industries of recycling of waste resources and old materials, which are not included in the Annual. Ten Indicators in terms of regional advantage, factor consumption, output and efficiency of production, degree of technological advancement and social impact constitute the paradigm. The ten indicators are regional entropy ($X_1$), industry contribution rate ($X_2$), total estate contribution rate ($X_3$), comparative productivity ($X_4$), profit-tax Percentage of industry ($X_5$), sales profit margin ($X_6$), weekly circulation time of flowing capital ($X_7$), cost expense profit margin ($X_8$), product sales rate ($X_9$) and absorption rate on employment ($X_{10}$). Among them, $X_3$, $X_6$, $X_7$, $X_8$, and $X_9$ originated from 2006 *Annual Gansu*, the formula for the rest five indicators are:

$$X_1 = \left( \frac{X_{ij}}{X_i} \right) / \left( \frac{X_i}{X_t} \right)$$

In this formula, $X_{ij}/X_i$ equals the Percentage of the industrial AV of industry $i$ accounting for the total VA, $X_i/X_t$ equals the Percentage of the number of labor forces in the industry $i$ accounting for that of the nation’s total.

Industry contribution rate ($X_2$) = $Z_i/Z$

In this formula, $Z_i$ is the industrial AT of industry $i$ in the region; while $Z$ is the total industrial AT of the region.

Comparative productivity ($X_4$) = $\left( \frac{Y_i}{Y_j} \right) / \left( \frac{L_i}{L_j} \right)$

In this formula, $Y_i/Y_j$ amounts to the share of the industry output of industry $i$ accounting for the total industry output in area $j$. $L_i/L_j$ is the share of the labour force in industry $i$ accounting for the total industry labour forces in area $j$.

Profit-tax Percentage of industry ($X_5$) = $G_{ij}/G_i$

In this formula, $G_{ij}$ is the profit and tax volume of industry $i$ in area $j$. $G_i$ is the total profit and tax volume of industry $i$ of the country.

Absorption rate on employment ($X_{10}$) = $X_{ij}/Y_{ii}$

In this formula, $X_{ij}$ is the average number of annually employed people in industry $i$ in Area $j$. $Y_{ii}$
Compounding the result of the calculation and the statistics directly cited. We get the original data of the Cluster Analysis on Gansu’s 36 industries. (See Table 1-1)

<table>
<thead>
<tr>
<th>Industry</th>
<th>X_1</th>
<th>X_2</th>
<th>X_3</th>
<th>X_4</th>
<th>X_5</th>
<th>X_6</th>
<th>X_7</th>
<th>X_8</th>
<th>X_9</th>
<th>X_10</th>
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<td>0.1805</td>
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<td>Electronic Machinery and Appliances</td>
<td>Telecommunications and Other Electrical Equipment</td>
<td>Instruments and Office School Use Machinery Manufacturing</td>
<td>Crafts and Other Manufacturing</td>
<td>Produce and Supply of thermo Electrical power</td>
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<td>4.44%</td>
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<td>5.67%</td>
<td>0.12%</td>
<td>-8.68%</td>
<td>-8.68%</td>
<td>-8.68%</td>
<td>-12.23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>97.65</td>
<td>98.13</td>
<td>93.03</td>
<td>99.12</td>
<td>99.84</td>
<td>91.42</td>
<td>99.84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Produce and Supply of thermo Electrical power</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Produce and Supply of gas

<table>
<thead>
<tr>
<th>Produce and Supply of gas</th>
<th>10.40</th>
<th>0.159</th>
<th>-0.059</th>
<th>11.60</th>
<th>142.93</th>
<th>0.058</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>2</td>
<td>9</td>
<td>%</td>
<td>%</td>
<td>0</td>
</tr>
<tr>
<td>0.5366 0.0010</td>
<td>0.5245</td>
<td>3.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Produce and Supply of water

<table>
<thead>
<tr>
<th>Produc and Supply of water</th>
<th>-2.30</th>
<th>0.002</th>
<th>-0.134</th>
<th>-25.37</th>
<th>97.09</th>
<th>0.186</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>4</td>
<td>6</td>
<td>%</td>
<td>%</td>
<td>6</td>
</tr>
<tr>
<td>0.5518 0.0021</td>
<td>0.1630</td>
<td>0.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Selection Procedure

The first step is the factor analysis. Since among the above-mentioned ten indicators, many reflect the information in the same regard such as industrial AV, and labor force, they are therefore endowed with a lot of links. Therefore, the factor analysis is first of all used to deal with the indicators. We can get some common factors for the ten indicators, abandoning the links in the original index system. The concrete path is: build up original matrix according to the related data and standardize the original data. Calculate on the links among data and determine whether or not to apply factor analysis. Make use of a main composition method to work out the original factor for the standardized matrix and determine the number of common factor. Make use of Varimax revolution method for the original factors, rendering definite factor explanation. The next step is to compute the scoring of factors.

We then utilize spss13.0 for windows, standardize the data (automatically processed by the system) and then choose KMO and Bartlett’s test of sphericity to compute the relativity. Through the calculation, the KMO comes up to 0.667, revealing that factor analysis method is suitable for this index system. Subsequently, we solve the original factor using Principal Components Analysis. Varimax is used for factor revolution.

Through the calculation, four common factors are withdrawn from the factor analysis. The accumulated contribution rate reaches 79.876%; therefore, they can reflect the information in the above-mentioned index system more completely. The characteristic value and contribution rate for the common factor, factor load and the factor load after revolution are revealed in Table 1-2, 1-3 and 1-4.
### Table 1-21 Characteristic Value and Contribution Rate for the Common Factor

<table>
<thead>
<tr>
<th>Common Factor</th>
<th>Characteristic Value</th>
<th>Contribution Rate</th>
<th>Accumulated Contribution Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>F₁</td>
<td>3.564</td>
<td>33.156</td>
<td>33.394</td>
</tr>
<tr>
<td>F₂</td>
<td>2.270</td>
<td>22.893</td>
<td>56.049</td>
</tr>
<tr>
<td>F₃</td>
<td>1.175</td>
<td>12.399</td>
<td>68.448</td>
</tr>
<tr>
<td>F₄</td>
<td>0.978</td>
<td>11.428</td>
<td>79.876</td>
</tr>
</tbody>
</table>

Note: statistics from *Gansu Annual Statistics (2006)*

### Table 1-22 Factor Load

<table>
<thead>
<tr>
<th></th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>X₁</td>
<td>0.368</td>
<td>-0.839</td>
<td>0.252</td>
<td>-0.061</td>
</tr>
<tr>
<td>X₂</td>
<td>0.465</td>
<td>-0.775</td>
<td>0.235</td>
<td>-0.089</td>
</tr>
<tr>
<td>X₃</td>
<td>0.792</td>
<td>0.377</td>
<td>0.033</td>
<td>-0.055</td>
</tr>
<tr>
<td>X₄</td>
<td>0.235</td>
<td>-0.155</td>
<td>-0.679</td>
<td>0.617</td>
</tr>
<tr>
<td>X₅</td>
<td>0.256</td>
<td>0.675</td>
<td>-0.104</td>
<td>-0.229</td>
</tr>
<tr>
<td>X₆</td>
<td>0.726</td>
<td>0.206</td>
<td>0.119</td>
<td>0.100</td>
</tr>
<tr>
<td>X₇</td>
<td>0.853</td>
<td>0.087</td>
<td>0.197</td>
<td>0.071</td>
</tr>
<tr>
<td>X₈</td>
<td>0.868</td>
<td>0.334</td>
<td>0.084</td>
<td>-0.020</td>
</tr>
<tr>
<td>X₉</td>
<td>-0.164</td>
<td>0.201</td>
<td>0.52</td>
<td>0.717</td>
</tr>
<tr>
<td>X₁₀</td>
<td>-0.655</td>
<td>0.377</td>
<td>0.416</td>
<td>-0.035</td>
</tr>
</tbody>
</table>

### Table 1-23 Factor Load after Revolution

<table>
<thead>
<tr>
<th></th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>X₁</td>
<td>0.066</td>
<td>0.947</td>
<td>0.014</td>
<td>-0.069</td>
</tr>
<tr>
<td>X₂</td>
<td>0.175</td>
<td>0.915</td>
<td>0.017</td>
<td>-0.109</td>
</tr>
<tr>
<td>X₃</td>
<td>0.869</td>
<td>-0.082</td>
<td>0.039</td>
<td>-0.101</td>
</tr>
<tr>
<td>X₄</td>
<td>0.039</td>
<td>-0.008</td>
<td>0.959</td>
<td>0.006</td>
</tr>
</tbody>
</table>
Among them, F₁ is mainly about the information on profit of the industries, and it is consequently defined as the profit factor. F₂ is mainly about the information on scale, and it is consequently defined as the scale factor. F₃ is mainly about the information on technological advancement, and it is consequently defined as the technology factor. F₄ is mainly about the information on product sales, revealing the risks the industries are confronted with and it is consequently defined as the risk factor.

According to the data in Table 4, we can obtain the scores of the four common factors in Gansu’s 37 industries. For instance:

\[ F₁=0.066 X₁+0.175 X₂+0.869 X₃+0.039 X₄+0.469 X₅+0.759 X₆+0.844 X₇+0.931 X₈+0.022 X₉-0.386 X₁₀ \]

After calculation, they are revealed in the following table (See Table 1-5)

<table>
<thead>
<tr>
<th>Industries</th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploitation and Seeding of Coal</td>
<td>1.325911</td>
<td>1.056148</td>
<td>0.171064</td>
<td>0.953961</td>
</tr>
<tr>
<td>Exploitation of petroleum and natural gas</td>
<td>11.07076</td>
<td>3.231757</td>
<td>4.322442</td>
<td>1.243841</td>
</tr>
<tr>
<td>Masa seeding of Black Metal mines</td>
<td>1.42611</td>
<td>0.732795</td>
<td>0.434528</td>
<td>1.015736</td>
</tr>
<tr>
<td>Masa seeding of Non-ferrous metal mines</td>
<td>1.971407</td>
<td>2.335873</td>
<td>0.719239</td>
<td>0.85483</td>
</tr>
<tr>
<td>Nonmetal Minerals Mining and Dressing</td>
<td>0.788471</td>
<td>0.871581</td>
<td>0.356568</td>
<td>0.883234</td>
</tr>
<tr>
<td>Processing of agricultural products and</td>
<td>1.435144</td>
<td>0.945547</td>
<td>0.649341</td>
<td>1.069747</td>
</tr>
<tr>
<td>Industry</td>
<td>Country 1</td>
<td>Country 2</td>
<td>Country 3</td>
<td>Country 4</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>Food manufacturing</td>
<td>0.940644</td>
<td>0.786708</td>
<td>0.74531</td>
<td>0.931161</td>
</tr>
<tr>
<td>Beverage manufacturing</td>
<td>0.793777</td>
<td>1.085011</td>
<td>0.546707</td>
<td>0.951269</td>
</tr>
<tr>
<td>Tobacco Products</td>
<td>2.020059</td>
<td>1.199229</td>
<td>3.677636</td>
<td>0.866265</td>
</tr>
<tr>
<td>Textile Industry</td>
<td>0.179383</td>
<td>0.144239</td>
<td>0.188685</td>
<td>1.104187</td>
</tr>
<tr>
<td>Costume, shoes and hats manufacturing</td>
<td>0.722835</td>
<td>0.129548</td>
<td>0.445362</td>
<td>1.025436</td>
</tr>
<tr>
<td>Leather, fur, and feather related products</td>
<td>1.204624</td>
<td>0.530376</td>
<td>0.874836</td>
<td>0.95983</td>
</tr>
<tr>
<td>Wood processing and wood, bamboos, stalk, and grass related products</td>
<td>0.256301</td>
<td>0.078849</td>
<td>0.075202</td>
<td>1.13004</td>
</tr>
<tr>
<td>Furniture manufacturing</td>
<td>0.492468</td>
<td>-0.04236</td>
<td>-0.00422</td>
<td>2.839226</td>
</tr>
<tr>
<td>Paper manufacturing and related products</td>
<td>1.999268</td>
<td>0.414827</td>
<td>0.27455</td>
<td>1.217526</td>
</tr>
<tr>
<td>Publishing and record, copying medium</td>
<td>1.290568</td>
<td>0.530954</td>
<td>0.220607</td>
<td>1.102449</td>
</tr>
<tr>
<td>Cultural, educational and PE product manufacturing</td>
<td>0.699969</td>
<td>0.121647</td>
<td>0.387992</td>
<td>0.950689</td>
</tr>
<tr>
<td>Petroleum processing, coking and processing of nuclear fuels</td>
<td>2.680723</td>
<td>7.474379</td>
<td>3.718173</td>
<td>0.846121</td>
</tr>
<tr>
<td>Chemical materials and chemical manufacturing</td>
<td>1.756441</td>
<td>1.769964</td>
<td>0.627245</td>
<td>0.97492</td>
</tr>
<tr>
<td>Pharmaceutical manufacturing</td>
<td>1.188683</td>
<td>0.839732</td>
<td>0.790506</td>
<td>0.887529</td>
</tr>
<tr>
<td>Plastic products</td>
<td>1.130704</td>
<td>0.747623</td>
<td>0.436842</td>
<td>0.910486</td>
</tr>
<tr>
<td>Non Metal mine products</td>
<td>0.710176</td>
<td>0.789522</td>
<td>0.280609</td>
<td>0.920214</td>
</tr>
<tr>
<td>Death Metal refining and calendaring processing industry</td>
<td>2.005383</td>
<td>1.6662</td>
<td>1.560819</td>
<td>0.876022</td>
</tr>
<tr>
<td>Nonferrous Metal refining and calendaring processing industry</td>
<td>2.449683</td>
<td>7.098239</td>
<td>1.214395</td>
<td>0.490727</td>
</tr>
<tr>
<td>Metal products</td>
<td>1.679149</td>
<td>0.251508</td>
<td>20.66914</td>
<td>1.122636</td>
</tr>
<tr>
<td>General equipment manufacturing</td>
<td>0.82217</td>
<td>0.449719</td>
<td>0.278722</td>
<td>1.025952</td>
</tr>
<tr>
<td>Special equipment manufacturing</td>
<td>1.052313</td>
<td>0.896823</td>
<td>0.49294</td>
<td>0.961746</td>
</tr>
</tbody>
</table>
The second step is the Cluster Analysis. From the procedures of the factor analysis, we get the four common factors in Gansu’s 36 industries. The links among them have been banished. Meanwhile, according to contribution rate, the four common factors are given their weight respectively. As is seen in Table 5, the level grouping is used based on the scores of the four common factors, from which we detect the similarities and differentiation of the internal structure in Gansu’s industries. The process is realized by spss13.0 for windows.

Subsequently standardize the data by spss13.0 for windows. Square Euclidean distance is used to measure the degree of similarity. Link method of groups can work out the ultimate group result. From the cluster Analysis, the 37 industries can be subsequently divided into four categories according to their scores of common factors. (See Table1-6)

<table>
<thead>
<tr>
<th>Category</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>1(^{st}) kind</td>
<td>Petroleum processing, coking and nuclear fuel industry</td>
</tr>
<tr>
<td>2(^{nd}) kind</td>
<td>Death Metal and Nonferrous Metal refining and calendaring processing</td>
</tr>
</tbody>
</table>
3. Explanations on Results

From the cluster Analysis, we can see that the petroleum, coking and processing industry of nuclear fuels which belong to the 1st category are undoubtedly in the absolute pillar industry position. In 2005, the total industry output of the SOEs and the selected non-SOEs account for 24.46%, fitting well to the definition of characteristic and advantaged industries. The refining and calendaring processing industry of black metal and non-ferrous metal, thermo electrical production and supply in the 2nd and 3rd categories account for 41.76% of the total industrial output of Gansu in the same period, therefore, they can be considered as the characteristic and advantaged industries in Gansu. The 32 industries in the 4th category account for 33.76% of Gansu’s industry economy. In general, the Percentage is comparatively small. However, by comparison of the statistics in common factors, there are quite a few industries with good performance, efficiency and fewer risks. The cultivation of the newly emerged characteristic and advantaged industries in Gansu can be selected from them.

Appendix 2 Selection and Calculation Procedures of Hierarchy Analysis

The selection method of this item, following the principles of selection of characteristic and advantaged industries, is also the establishment of index system. Upon completion of the index system, we subsequently apply model operation. The model operation includes the following three steps: Firstly is the index and standardized calculation. Using Annuals and industry surveys, we try to seek or calculate the indicators. The standardization of the indicators is to eliminate the influences by dimension and weight. The second step is to give the weight of each index. In this regard, we use hierarchy analysis to determine the weight. The third step is the compounding of various indicators. By certain formulas, various indicators are comprehensively evaluated. After that, the industries with higher marks are treated with nature analysis to finally confirm the
characteristic and advantaged industries. The concrete calculation formula is as follows:

1. Determination of Indicators

Considering the science, mobility and feasibility principles of selection of indicators and the reality of the development of Gansu’s industries, altogether seven indicators out of four categories are determined as the quantity bases.

The concrete formula is as follows:

① The specialty rate of labor forces  C1

It is formulated as the Percentage of the number of employed people in this industry of the region divided by the total number of employed people in this region/the Percentage of the number of the employed people in this industry divided by the nation’s total number of employed people.

② Demand-income elasticity C2

It is formulated as the increase rate of industry demand divided by the increase rate of dispensable income per capita.

③ Comparative productivity  C3

It is formulated as the share of the output of this industry accounting for the total output in this region divided by the share of the labor force of this industry accounting for the total labor force in this region.

④ Industry contribution rate  C4

It is formulated as the industrial AV of this industry divided by the total industrial AV in the region.

⑤ Regional entropy  C6

It is formulated as the industrial AV of industry i divided by the industrial AV of region j/ the country’s industrial AV of industry i divided by the industrial AV of the nation.

⑥ Market share  C5

It is formulated as the sales income of this industry divided by the total sales income of this industry of the nation.
Employment absorption rate C7

It is formulated as the annually average number of the employed people in industry i of region j divided by the total industry output of industry i in region j.

2. Establishment of Quantitative Evaluation Model

We have to set different layers for the problems to be tackled and subsequently segment them into different component factors according to different natures and tasks. Besides, based on links and belongings, factors will be further combined to form the analytical model of different layers. Ultimately, the system is concluded with the problem of the degree of weight for the basic levels (schemes, measures and indicators) and comparative superiority. According to the seven indicators out of four categories, AHP gradient structure model is built up. (See Graph 2-1)

![AHP Gradient Structure Model](image)

Figure 1-9 AHP Gradient Structure Model

Above them is the task level for the selection of characteristic and advantaged industries

3. General Selection of Industries and Calculation on Each Index

For sake of simplicity, referring to related literatures and considering the current stage of the
development of Gansu economy, factor aptitude structure and the situation of the development of each industry, industries are at first generally selected to thin the scope of the candidates. Industries are selected and according to relativity, they are compounded into 7 industries:

**Petrochemical Industry** (including exploitation of petroleum and natural gas, petrochemical processing, chemical materials and chemical manufacturing and chemical fibre manufacturing and coking), **Nonferrous Metal Industry** (including Death Metal refining and calendaring processing industry, Nonferrous Metal refining and calendaring processing industry, Mass seeding of Non-ferrous metal mines and Metal products), **Building material Industry** (including Nonmetal Minerals Mining and Dressing and Non Metal mine products), **Food Industry** (including Processing of agricultural products and byproducts, Food manufacturing, Beverage manufacturing and Tobacco Products), **Pharmaceutical manufacturing Industry**, **Equipment Manufacturing Industry** (including general machinery manufacturing, electrical machinery and equipment manufacturing industry, Communications equipment manufacturing and Special equipment manufacturing) and **Energy Industry** (including Coal mass seeding and Produce and Supply of water).The original data of Annual Statistics 2005 &2006 of Gansu and Annual Statistics of China 2006 are used (See Table 2-1) to compute on the 7 indicators of the 7 major industries with the results exhibited in Table 2-2.

**Table 1-26 Basic Statistics**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number of employed people in this industry (unit:10 thousand people)</th>
<th>Number of employed people in this industry of the country(unit:10 thousand people)</th>
<th>Number of employed people in this industry of the country(unit:10 thousand people)</th>
<th>Added-value of Industry Sales(unit:10 thousand Yuan)</th>
<th>Sales income of this industry(unit:10 thousand Yuan)</th>
<th>Annually average employed people in this industry</th>
<th>Annually average employed people in this industry</th>
<th>Annually average employed people in this industry</th>
<th>Annually average employed people in this industry</th>
<th>Annually average employed people in this industry</th>
<th>Annually average employed people in this industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrochemical</td>
<td>89798</td>
<td>363.7</td>
<td>1856774</td>
<td>6833681</td>
<td>89798</td>
<td>32.75</td>
<td>11672.83</td>
<td>7043368</td>
<td>36913.95</td>
<td>90842</td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>8953</td>
<td>83.2</td>
<td>-414705</td>
<td>893457</td>
<td>8953</td>
<td>6.24</td>
<td>4813.96</td>
<td>893457</td>
<td>6151.22</td>
<td>9231</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------</td>
<td>-------</td>
<td>---------</td>
<td>--------</td>
<td>------</td>
<td>-------</td>
<td>---------</td>
<td>--------</td>
<td>---------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>Petrochemical processing And coking</td>
<td>42168</td>
<td>54.0</td>
<td>1885058</td>
<td>4862609</td>
<td>42168</td>
<td>17.84</td>
<td>1981.64</td>
<td>4792230</td>
<td>12030.52</td>
<td>33042</td>
<td></td>
</tr>
<tr>
<td>Chemical materials and chemical manufacturing</td>
<td>35799</td>
<td>206.3</td>
<td>342903</td>
<td>963931</td>
<td>35799</td>
<td>8.42</td>
<td>4391.92</td>
<td>1219716</td>
<td>16165.21</td>
<td>45650</td>
<td></td>
</tr>
<tr>
<td>Chemical Fibre Manufacturing</td>
<td>2878</td>
<td>202</td>
<td>43518</td>
<td>113684</td>
<td>2878</td>
<td>0.25</td>
<td>485.31</td>
<td>137965</td>
<td>2567</td>
<td>2920</td>
<td></td>
</tr>
<tr>
<td>Non ferrous metal</td>
<td>169880</td>
<td>382.5</td>
<td>1682491</td>
<td>6185346</td>
<td>169880</td>
<td>31.3</td>
<td>9827.53</td>
<td>6335016</td>
<td>36954.09</td>
<td>175056</td>
<td></td>
</tr>
<tr>
<td>Death Metal refining and calendaring processing industry</td>
<td>50045</td>
<td>184.2</td>
<td>32395</td>
<td>2433457</td>
<td>50045</td>
<td>10.58</td>
<td>5776.9</td>
<td>2344429</td>
<td>21594.05</td>
<td>50337</td>
<td></td>
</tr>
<tr>
<td>Nonferrous Metal refining and calendaring processing industry</td>
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<td>45057.32</td>
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<td>9111</td>
<td>208907</td>
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<td>2966.96</td>
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<td>C2</td>
<td>C3</td>
<td>C4</td>
<td>C5</td>
<td>C6</td>
<td>C7</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Petrochemical</td>
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<td>0.3275</td>
<td>0.0191</td>
<td>2.0254</td>
<td>0.0133</td>
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<td></td>
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<td></td>
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<tr>
<td>Non-ferrous metal and metallurgy</td>
<td>2.4204</td>
<td>0.3578</td>
<td>26.1945</td>
<td>0.3130</td>
<td>0.0171</td>
<td>2.2994</td>
<td>0.0283</td>
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<tr>
<td>Building material</td>
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<td>0.1298</td>
<td>7.0795</td>
<td>0.0303</td>
<td>0.0055</td>
<td>0.7080</td>
<td>0.1079</td>
<td></td>
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</tr>
</tbody>
</table>


Table 1-27 Specific Figures after Calculation
Food  | 0.7661  | 0.0920  | 27.3054  | 0.0848  | 0.0062  | 0.8579  | 0.0273  
Pharmaceutical manufacturing | 0.5087  | 0.8286  | 24.5083  | 0.0145  | 0.0059  | 0.6847  | 0.0301  
Equipment manufacturing | 0.7256  | 0.03279 | 6.6631   | 0.0539  | 0.0019  | 0.3225  | 0.1104  
Energy Industry | 1.3881  | 0.6719  | 14.7214  | 0.1351  | 0.0116  | 1.1322  | 0.0449  

4. Determine the Weight of Indicators

In each layer of the Hierarchy Analysis, the order of a certain factor of some related indicators, compared with the previous layer, can be simplified to a series of comparison of Pair indicators (factors). For the quantitative analysis of the comparison result, five experienced experts from the academic circle and government sectors were invited to compare and analyze the statistics in pairs, using 1—9 mark of indicators. Therefore, matrix $O-B$ and $B-C$ are set up. Compounding the results of their scores, Mathpro is used to compute and judge on the maximum root and corresponding vector, working out the comparative importance weight of factors in a certain layer compared with the factors in the upper layer. Then, using the compounding of weight composition of the factors in the upper layer, the comparative importance weight of the factors in a certain layer compared with the upper level is attained. From the highest layer to the lowest, the relative importance weight of factors in the basic layer for the general task is worked out. The ranking of layers and the comprehensive weight degree are revealed in Table 2-3.

Table 1-28 The Final Standing of Layers and Comprehensive Weight Degree

<table>
<thead>
<tr>
<th>Bj</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.0736</td>
<td>0.1293</td>
<td>0.5495</td>
<td>0.2476</td>
<td>-</td>
</tr>
<tr>
<td>Cj</td>
<td>C1</td>
<td>C2</td>
<td>C3</td>
<td>C4</td>
<td>C5</td>
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<tr>
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<td>0.0667</td>
<td>0.3333</td>
<td>0.1047</td>
<td>0.6370</td>
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<td>0.0862</td>
<td>0.0431</td>
<td>0.0575</td>
<td>0.3500</td>
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</table>
5. Scoring on the Selection of Characteristic and advantaged industries in Gansu

After the treatment of non-dimensional standardization for each row of statistics in Table 3-10 and the standardization by formula $X_{ij}' = \frac{X_{ij}}{\sum X_{ij}}$, seven major industries of Gansu get their scores after standardization. Finally, the comprehensive evaluation of each industry is worked out by weight adding. (See Table 2-4)

Table 2-4 Comprehensive Evaluation of Each Industry

<table>
<thead>
<tr>
<th>Industry</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
<th>C7</th>
<th>Total Score</th>
<th>Final Standing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrochemical</td>
<td>15.74</td>
<td>13.81</td>
<td>33.96</td>
<td>34.15</td>
<td>28.38</td>
<td>25.22</td>
<td>3.67</td>
<td>20.20</td>
<td>2</td>
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<tr>
<td>Non-ferrous metal and metallurgy</td>
<td>28.31</td>
<td>14.60</td>
<td>16.25</td>
<td>32.63</td>
<td>25.41</td>
<td>28.63</td>
<td>7.81</td>
<td>20.81</td>
<td>1</td>
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<td>16.33</td>
<td>5.29</td>
<td>4.39</td>
<td>3.16</td>
<td>8.17</td>
<td>8.82</td>
<td>29.79</td>
<td>13.52</td>
<td>4</td>
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<tr>
<td>Food</td>
<td>8.96</td>
<td>3.75</td>
<td>16.94</td>
<td>8.84</td>
<td>9.21</td>
<td>10.60</td>
<td>7.54</td>
<td>8.82</td>
<td>7</td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td>5.94</td>
<td>33.80</td>
<td>1.52</td>
<td>1.51</td>
<td>8.77</td>
<td>8.53</td>
<td>8.31</td>
<td>10.43</td>
<td>5</td>
</tr>
<tr>
<td>manufacturing</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment manufacturing</td>
<td>8.49</td>
<td>1.34</td>
<td>4.13</td>
<td>5.62</td>
<td>2.82</td>
<td>4.02</td>
<td>30.48</td>
<td>10.35</td>
<td>6</td>
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</table>

From Table 2-4, we can see the order is: Petrochemical, Non-ferrous metal and metallurgy,
Building material, Food, Pharmaceutical manufacturing, Equipment manufacturing and Energy Industry. Among them, the industries with remarkable strengths are petrochemical, non-ferrous metal and metallurgy and Building material, which can be considered as the characteristic and advantaged industries.

The results of Cluster Analysis and Hierarchy Analysis indicate that although the ranking of Petrochemical, Non-ferrous metal and metallurgy differ in different systems, they nevertheless are all in top three. They can therefore be considered as the characteristic and advantaged industries of Gansu. The industries like building material, food and equipment manufacturing can also be given consideration as the potentials to be tapped or the development of characteristic and advantaged industries in Gansu.

Appendix 3 Horizontal and Vertical Verification on the Comprehensive Conclusions of the Characteristic and advantaged industries

1. Vertical Verification

Firstly we segment the industries in Gansu according to the fields and subsequently calculate the arithmetic average (See Table 3-1, 3-2, 3-3) of the increase rate, the total volume of profit and tax, and total sales volume.

<table>
<thead>
<tr>
<th>Industry</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>平均值</th>
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</thead>
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<td>Exploitation and Seeding of Coal</td>
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<td>2.69</td>
<td>3.08</td>
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<td>3.60</td>
<td>2.956973</td>
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<td>Exploitation of petroleum and natural gas</td>
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<td>11.97</td>
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<tr>
<td>Masa seeding of Black Metal mines</td>
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<td>Masa seeding of Non-ferrous metal mines</td>
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<td>1.48</td>
<td>1.33</td>
<td>1.27</td>
<td>1.49</td>
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<td>0.65</td>
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<td>3.37</td>
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<td>0.43</td>
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<td>0.04</td>
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<td>0.07</td>
<td>0.05</td>
<td>0.02</td>
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<td>15.95</td>
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<td>17.19</td>
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<td>2004</td>
<td>2005</td>
<td>2006</td>
<td>2007</td>
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<td>10.58</td>
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<td>13.79</td>
<td>15.78</td>
<td>17.12</td>
<td>18.84</td>
<td>16.18</td>
</tr>
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<td>1.40</td>
<td>0.61</td>
<td>1.19</td>
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<td>1.37</td>
<td>1.63</td>
<td>1.38</td>
<td>1.45</td>
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<td>2.56</td>
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<td>Communications equipment manufacturing</td>
<td>0.62</td>
<td>0.73</td>
<td>0.62</td>
<td>0.47</td>
<td>0.33</td>
<td>0.53</td>
</tr>
<tr>
<td>Electronic machinery and appliances</td>
<td>2.24</td>
<td>1.89</td>
<td>1.91</td>
<td>1.81</td>
<td>1.97</td>
<td>1.96</td>
</tr>
<tr>
<td>Telecommunication, computer and other</td>
<td>1.86</td>
<td>1.54</td>
<td>1.40</td>
<td>0.86</td>
<td>0.47</td>
<td>1.10</td>
</tr>
<tr>
<td>manufacturing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instruments, meters and office&amp;school use</td>
<td>0.22</td>
<td>0.18</td>
<td>0.33</td>
<td>0.16</td>
<td>0.15</td>
<td>0.19</td>
</tr>
<tr>
<td>machinery manufacturing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crafts and other manufacturing</td>
<td>0.70</td>
<td>0.13</td>
<td>0.07</td>
<td>0.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Produce and Supply of thermo electrical</td>
<td>11.35</td>
<td>11.54</td>
<td>10.46</td>
<td>9.14</td>
<td>9.91</td>
<td>10.44</td>
</tr>
<tr>
<td>power</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Produce and Supply of gas</td>
<td>0.09</td>
<td>0.05</td>
<td>0.04</td>
<td>0.04</td>
<td>0.10</td>
<td>0.06</td>
</tr>
<tr>
<td>Produce and Supply of water</td>
<td>0.30</td>
<td>0.32</td>
<td>0.25</td>
<td>0.30</td>
<td>0.20</td>
<td>0.27</td>
</tr>
</tbody>
</table>

Source: *Gansu Annual Report (2002-2006)*
## Table 1-30 Average Value of Total Volume of Profit and Tax of Industries in Gansu (2001-2005)

**Unit: Ten Thousand Yuan**

<table>
<thead>
<tr>
<th>Industry</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>Average Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploitation and Seeding of Coal</td>
<td>172460</td>
<td>205312</td>
<td>277407</td>
<td>363790</td>
<td>478979</td>
<td>279690.3</td>
</tr>
<tr>
<td>Exploitation of petroleum and natural gas</td>
<td>421776</td>
<td>736183</td>
<td>869828</td>
<td>1064145</td>
<td>893457</td>
<td>761930</td>
</tr>
<tr>
<td>Masa seeding of Black Metal mines</td>
<td>9338</td>
<td>10179</td>
<td>80011</td>
<td>46147</td>
<td>113904</td>
<td>33140.42</td>
</tr>
<tr>
<td>Masa seeding of Non-ferrous metal mines</td>
<td>116088</td>
<td>1123139</td>
<td>1425673</td>
<td>153823</td>
<td>210259</td>
<td>359586.5</td>
</tr>
<tr>
<td>Nonmetal Minerals</td>
<td>148193</td>
<td>154621</td>
<td>53396</td>
<td>54959</td>
<td>45290</td>
<td>78836.91</td>
</tr>
<tr>
<td>Processing of agricultural products and byproducts</td>
<td>166118</td>
<td>172060</td>
<td>314794</td>
<td>391703</td>
<td>499336</td>
<td>281251.4</td>
</tr>
<tr>
<td>Food manufacturing</td>
<td>86155</td>
<td>93125</td>
<td>100034</td>
<td>125237</td>
<td>131154</td>
<td>105682.2</td>
</tr>
<tr>
<td>Beverage manufacturing</td>
<td>126612</td>
<td>125153</td>
<td>143903</td>
<td>178550</td>
<td>263747</td>
<td>160763.2</td>
</tr>
<tr>
<td>Tobacco Products</td>
<td>167584</td>
<td>234931</td>
<td>308563</td>
<td>344324</td>
<td>349033</td>
<td>270938</td>
</tr>
<tr>
<td>Textile Industry</td>
<td>135415</td>
<td>161571</td>
<td>111182</td>
<td>131879</td>
<td>91134</td>
<td>123932.1</td>
</tr>
<tr>
<td>Costume, shoes and hats manufacturing</td>
<td>25426</td>
<td>26412</td>
<td>28924</td>
<td>25744</td>
<td>8895</td>
<td>21361.61</td>
</tr>
<tr>
<td>Leather, fur, and feather related products</td>
<td>39422</td>
<td>38085</td>
<td>73114</td>
<td>90504</td>
<td>88899</td>
<td>61547.72</td>
</tr>
<tr>
<td>Wood processing and wood, bamboos, stalk, and grass related products</td>
<td>6709</td>
<td>7682</td>
<td>8747</td>
<td>7459</td>
<td>10655</td>
<td>8144.106</td>
</tr>
</tbody>
</table>

219
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture manufacturing</td>
<td>13189</td>
<td>11747</td>
<td>11952</td>
<td>8135</td>
<td>4895</td>
<td>9408.765</td>
</tr>
<tr>
<td>Paper manufacturing and related products</td>
<td>44619</td>
<td>45960</td>
<td>45283</td>
<td>48623</td>
<td>57717</td>
<td>48216.46</td>
</tr>
<tr>
<td>Publishing and record, copying medium</td>
<td>22788</td>
<td>26183</td>
<td>35801</td>
<td>33791</td>
<td>35250</td>
<td>30277.2</td>
</tr>
<tr>
<td>Cultural, education and PE product manufacturing</td>
<td>6715</td>
<td>8019</td>
<td>8097</td>
<td>5792</td>
<td>2632</td>
<td>5814.615</td>
</tr>
<tr>
<td>Petroleum processing, coking and processing of nuclear fuels</td>
<td>1673944</td>
<td>1730516</td>
<td>2154856</td>
<td>3013942</td>
<td>4792230</td>
<td>2460376</td>
</tr>
<tr>
<td>Chemical materials and chemical manufacturing</td>
<td>305996</td>
<td>344443</td>
<td>435593</td>
<td>681872</td>
<td>1219716</td>
<td>520445.4</td>
</tr>
<tr>
<td>Pharmaceutical manufacturing</td>
<td>108457</td>
<td>110049</td>
<td>128849</td>
<td>161121</td>
<td>237870</td>
<td>142588.1</td>
</tr>
<tr>
<td>Plastic products</td>
<td>170692</td>
<td>178120</td>
<td>129761</td>
<td>102940</td>
<td>150987</td>
<td>143720.6</td>
</tr>
<tr>
<td>Non Metal mine products</td>
<td>377794</td>
<td>412488</td>
<td>455956</td>
<td>570665</td>
<td>478061</td>
<td>454454.9</td>
</tr>
<tr>
<td>Death Metal refining and calendaring processing industry</td>
<td>578640</td>
<td>552015</td>
<td>1019413</td>
<td>1710223</td>
<td>2344429</td>
<td>1054775</td>
</tr>
<tr>
<td>Nonferrous Metal refining and calendaring processing industry</td>
<td>1186915</td>
<td>1275663</td>
<td>1819696</td>
<td>2804417</td>
<td>3689342</td>
<td>1954291</td>
</tr>
<tr>
<td>Metal products</td>
<td>96808</td>
<td>100040</td>
<td>114676</td>
<td>118042</td>
<td>90986</td>
<td>103589</td>
</tr>
<tr>
<td>General equipment manufacturing</td>
<td>133047</td>
<td>134284</td>
<td>163449</td>
<td>184196</td>
<td>218323</td>
<td>163665.8</td>
</tr>
<tr>
<td>Special equipment manufacturing</td>
<td>127321</td>
<td>183608</td>
<td>312793</td>
<td>303290</td>
<td>263419</td>
<td>225585.3</td>
</tr>
<tr>
<td>Communications</td>
<td>52486</td>
<td>61502</td>
<td>64945</td>
<td>88231</td>
<td>101021</td>
<td>71499.31</td>
</tr>
<tr>
<td>Industry</td>
<td>2001</td>
<td>2002</td>
<td>2003</td>
<td>2004</td>
<td>2005</td>
<td>平均值 Average Value</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Exploitation and Seeding of Coal</td>
<td>29306</td>
<td>32409</td>
<td>40921</td>
<td>60629</td>
<td>85053</td>
<td>49663.54</td>
</tr>
<tr>
<td>Exploitation of petroleum and gas</td>
<td>40873</td>
<td>173657</td>
<td>250420</td>
<td>353669</td>
<td>556121</td>
<td>274947.9</td>
</tr>
</tbody>
</table>

Source: *Gansu Annual Report (2002-2006)*

**Table 1-31 Average Value of Total Sales Volume of Industries in Gansu (2001-2005)**

*Unit: ten thousand yuan*
<table>
<thead>
<tr>
<th>Natural Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masa seeding of Black Metal mines</td>
</tr>
<tr>
<td>Mass seeding of Non-ferrous metal mines</td>
</tr>
<tr>
<td>Nonmetal Minerals Mining and Dressing</td>
</tr>
<tr>
<td>Processing of agricultural products and byproducts</td>
</tr>
<tr>
<td>Food manufacturing</td>
</tr>
<tr>
<td>Beverage manufacturing</td>
</tr>
<tr>
<td>Tobacco Products</td>
</tr>
<tr>
<td>Textile Industry</td>
</tr>
<tr>
<td>Costume, shoes and hats manufacturing</td>
</tr>
<tr>
<td>Leather, fur, and feather related products</td>
</tr>
<tr>
<td>Wood processing and wood, bamboos, stalk, and grass related products</td>
</tr>
<tr>
<td>Furniture manufacturing</td>
</tr>
<tr>
<td>Paper manufacturing and related products</td>
</tr>
<tr>
<td>Publishing and record, copying medium</td>
</tr>
<tr>
<td>Cultural, education and PE product manufacturing</td>
</tr>
<tr>
<td>Petroleum processing, coking and processing of</td>
</tr>
</tbody>
</table>

| 2250 | 361 | 373 | 3130 | 10312 | 3085.14 |
| 21847 | 18436 | 27971 | 36604 | 45061 | 29838.84 |
| 19715 | 21003 | 7888 | 8854 | 4459 | 12383.82 |
| 4285 | 6302 | 16819 | 20402 | 20690 | 13699.5 |
| 2238 | 2541 | 6378 | 4567 | 1725 | 3489.84 |
| 21767 | 19050 | 20579 | 24344 | 31589 | 23465.78 |
| 113792 | 144950 | 160483 | 208445 | 197170 | 164968 |
| -1712 | 5260 | 820 | 6511 | 2394 | 2654.58 |
| 2301 | 2052 | 1994 | 2005 | 972 | 1864.7 |
| 1782 | 2572 | 10395 | 7893 | 6948 | 5917.94 |
| -277 | 363 | 883 | 631 | 132 | 346.32 |
| 1286 | 332 | 844 | 570 | 358 | 678.02 |
| 3049 | 2626 | 3862 | 4173 | 3858 | 3513.58 |
| 1531 | 1409 | 2605 | 1495 | 3712 | 2150.32 |
| 891 | 668 | 803 | 433 | 235 | 606.02 |
| 119653 | 93195 | -785 | 189072 | -163710 | 47485.02 |
|----------------------------------------------|--------|--------|--------|--------|--------|-------|
| Nuclear fuels                                | -5519  | 3581   | 15863  | 15510  | 21112  | 10109.42 |
| Chemical materials and chemical manufacturing| 17225  | 19483  | 22883  | 30395  | 32296  | 24456.4 |
| Pharmaceutical manufacturing                 | 11787  | 13376  | 5324   | 4270   | 7748   | 8500.92 |
| Plastic products                             | 41240  | 42028  | 36897  | 59025  | 12082  | 38254.44 |
| Non Metal mine products                      | 50419  | 72928  | 144241 | 214865 | 226678 | 141826.2 |
| Death Metal refining and calendaring processing industry | 106416 | 111550 | 187498 | 289494 | 418066 | 222604.7 |
| Nonferrous Metal refining and calendaring processing industry | 3107  | 5826   | 4881   | 6240   | 4958   | 5002.44 |
| Metal products                               | -3002  | 2084   | 864    | 8309   | 12546  | 4160.26 |
| General equipment manufacturing              | -4447  | 7614   | -1043  | -3290  | 10848  | 1936.42 |
| Special equipment manufacturing              | -3870  | -738   | -8438  | 1794   | 7338   | -782.88 |
| Communications equipment manufacturing       | 7260   | 10468  | 10627  | 10268  | 11737  | 10072.04 |
| Electronic machinery and appliances manufacturing | 9520  | 17097  | 8423   | -499   | 7321   | 8372.36 |
| Telecommunication, computer and other electrical equipment manufacturing | -2512 | -3841  | -4894  | 1437   | 1749   | -1612.14 |
Secondly, according to the average value, we obtain the top ten industries in each aspect. (See Table 3-4)

Table 1-32 Top Ten Industries of Gansu in Different Aspects of Recent Five Years

<table>
<thead>
<tr>
<th>Standing</th>
<th>Average Percentage of Industrial AT</th>
<th>Average Value of Total Volume of Profit and Tax</th>
<th>Average Value of Total Sales Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Petroleum processing, coking and processing of nuclear</td>
<td>Exploitation of petroleum and natural gas</td>
<td>Petroleum processing, coking and processing of nuclear</td>
</tr>
<tr>
<td>2</td>
<td>Nonferrous Metal refining and calendaring processing industry</td>
<td>Nonferrous Metal refining and calendaring processing industry</td>
<td>Nonferrous Metal refining and calendaring processing industry</td>
</tr>
<tr>
<td>3</td>
<td>Produce and Supply of thermo electrical power</td>
<td>Produce and Supply of thermo electrical power</td>
<td>Produce and Supply of thermo electrical power</td>
</tr>
<tr>
<td>4</td>
<td>Death Metal refining and calendaring processing industry</td>
<td>Tobacco Products</td>
<td>Death Metal refining and calendaring processing industry</td>
</tr>
<tr>
<td>5</td>
<td>Exploitation of petroleum and natural gas</td>
<td>Death Metal refining and calendaring processing industry</td>
<td>Exploitation of petroleum and natural gas</td>
</tr>
<tr>
<td>6</td>
<td>Chemical materials and chemical manufacturing</td>
<td>Exploitation and Seeding of Coal chemical manufacturing</td>
<td>Chemical materials and chemical manufacturing</td>
</tr>
<tr>
<td>7</td>
<td>Non Metal mine products</td>
<td>Non Metal mine products</td>
<td>Non Metal mine products</td>
</tr>
<tr>
<td>8</td>
<td>Tobacco Products</td>
<td>Mass seeding of Non-ferrous metal mines</td>
<td>Tobacco Products</td>
</tr>
<tr>
<td>9</td>
<td>Exploitation and Seeding of Coal</td>
<td>Pharmaceutical manufacturing</td>
<td>Processing of agricultural</td>
</tr>
</tbody>
</table>

The vertical verification, in its real sense, is the extension of the nature selection to the extent of the verification by historical statistics. From the vertical verification we can see that except the tobacco and basic industries, the rest of the industries are all in the series of the characteristic and advantaged industries which we have enclosed. However, they have different external reflections: Petroleum processing, coking and processing of nuclear, nonferrous metal refining and calendaring processing industry, produce and supply of thermo electrical power, death metal refining and calendaring processing industry and exploitation of petroleum and natural gas are reflected in scale while exploitation of petroleum and natural gas, nonferrous metal refining and calendaring processing industry, produce and supply of thermo electrical power, tobacco products and Death metal refining and calendaring processing industry are reflected in profit. This, in turn, confirms the unparalleled structure of the characteristic and advantaged industries in Gansu. They are not only reflected in different periods from different perspectives like reality and potential, Rich the People and Rich the Province, but also have the differentiation in terms of strength in aspects like scale, profit and competitiveness.

2. Horizontal Verification

**Verification 1: Characteristic and advantaged industries in Regional Structure**

According to the statistics of 10th and 11th Five Year Plan of the western provinces and the digital map of Chinese industry development, we get the specifications of the characteristic and advantaged industries in the western region. (See Table 3-5)
<table>
<thead>
<tr>
<th>Province</th>
<th>Industries and Key Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaanxi</td>
<td>Fruit, tourism, textile, medicine, national defense technology(aero and aviation), energy, chemical and equipment manufacturing, exploitation of petroleum and natural gas, hydropower, non-ferrous metal, slat chemical, tourism, processing of characteristic agricultural products (refined rape seed oil, honey, goat wool and milk products)</td>
</tr>
<tr>
<td>Qinghai</td>
<td>Energy, chemical, new materials, processing machinery of agricultural products, pharmaceutical, characteristic theme tourism, medicine and fermentation industry, Bio-medicine, new materials, new energies, machinery, electronics, petrochemical, exploitation of petroleum and natural gas, hydropower, non-ferrous metal, slat chemical, tourism, processing of characteristic agricultural products</td>
</tr>
<tr>
<td>Ningxia</td>
<td>Energy, chemical, new materials, processing machinery of agricultural products, pharmaceutical, characteristic theme tourism, medicine and fermentation industry, Bio-medicine, new materials, new energies, machinery, electronics, petrochemical, exploitation of petroleum and natural gas, hydropower, non-ferrous metal, slat chemical, tourism, processing of characteristic agricultural products</td>
</tr>
<tr>
<td>Xinjiang</td>
<td>Equipment manufacturing, hydropower, high-tech, deep processing of agricultural products, chemical, electricity, tobacco, drinks, chemical, characteristic food and medicine (traditional medicine), fruits, melons and gardening, husbandry, green food industry (Ephedra, tomato) and characteristic light textile (cotton), Bio-medicine, new materials, new energies, machinery, electronics, petrochemical, exploitation of petroleum and natural gas, hydropower, non-ferrous metal, slat chemical, tourism, processing of characteristic agricultural products</td>
</tr>
<tr>
<td>Sichuan</td>
<td>Equipment manufacturing, hydropower, high-tech, deep processing of agricultural products, chemical, electricity, tobacco, drinks, chemical, characteristic food and medicine (traditional medicine), Bio-medicine, new materials, new energies, machinery, electronics, petrochemical, exploitation of petroleum and natural gas, hydropower, non-ferrous metal, slat chemical, tourism, processing of characteristic agricultural products</td>
</tr>
<tr>
<td>Guizhou</td>
<td>Tobacco, development and innovation of biological resources, mineral resources (Non-ferrous metal and Phosphide), energy (hydropower) and tourism, Energy, processing of raw materials, equipment manufacturing, processing of agricultural byproducts, Chinese traditional medicine, forestry, tourism and aluminum industry, Bio-medicine, new materials, new energies, machinery, electronics, petrochemical, exploitation of petroleum and natural gas, hydropower, non-ferrous metal, slat chemical, tourism, processing of characteristic agricultural products</td>
</tr>
<tr>
<td>Yunnan</td>
<td>Tobacco, development and innovation of biological resources, mineral resources (Non-ferrous metal and Phosphide), energy (hydropower) and tourism, Energy, processing of raw materials, equipment manufacturing, processing of agricultural byproducts, Chinese traditional medicine, forestry, tourism and aluminum industry, Bio-medicine, new materials, new energies, machinery, electronics, petrochemical, exploitation of petroleum and natural gas, hydropower, non-ferrous metal, slat chemical, tourism, processing of characteristic agricultural products</td>
</tr>
<tr>
<td>Guangxi</td>
<td>Tourism, Tibetan medicine, green food industry, traditional folk crafts, plateau ecological agriculture, mining technology and building materials, Bio-medicine, new materials, new energies, machinery, electronics, petrochemical, exploitation of petroleum and natural gas, hydropower, non-ferrous metal, slat chemical, tourism, processing of characteristic agricultural products</td>
</tr>
<tr>
<td>Tibet</td>
<td>Bio-medicine, new materials, new energies, machinery, electronics, petrochemical, exploitation of petroleum and natural gas, hydropower, non-ferrous metal, slat chemical, tourism, processing of characteristic agricultural products</td>
</tr>
<tr>
<td>Chongqing</td>
<td>Buses and motors, equipment manufacturing, processing of resources, high-tech and modern Chinese traditional medicine, Bio-medicine, new materials, new energies, machinery, electronics, petrochemical, exploitation of petroleum and natural gas, hydropower, non-ferrous metal, slat chemical, tourism, processing of characteristic agricultural products</td>
</tr>
<tr>
<td>Inner Mongolia</td>
<td>Energy, chemical, metallurgy, equipment manufacturing (engineering machinery, transportation machinery), processing of agricultural and livestock products and high-tech industries (rare earth, bio-medicine and IT), Bio-medicine, new materials, new energies, machinery, electronics, petrochemical, exploitation of petroleum and natural gas, hydropower, non-ferrous metal, slat chemical, tourism, processing of characteristic agricultural products</td>
</tr>
</tbody>
</table>

Source: 10th and 11th Five Year Plans of Western Region

According to the contents of the table and the verification result, we hold that in the series of the
characteristic and advantaged industries in Gansu, the industries of petrochemical, non-ferrous metal and nuclear have the unique and indispensable advantages. They have strong market demands in the long-run. However, to make them stronger and more powerful, we also face the resource and technology strains. The metallurgy industry has the regional advantage and stronger Industrial Competitiveness. In the long run, it is expected to be prosperous in the regional market. But in the larger scope, it is still confronted with the threats like being reshuffled and restricted. Except for some varieties in the pharmaceutical, equipment manufacturing and building materials industries, the overall competitiveness is not strong enough. In addition, the entry into the industries is not high and they all belong to the general competition industries, therefore, there are huge competition pressures if they are to be developed in large scale. The high-tech industries have their characteristics but not strong enough. Moreover, the industrialization process is not smooth. According to the Chinese Industry development Report 2006, in terms of ration of industrial AT in the high-tech industries, in 2004, Gansu was ranked the third last in the western provinces and the fourth last in the country, only higher than that of Xinjiang, Qinghai and Shaanxi. Therefore, breakthroughs in industrialization must be realized if they are to be developed into advantaged industries. As for the processing industries of agriculture products, they have quite a lot similarity with the western provinces. The market competition is cut-throat and there are ranges of resource and pricing battles. More efforts are to be made to cultivate them as the characteristic and advantaged industries.

**Verification 2: Characteristic and advantaged industries in the National Structure**

Again we put the series back to the fields. According to the economic survey in 2004, we make comparison nationwide in terms of employment, scale, estate and profit and consequently verify the conclusions we have drawn. (See Table 3-6)

**Table 1-34 Comparison Analysis of Characteristic and advantaged industries of Gansu in National Structure**
<table>
<thead>
<tr>
<th>Industry</th>
<th>Employed people (unit: ten thousand people)</th>
<th>Assets (unit: one hundred million yuan)</th>
<th>Sales Income (unit: one hundred million yuan)</th>
<th>Profit (unit: one hundred million yuan)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nation</td>
<td>Gansu</td>
<td>Percentage</td>
<td>Nation</td>
</tr>
<tr>
<td>Petroleum processing, coking and processing of nuclear</td>
<td>6273</td>
<td>300</td>
<td>4.38</td>
<td>4774.74</td>
</tr>
<tr>
<td>Nonferrous Metal refining and calendaring processing industry</td>
<td>1155</td>
<td>8</td>
<td>9.30</td>
<td>5009.09</td>
</tr>
<tr>
<td>Death Metal refining and calendaring processing industry</td>
<td>2613</td>
<td>9</td>
<td>6.70</td>
<td>14798.0</td>
</tr>
<tr>
<td>Chemical materials and chemical manufacturing</td>
<td>3156</td>
<td>6</td>
<td>5.90</td>
<td>12118.6</td>
</tr>
<tr>
<td>Non Metal mine products</td>
<td>4071</td>
<td>9</td>
<td>6.30</td>
<td>8756.12</td>
</tr>
<tr>
<td>Exploitation of petroleum and</td>
<td>7607</td>
<td>150</td>
<td>1.97</td>
<td>548421</td>
</tr>
</tbody>
</table>
From the table, we can see that given the reality that Gansu’s population accounts for 2% of the nation, GDP 1% and industry 0.89%, the majority of the characteristic and advantaged industries in Gansu have advantages over their peers. Among them, the industries of petrochemical, non-ferrous metal and nuclear present strong advantage trends and the relative figures in the four indicators all account for nearly 4%. The advantage in metallurgy industry is just a little weaker and the percentage in the four indicators is between 1.2 and 3%. The processing industries of agriculture products still maintain the advantage with the figure 0.8—2.5% while the advantage is obscure in pharmaceutical, equipment manufacturing and building materials industries with the figure 0.3—0.7%. It indicates that the series, if viewed in the larger scope, is not fully justified. The characteristic and strong industries shall be highlighted and both the quality and quantity of industries shall have new breakthroughs. Meanwhile, we are facing the new subject of how to cultivate the potential characteristic and strong industries into the real ones.

In summary, the series of the characteristic and advantaged industries in Gansu is justifiable. However, based on the reality of the development of the industries in Gansu, creative development paths must be planned to overcome the conventional ways if they are to be truly developed. Otherwise, the characteristic and advantaged industries in Gansu may cease to exist if we just follow the suit or directly copy others’ experiences.
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Appendix of Sub-report 1

Case Study on Baiyin’s Transformation as a Resource-oriented City
Abstract

This is a sub-report of the *Study on Development Strategy of Characteristic and Advantaged Industries in Gansu* and targets Baiyin, which is very representative as a resource-oriented city in a transformation dilemma with a long development history. By analyzing the reality and features, we comment on transformation paths, use the SWOT analysis, and put forward strategies as follows: the pillar industries shall be diversified. The economic integration of Lanzhou-Baiyin shall be accelerated. Transformation paths like accelerated reforms on SOEs shall be adopted to enhance the mobility of industrial workers. The Baiyin Corporation shall transfer from a resource supplier to a technology exporter. This report is expected to give suggestions on Baiyin’s successful transformation. It is also expected to give insights into the development rules of resource-oriented cities in Gansu and the restructuring of the characteristic and advantaged industries.
Resource-based cities have been the major impetus for the industrialization in Gansu since the founding of PRC and will be the important support for Gansu's development for the coming years. The study on the development strategy of Gansu should include the resource-based cities, for they are the implementers and platform of distribution of industries and enterprises. Moreover, since the development of resource-based cities show special laws, the research attention is easily attracted to the cities that are undergoing development transformation. Baiyin is a resource-based city developed early in Gansu and is facing with the typical difficulties during the process of city transformation. Therefore, it is rational and practical to choose Baiyin as an example to study the transformation of resource-based cities in Gansu.

Based on the definition of resource-based cities, this study is focused on Baiyin District and Pingchuan District, which compose the main part of Baiyin. Among the two typical districts, the former is at a late stage of resource development and the latter is now developing steadily. We will analyze the other counties and districts of Baiyin when elaborating the multi-support for industry and the economic integration of Lanzhou-Baiyin.

Section 1 Brief History and Present Features of Baiyin’s Development as A Resource-Based City

1.1. Natural, Economic and Social Status

Baiyin is located in the arid area in mid-Gansu along the upper reaches of the Yellow River. Its eastern part borders with Zhongwei, Haiyuan and Xijie county of Ningxia Hui Autonomous Region, the southeastern part on Jingning county of Pingliang city, southern and southeastern part on Tongwei County and Anding District of Dingxi city, the western part with Yuzhong, Gaolan and Yongdeng county of Lanzhou city, the northeastern part with Tianzhu and Gulang county of Wuwei city, the northern and northeastern part with Alashan Zuoqi of Inner Mongolia Autonomous Region and
Zhongwei county of Ningxia Hui Autonomous Region. Its geological location is between E 103° 33 ′ -105° 34 ′ and N 35° 33 ′ -37° 38 ′. The distance from east to west is 174.75 kilometers and that from south to north is 249.25 kilometers with an area of 21,200 square kilometers, accounting for 4.4% of Gansu.

Baiyin is famous for and named after its gold and silver production in history (note: Baiyin in Chinese means silver). According to historical records, the excavation of mineral resources in Baiyin can be dated back to the Han Dynasty. Baiyin is a typical resource-based city set up with the copper mine development in its region. After the founding of People’s Republic of China, Baiyin was established as a county-level city in 1956, and upgraded to provincial city in 1958 and then cancelled in 1963. In 1985, with the approval of the State Council, Baiyin was reinstated at the prefecture level. Baiyin governs two districts of Baiyin and Pingchuan and three counties of Huining, Jingyuan and Jingtai, including 81 villages and towns and 7 neighborhood offices with a population of 1,746,900 with 23 ethnic groups (Han, Hui, Meng, Zang, Man etc.), among which 521,900 are urban residents.

In 2006, Baiyin achieved a GDP of RMB 16.8 billion, with RMB 9,600 per capita; its food production was over 0.5 million tons; it generated RMB 2.028 billion of total revenue and RMB 559 million of general budget revenue; the total trade volume reached USD 0.2 billion; the net income of rural population per capita was RMB 2,145 and the income of urban residents per capita was RMB 9,043 and its population increased by 5.62‰.

1.2. City Status and Its Features at Present Stage

1.2.1. Baiyin possesses an important status in China as well as in Gansu Province.

Baiyin is an important node area of Gansu Part of the West Longhai-Lanxin
Economic Zone. The economic growth rate and urbanization standard of Baiyin ranked high among the prefecture-level cities in Gansu for many years and was the second largest industrial added value and revenue contributor with the ninth largest population in Gansu.

Baiyin is a key industrial base of nonferrous metals production. Through 50 years’ growth, Baiyin has developed a relatively integrated production system of nonferrous metal industry, including geology, mining, dressing, smelting, processing, comprehensive utilization and scientific research. Baiyin Nonferrous Metals CO. (hereafter referred to as Baiyin Co.) has an annual nonferrous metal production of 0.4 million ton, accounting for over 35% of the total production in Gansu. Baiyin Co. has contributed 4.27 million tons of nonferrous metals to China accumulatively, including 1.45 million tons of copper. It used to be 1st copper producer in China for a consecutive of 18 years. The “Baiyin Copper Smelting Method” developed on its abundant operational experiences has been well-known in nonferrous metal metallurgical industry in China. Gansu Rare Earth Group Co., Ltd. has an annual production of chloride rare earth of nearly 30,000 ton, ranking the first in Asia and the second in the world.

Baiyin is a major energy and chemical production base in Gansu. Its coal production capacity is 8 million tpa. Three of the five planned or constructed hydroelectric station in Gansu along the upper reaches of Yellow River are located in Baiyin. The total installed capacity of Daxia hydroelectric station and Jingyuan thermal power plant reaches 1.7 million KW. Gansu Yinguang Chemical Industrial Co. is the largest TDI producer in China with an annual capacity of 50,000 tons. Its annual capacity of high purity dynamite is 60,000 tons, ranking No.1 in China as well as in Asia.
1.2.2. Baiyin is a typical resource-exhausted city.

Baiyin is a typical resource-based city, which followed the development pattern of “enterprises based on mines and cities based on enterprises”. According to the recent standard and relevant data defined by China Mining Association, in 2000, Baiyin’s enrollment in mining sector ranked the 14th among the 178 resource-based cities in China and the 1st among the 27 nonferrous metals-based cities. Baiyin’s production value in mining ranked the 44th and the 4th among the resource-based cities and nonferrous metal-based cities respectively. Mining is the economic arteries of Baiyin and undertakes most employment in Baiyin.

Table 1-35 Baiyin’s Ranking among Resource-Based Cities and Nonferrous Metals-Based Cities in China in 2000

<table>
<thead>
<tr>
<th>Indices</th>
<th>Baiyin City (Baiyin District &amp; Pingchuan District)</th>
<th>Ranking among the 178 Resource-Based Cities in China</th>
<th>Ranking among the 27 Nonferrous Metals-Based Cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban population (10,000 people)</td>
<td>45.8</td>
<td>62</td>
<td>8</td>
</tr>
<tr>
<td>Non-farming population (10,000 people)</td>
<td>26.27</td>
<td>64</td>
<td>5</td>
</tr>
<tr>
<td>Total regional production value (10,000 RMB)</td>
<td>512188</td>
<td>88</td>
<td>7</td>
</tr>
<tr>
<td>Production value in mining sector (10,000 RMB)</td>
<td>154666.4</td>
<td>44</td>
<td>4</td>
</tr>
<tr>
<td>Enrollment in mining sector(10,000 people)</td>
<td>12.44</td>
<td>14</td>
<td>1</td>
</tr>
</tbody>
</table>

Baiyin began to explore copper resources in 1950s and extended to multi-resources development of copper, aluminum, lead, zinc, noble metals, etc. since 1980s. Over 50 years’ development has nearly exhausted the nonferrous metal resources in Baiyin. At present, raw materials self-supplied by Baiyin Co. only satisfies 10%, 23% and 37% of its copper, lead and zinc smelting capacity respectively. Raw materials for aluminum smelting and rare earth production rely on outside purchase completely. Baiyin has become one of the 18 typical resource-exhausted cities in China.

1.2.3. Baiyin faces various difficulties in its socio-economic development

1.2.3.1 Limited support to regional economic development in Baiyin. From the perspective of economic foundation, Baiyin is strongly dependent on the state-owned economy, specific industries and large-scale enterprises. In 2004, the proportion of its state-owned economy is up to 79.51% while its private-owned economy is small and weak; the added value of nonferrous metal industry, chemical industry and basic energy industry accounts for 84% of the total large-scale economy and contributes to 93% of the large-scale economic growth in Baiyin. Tertiary industries such as eco-agriculture, touring and service industries remain unsubstantial. Baiyin’s industry relies on few large-scale enterprises such as Baiyin Co., Jingyuan Coal Co., Ltd., Gansu Rare Earth Co., Ltd., Yinguang Co., Ltd., and Jingyuan Power Plant, etc. The economic resources are highly centralized and there are not enough medium and small enterprises.

1.2.3.2 The advantages and competitiveness of pillar industries are declining. With decreasing resources in the city, the copper yield of Baiyin is falling year by year, with 73,659 tons in 2001, 69,913 tons in 2002, 66,985 tons in 2003 and 65,532 tons in 2004, an average decrease of 2709 tons per year. The percentage of purchased raw materials for lead, zinc and aluminum smelting is enlarging year by year. All the raw materials for rare earth industry are purchased from outside with rising cost, shrinking profit margin and descending industry positioning. Without necessary accumulation
of technologies, the production system of nonferrous metal industry in Baiyin has not been substantially renovated and upgraded for over 50 years, which result in outdated equipments and techniques and weak competitiveness.

1.2.3.3 Prominent economic conflicts between the urban and rural area. The economic development in the urban and rural areas in Baiyin is featured by the coexistence of industrialized city based on enterprises and the underdeveloped rural areas and the coexistence of industry driven by machines and the traditional agriculture powered by man and animals. Baiyin gives priority to the heavy industry, showing the features of industrialization at the middle or late stage, while the processing industry and agriculture are at the initial stage of industrialization; the predominant heavy industry in Baiyin lays particular stress on outer circulation of materials and products; most of the raw-material products of the large-scale state-owned or provincial-owned enterprises are sold to the markets outside of Baiyin or even outside of Gansu Province, so there is little relationship and technical coordination between such enterprises and cannot achieve added value by local processing; the large and medium enterprises centralize in Baiyin District and Pingchuan District, isolated to other counties of Baiyin. Therefore, the large enterprises play a weak role in bringing up the growth of township enterprises and service industry.

1.2.3.4 Increasing pressure on sustainable urban development. Baiyin has become a city with most severe air pollution, water pollution and heavy metal pollution in Gansu. Recently, the State Environmental Protection Agency listed Baiyin into the cities with “restricted drainage”. Sulfur dioxide leakage, resulted from the aging equipment and out-dated techniques of Baiyin Co., is a key source for air pollution in Baiyin. The heavy metal born with copper, lead, zinc, cadmium and arsenic and untreated industrial and living wastewater has lead to severe heavy metal pollution along the Baiyin reaches of the Yellow River. The large amount of industrial solid waste occupies lots of land. Ground crack, transmogrification and ground sinking
resulted by excavation of mines have destroyed the geological environment.

1.2.3.5 Prominent social problems and conflicts. Nearly half of the industrial workers in Baiyin are laid off and face the pressure of re-employment. Some enterprises with bad financial conditions have been unable to pay their staff for a consecutive of 108 months. At present, 68,000 people in Baiyin live under the lowest life-guarantee line, accounting for 20% of the total urban population. The laid-off workers has reached 47,000, accounting for over 30% of the total workers. The frequent appealing to the authorities and blocking of traffic has negative impact on social stability.

Section 2 Practice and History of Development and Transformation of Baiyin as a Resource-Based City

In order to breakthrough the restrictions on city development by the weakening advantage of resources in Baiyin, the central , Gansu and Baiyin governments have designed many various programs for the sustainable development in Baiyin and generate different effects.

2.1. Representative Thinking of City Transformation

2.1.1. “Second Pioneering of Business” of Baiyin Co.to support industrial growth

Baiyin Co. was the first nonferrous metal production enterprise after the founding of China. Copper mining in Baiyin is one of the 156 key projects of the “1st Five-Year Plan”. In the early period after Baiyin CO. was set up, it only produced copper and sulfur products. In 1987, after Baiyin Co. closed its open-pit mine, the sharp decrease of copper led to the “Second Pioneering of Business”. During 7th and 8th Five-Year Plans, the company built “two smelters and one mine”, i.e. Baiyin Aluminum Smelter, Northwest Lead-Zinc Smelter and Changba Lead-Zinc Mine. The leading products in
Baiyin were expanded to multi-products of copper, sulfur, lead, zinc and aluminum, enriching the product structure and enhancing its anti-risk ability. Through the “Second Pioneering of Business”, Baiyin Co. has grown into a group enterprise engaging in nonferrous metal mining, dressing, smelting, processing, chemical industries, scientific research and domestic & foreign trade of multi-products of copper, aluminum, lead, zinc, gold, silver and sulfur.

2.1.2. Developing hi-tech industry and building energy bases in West China to foster alternative and substitute industries

After the “Second Pioneering of Business” of Baiyin Co., to accelerate the construction of economic zones and foster new regional growth point has become the main measures adopted by the local governments to promote the development of multi-industry since 1990s. The functions and industrial directions of Baiyin was gradually clarified and improved. At the early stage, Baiyin West Economic Zone emphasized rough processing of raw materials backed by resources and such advantageous industries as nonferrous metals industry and chemical industry. Later, Baiyin Hi-Tech Industrial Zone of Chinese Academy of Sciences in Baiyin West Economic Zone focused on biomedicines, medical instruments, chemical industry and fine chemical industry, new materials and new energy, wishing to transform from resource-based development to high-tech progress.

To develop alternative and substitute industries is another important goal of Baiyin. Backed by the coal, hydropower resources within this area, oil and gas resources in Dingxi Basin and the battery industry base in the economic zones, the city is striving to achieve breakthrough for economic transformation of Baiyin by developing from traditional energy industry to high-tech energy industry and building an energy base in West China.
2.1.3. Developing circular economy for coordinated and sustainable regional development

Since the 11\textsuperscript{th} Five-Year Plan, Baiyin has put forward the thinking of realizing the economic transformation by growing circular economy in line with the Scientific Outlook, aiming at changing the resource utilization method, reducing resources’ restriction on economy, winning time for Baiyin to develop alternative industry, providing a new approach to realize new-type industrialization and radically addressing the serious environment pollution to ensure the smooth economic transformation of Baiyin. Through circular economy, the city builds circular-economic enterprises, eco-industrial zones and resource recycling society by production, circulation, consumption, tax increase measures to realize minimum consumption of resources, maximum productivity, minimum and harmless waste discharge.

2.2. Effect of Economic Transformation of Baiyin

The above-mentioned practice of economic transformation in Baiyin reduced the pressure for city development to a certain extent. However, all of them failed to solve the difficulties of Baiyin due to the restrictions from development concept at the historical stage, economical management mechanism and the market, etc.

2.2.1. Effect of “Second Pioneering of Business”

“Second Pioneering of Business” is the passive adjustment aimed at solving the management difficulties of enterprises after the decrease of their own resources. Whereas Baiyin’s economy relies heavily on the development of Baiyin Co., the fate of Baiyin city depends on the successful operation of Baiyin Co. to a large extent. The “Second Pioneering of Business” is not only a practice of Baiyin Co., but also a practice of the economic transformation in Baiyin. Baiyin Co. has optimized to a multi-product structure through the “Second Pioneering of Business” and entered a new round of fast development. Nevertheless, it has not changed nature of Baiyin Co. as a resource-based enterprise and Baiyin as a resource-based city by relying on multi-resources. In 1980s when China was transforming from planned economy to
market economy, Baiyin Co. went into trouble after a short-term benefit.

2.2.2. Effect of developing hi-tech industry and building energy bases in West China

These two kinds of thinking put forward multi-industrial development for Baiyin to change its reliance on one resource. Since 1990s, the construction of economic zones and development of energy industry has provided great impetus for Baiyin to keep good economic momentum despite of its descending position in the nonferrous metal industry. The early Baiyin West Economic Zone and current High-Tech Industrial Zone of Chinese Academy of Sciences and Pingchuan Economic Zone rank the top in Gansu Province in terms of scale, management and speed of development. With rich experience, they have become an important carrier and platform for Baiyin’s industrial development for a long period in the future. While the energy industry backed by coal, hydropower and wind power has developed very fast, making Baiyin an important pillar of the energy industry in Gansu and even in West China. However, from both the current and future perspective, it is still impossible to make up for the negative impact of the shrinking nonferrous metal industry by consistent development of high-tech and energy industries in Baiyin.

The high-tech industry, supported by the preferential policies and sound environment in the economic zones, has introduced enterprises engaging in fine chemicals, bio-medicine, new materials development and production which promote steady economic growth in the zones and become an important increasing point of regional economy. However, restricted by regional environment, infrastructure, industrial development base and HR, it is difficult for Baiyin make a clear direction for the industrial development within the zones. The so-called hi-tech industrial zones in Baiyin receive all the enterprises coming to them and show no distinct preferences to the hi-tech industries.
For the construction of energy base, Baiyin boosts advantages in such energies as hydropower, coal, coal gangue, coal gas, wind energy etc. In recent years, power energy enterprises have enjoyed rapid development and the energy industry has become a driving force for regional economy. However, restricted by the capability of consistent resource provision as well as the potential influence of the national industrial planning and policies energy industry, it is still uncertain whether the energy industry in Baiyin can expand substantially within the current sight to become a major energy base of energy in west China, to serve as breakthrough of economic transformation of the region and to gradually replace the nonferrous metal industry as the leading industry.

2.2.3. Effects of circular economy

Circular economy is an option for the transformation of resource-based cities guided by the Scientific Outlook. However, the circular economy serves the public interests, which reduces its adaptability in the city transformation and make it difficult to become the main power for the overall municipal development.

As for the nature of circular economy, it not only arranges the economic activities pursuant to the laws of ecology and economy, but also targets at addressing the shortage of resources and environment pollution for the public interest. Therefore, for a long time in the future, the circular economy will remain as policy industry. The lack of sound policies to promote efficient resource distribution and protect the environment will hinder the development of circular economy to some extent. For example, taxation in China is mainly levied in the production rather than the consumption process. It may lower the cost but leads to the neglect of market requirement by the producers. It is the same with value-added tax. If the enterprises adopt the energy saving measures, the added value of its products is higher and they will pay more tax. Therefore, the policies are not encouraging the enterprises to take saving measures. Another example is that the sewage-discharging fee for mine waste
is only several Chinese cents per ton. However, if you use this waste water, resources using fee will be levied and in some regions it is very high. Hence, the enterprises will be reluctant to select such energy-saving measures because of the high cost. There is still much to do to change the current policies. Moreover, the national promotion of circular economy aims at advancing the efficiency of resource utilization, improving the environment and realizing harmonious development between human and nature so as to deal with limited resources and environment pollution through development. However, the main impetus for the enterprises to grow circular economy is to achieve profit through material substitution and cost saving. Maximizing profit is the eternal pursuit for the companies. If there is no profit, the enterprises shall not survive.

2.3. Inspiration of the Practice of City Transformation

2.3.1. Transformation of resource-based cities should satisfy the requirements of economic globalization and market integration

With the accelerated economic globalization and market integration, traditional theory of economic planning cannot explain lots of flexible market approaches. Abundant resources will not necessarily produce advantageous industries and market advantages and dry-up of resources does not mean a dead end. In the process of Baiyin transformation, we should set up a wide concept for resources. Right now, Baiyin has exhausted its copper resources it relies on. However, during the process of nonferrous metal industrial development, Baiyin has mastered relatively mature techniques on nonferrous metals and rare earth materials smelting and dressing and has enrolled a batch of people specialized in the in-depth processing of nonferrous metals. Techniques and HR are also scare resources. With the advantages of techniques and HR, Baiyin can extend and improve its industrial chain by organizing resources from the national and international markets, shift the industrial focus to the in-depth processing of nonferrous metal and rare earth and keep its advantages in nonferrous metal industry development on a higher stage.
2.3.2. The Core is to realize transformation of industries and enterprises

Most of the resource-based cities are built on the principle of “enterprises based on mines and city based on enterprises”. The industries in these cities are usually supported by the enterprises. Baiyin is developed following the sequence of “Baiyin copper mine – Baiyin Co. - Baiyin city”. For a long time in the past, Baiyin Co. represents the nonferrous metal industry in Baiyin and thus determines the development of the city. The transformation of Baiyin as a resource-based city is how to address the dry-up of copper resources, the difficulties in management and the descending nonferrous metal industry. The change of resource concept and use of market mechanism may solve the problem of resource supply in the regional economic development. Since the rise and fall of the enterprises and the transformation of industry involves huge cost, thus become the key problems in the transformation of such resource-based cities.

2.3.3. Hi-tech industry and circular economy will radically change the pattern of economic growth of resource-based cities

At present, Baiyin is facing restrictions from its economic foundation, environment and capability of consistent input in fostering high-tech industry and promoting multi-industrial development, and is unable to facilitate the growth of high-tech industry as a unique and featured industry in the city. Since the circular economy focuses on public good, the enterprises show little interest in the economic pattern and it is difficult for the government to extend the pattern. However, guided by relevant policies, the hi-techs have witnessed fast and in-depth expansion to the traditional industry, which has helped the improvement of technical equipments and crafts in the backbone enterprises. The progress of high-tech industries such as new nonferrous metal materials industry, new energy materials industry, chemicals and fine chemicals industry, eco-medicine and medical instrument industry, modern processing and manufacturing industry, has extended the industrial chain and nurtured new industries. The development of circular economy shall have profound and long-term influence on
promoting resource efficiency, adjusting the production model of enterprises and changing people's life and consumption pattern.

Section 3 SWOT Analysis on Transformation of Baiyin and Solution Selection

3.1. Analysis of Strengths

3.1.1. Baiyin is rich in nonmetallic mines, water, land and biological resources.

The nonmetallic mineral resources in Baiyin are important for Gansu as well as the whole country. 14 kinds of nonmetallic mines have been discovered and proved, among which the reserve of attapulgite ranks the first in China and its clay mines top the Gansu Province. The reserve of associated sulfur, fire clay, calcium sulfate, sodium sulfate, quartzite and pyrite ranks the fifth in Gansu and it boosts large reserve of zeolite, barytite, medicinal stone, mineral water, etc. Baiyin is located along the Yellow River, with a water volume of 1.0788 billion m³. It has abundant water resources for industrial and agricultural production, and will not pose restrictions on regional economic development in a short term. Baiyin has great potential in clean energy development, including wind energy, solar energy, gas energy and biogas energy etc. There are 13.4238 million mu unused land in Baiyin, accounting for 42.30% of its total land. Among them 2.4835 million mu can be developed (1.31 million mu can be developed into irrigated land). Therefore, there is large space for city expansion and agricultural development. Moreover, due to the sound water, land and geological environment, Baiyin is rich in biological resources and shows advantages in barley, vegetables, fruits and grain crops planting. In the future, featured agriculture and processing of agricultural products and livestock can be encouraged in Baiyin.
3.1.2. Baiyin has been equipped with certain industrial base.

Baiyin has set up an industrial system led by nonferrous metal industry and energy industry, with chemical industry, mechanical industry, construction materials and textile industry as accessories. With over ten large or medium-sized enterprises such as Baiyin Nonferrous Metal Co., Ltd., Yinguang Chemical Industrial Co., Ltd., Gansu Rare Earth Co., Ltd., Jingyuan Coal Co., Ltd., Jingyuan Power Plant, Changtong Cable Group Co., Ltd., Daxia Hydroelectric Power Plant, Baiyin is famous for its chemical, rare earth processing, coal and nonferrous metal industries.

3.1.3. Baiyin possesses a good regional position.

70 km from Lanzhou, Baiyin is the second center for Lanzhou with complete highway, railway and airway systems. Baiyin-Lanzhou Highway and Liuzhaike-Baiyin Highway go from the east to west of Baiyin. The No.109, No.312 and No.309 national highway and No.207 and No.201 provincial highway go across the city, four of which go from Lanzhou to Baiyin. The railway within Baiyin is 251km in length and the distance between Zhongchuan Airport and Baiyin is almost the same with that from Baiyin to Lanzhou. The 150 km shipping channel from Silong to Wufo along the Yellow River is under construction.

3.2. Analysis of Weaknesses

3.2.1. Resource guarantee for the present dominant industry is decreasing.

At present, the copper produced by Baiyin can only meet 10% of the need and the other 90% are purchased from outside, among which 90% come from abroad. The self-sufficiency of lead and zinc is 25% and 40% respectively and all the aluminum needed is purchased. With the current excavation rate, the Honghui mine of Jingyuan Coal Co., Ltd., can only serve another 5 to 8 years.
3.2.2. The pillar enterprises are facing with aging technical equipments, outdated technologies, difficulties in management and high cost of reform

Most of the resource-based enterprises in Baiyin were built in the 1950s and 1960s. The techniques of the old system have never been overhauled for over 50 years, which results in low resource efficiency, high-energy consumption and heavy pollution. Meanwhile, the purchase of raw materials has increased the cost is increased and reduced the profit margin. Most enterprises are facing degrading finance and have difficulties in operation. Furthermore, the slow pace of the reform and reorganization of most state-owned enterprises (SOEs) and the huge money needed to hold the retired and laid-off workers and to separate social roles from the SOEs lead to high cost for the reform of the SOEs.

3.3. Analysis of Opportunities

3.3.1. Scope of resource allocation is enlarging under economic globalization

The accelerated economic globalization provides an unprecedented opportunity to breakthrough regional limitation and increase resource supply required by regional economic growth. Against this context, the combination of resources allocated by the market with the industrial base and human resources within this region can effectively make up the shortage of “hard resources” (mineral resources) as well as “soft resources” (technologies, HR, equipments, management, information) and speed up the socio-economic development in the area.

3.3.2. Opportunities for multi-industrial development are increasing in regional integration.

In the economic development, the more correlation the industry shares, the more likely it will facilitate other industrial chains and the plentier conditions and opportunities it enjoys. The complementary economy formed in regional integration by the correlation and dis-correlation of industries has led Baiyin’s dominant industry
to develop in a multi-industrial way. Now these industries have more opportunities for in-depth development and extension of the industrial chain and are capable of turning the raw material products into end products, turning the resource advantages into economic advantages, turning single industrial development into multi-industrial growth as well as turning traditional industry and initial products into high-tech industry and deep processing.

3.3.3. The State has given more support to the transformation of resource-based cities

The report of the 16th Party Congress stated that “we should support the resource-based cities or areas to develop alternative industries”. The 3rd Plenary Session of the 16th Central Committee of CPC put forward that “we should strengthen coordination and guidance to regional development, promote the Western Development Program and support the reform and development of central and western areas in China.” Opinions on Renovation Strategy of the Old Industrial Bases in Northeast China by Central Committee of CPC and the State Council again suggest to “carry out research on establishing compensation mechanism for resource development and assistance mechanism for declining industries to promote the transformation and sustainable development of resource-based cities.” These policies indicate the increasing support of the central government. In 2006, the National Development and Reform Commission agreed in principle to list Baiyin as the pilot city for the transformation of resource-based cities and led to substantial economic transformation in Baiyin.

3.4. Analysis of Threats

3.4.1. Increasing competition faced by the dominant industry

With the speeding up of industrialization in the west region in recent years, the provinces and areas that used to provide raw materials to the nonferrous metal smelting or processing enterprises in Baiyin have built up their own smelters or
processing plants, which leads to the uptight supply and soaring prices of raw materials. Moreover, the newly built enterprises enjoy higher capacity and advantageous techniques, equipments and products. This has increased the cost, shrunk the market share and profit margin and reduced the competitiveness of Baiyin Co. The prospect for Baiyin is by no means optimistic. Furthermore, the Gansu Jinchuan CO. is gradually expanding its business from deep processing of nickel to copper smelting and alternative processing industry. Jinchuan Co. has already become the biggest copper smelting enterprise in northwest China. The rapid progress of other enterprises in Gansu has exerted great pressure on Baiyin Co.

3.4.2. The national industrial policies have increasing influence over the enterprises’ selection of growth pattern

Most backbone enterprises in Gansu have been facing with operation difficulties and backward techniques for many years, with limited input in energy conservation and pollution control and thus low energy efficiency and severe environment pollution. Meanwhile, due to the urgent need for rapid construction of industrial zones and multi-industrial development, the newly introduced projects and enterprises may not meet the requirements of the high-tech zone nor satisfy the request on energy consumption and pollution control. However, in line with the Scientific Outlook that is people-oriented, the central and provincial government have put forward strict controlling standard on energy consumption and pollutant discharge in the 11th Five-Year Plan. It can be assumed that these policies will be intensified in the future, which will lead to increased input and operational cost of enterprises, become restrictions on the project selection of new energy and chemical industries in Baiyin and change the long-term industrial layout.

3.5. Conclusions and Solution Selection

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Opportunities (O)</th>
<th>Threats (T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Factors</td>
<td>• Scope of resource allocation is enlarging under economic globalization; • Opportunities for multi-industrial development are increasing in</td>
<td>• Increasing competition faced by the dominant industry; • The national industrial policies have increasing influence over the enterprises’ selection</td>
</tr>
<tr>
<td>Internal Factors</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
regional integration;
● The State has given more support to the transformation of resource-based cities.

of growth pattern.

<table>
<thead>
<tr>
<th>Strengths（S）</th>
<th>S—O Strategy（take advantage of both internal strengths and external opportunities）</th>
<th>S—T Strategy（take advantage of internal strengths to offset external threats）</th>
</tr>
</thead>
</table>
| ● Baiyin is rich in non-metallic mines, water, land and biological resources;  
● Baiyin has been equipped with certain industrial base;  
● Baiyin possesses a good regional position. | ● Take fully advantage of the national policies, expand resource utilization channels, enhance and upgrade the strengths of nonferrous metal industry;  
● Promote the multi-industrial development by using other resources in Baiyin;  
● Build a competition-cooperation model in the Lanzhou-Baiyin integration and form new industrial division between them. | ● Make use of the present industrial base and technologies to promote the in-depth processing and new material production of the nonferrous metal industry;  
● Promote the featured, diversified and multi-industrial development pursuant to the local resources. |

<table>
<thead>
<tr>
<th>Weaknesses（W）</th>
<th>W—O Strategy（take advantage of external opportunities to make up for inner disadvantages）</th>
<th>W—T Strategy（reduce internal disadvantages and to avoid external threats）</th>
</tr>
</thead>
</table>
| ● Resource guarantee for the present dominant industry is decreasing;  
● The pillar enterprises are facing with aging technical equipments, outdated technologies, difficulties in management and high cost of reform. | ● Expand resource utilization channels and maintain the position of the dominant industry;  
● Make full use of the national policies to deepen reform of enterprises, remove their historical burden and build a new development mechanism. | ● Enhance technical innovation to upgrade the traditional industry;  
● Stick to the featured, hi-tech and scientific standard for industrial development orientation and project selection. |

Among the above strategy groups based on SWOT analysis, S-O and W-T are two extreme strategies. The former is the optimal result based on both external and internal positive factors. It can not only strengthen the dominant industry, but can also facilitate multi-industrial development and regional economic integration. The latter strategy is the most difficult situation based on internal and external negative factors. In this case, the competitiveness of the dominant industry will be weakened and that the selection of new industry and new project will be restricted by relevant policies and competition from outside. In practice, the probability of the two extremes is quite
low, so they may not be the right solution for city transformation. Comparatively, the
S-T and W-O Strategy are more feasible. The S-T Strategy focuses on internal
advantages to mitigate external threats while the W-O Strategy makes use of external
opportunities to make up for its shortages. Both of them are practical solutions for city
transformation. It is a better choice to combine the W-O and S-T strategy by taking
into consideration both internal and external opportunities and threats. Therefore, the
transformation of Baiyin can be achieved through the following three aspects.

3.5.1. Promoting multi-support for industry

The multi-support for industry is determined by the evolution law of economic
structure and the payment capacity of transformation cost. Since the nonferrous metal
industry of Baiyin still has the potential for further development. The practical cost
and opportunity cost of giving up the industry is very high and it is not practical for
the other industries, such as the high-tech industry and energy industry, to replace the
nonferrous metal industry completely. If the problems of the enterprises can be solved
and the external opportunities of the market economy can be utilized, we may not
only maintain the competitiveness of the old industry and avoid economic fluctuation
in the city, but also foster such alternative industries as the chemical industry, energy
industry, agro-processing industry and tourism industry and win time for the
descending of the nonferrous metal industry and municipal economic transformation.

3.5.2. Accelerating the integration of Lanzhou-Baiyin

Promoting multi-support for industry is a major approach to strengthen the ability of
self-development for resource-based cities like Baiyin. However, the implementation
of multi-support for industry can not only depend on Baiyin itself, but should also rely
on the external market. From the perspective of regional conditions and functional
positioning of Baiyin, efforts should be made to integrate Baiyin into Lanzhou's
economic development by improving the infrastructure and optimizing the industrial
structure while accelerating Lanzhou-Baiyin integration and find the most feasible
external platform for economic transformation of Baiyin by allocating resources in a
larger area and promoting complementary advantages.
3.5.3. Speeding up reform of SOEs

The typical feature of Baiyin's development as a resource-based city is that the city economy largely depends on few industries, that the industrial development relies on several SOEs and the SOEs suffer from untimely reform. Therefore, if the multi-support for industry and the Lanzhou-Baiyin integration is the feasible plan for Baiyin's transformation, the start point should be accelerating SOE reform and tackling the historical problems as well as the current difficulties, which cannot be avoided or delayed.

Section 4 Thinking and Countermeasures of Multi-Support for Industry

4.1. Orientation of Multi-Support for Industry

Based on its resources and potential external opportunities, Baiyin may nurture the nonferrous metal industry, rare earth industry, fine chemical integrated industry, energy and new energy industry, mineral industry and resource re-utilization industry, nonmetallic mineral products industry and the Yellow River tourism industry into future pillar industries. For their industrial bases, the nonferrous metal industry, chemical industry, energy industry and nonmetallic mineral products industry have established profound bases while the new energy industry, mineral industry, resource re-utilization industry and cultural tourism industry are newly built and are at the initial stage of development. For the development focus, the nonferrous metal industry and rare earth new material industry emphasize in-depth processing and industrial chain extension whereas the energy industry and the cultural tourism industry focus on enlarging industrial scale and the fine chemical industry and nonmetallic mineral products industry focus on expanding supply of resources and the vary of products. For the orientation selection based on static evaluation and dynamic analysis, some are feasible and some potential; some must be carried out and some are for standby (see Table 4-1).
4.2. Measures of Multi-Support for Industry

4.2.1. Promoting the construction of economic zones and centralized industrial areas

The economic zones in Baiyin were built relatively early in Gansu and are with high density. At present, there are three provincial economic zones including Baiyin High-Tech Industrial Zone of Chinese Academy of Sciences, Baiyin West Economic Zone and Economic Zone in the Middle of Pingchuan, and various featured industrial zones in Liuchuan, west Huining, north Jingyuan and south Jingtai. In recent years, the setting up of new materials, new energy, fine chemicals and agro-products industries in Baiyin benefit from the rapid construction of the economic zones and their standardized development. Accelerating the development of economic zones meets the requirements of industrialization pace and the Scientific Outlook, and is beneficial to upgrading the urbanization level and to centralized and scale development, thus an important carrier of the multi-support for industry in Baiyin. However, problems such as vague characteristics, similar structure and mutual competition still exist in the industrial zones. So in the future, attention should be paid to the coordinated industrial positioning of the zones and the multi-support for industry, the differentiation and characteristics between these zones and the definition of their roles in the Lanzhou-Baiyin integration.

Table 1-37 Basis of Selection for the Supporting Industries in Baiyin’s Transformation

<table>
<thead>
<tr>
<th>Industry</th>
<th>Supporting Conditions</th>
<th>Focus of Development</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonferrous metal and rare earth new material industry</td>
<td>1. The original industrial base; 2. The long-term technical accumulation; 3. Material supply under the market distribution.</td>
<td>1. Alloy materials, functional materials and powdery materials of nonferrous metals; 2. New-type high precision copper plates, strips, pipes and advanced electrolytic copper foil; 3. Rare earth magnetism material, energy material, lightening material, grinding material and environmental protection material</td>
<td>Feasible industrial orientation that has to be selected.</td>
</tr>
<tr>
<td>Industry</td>
<td>Description</td>
<td>Direction</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Fine chemical integration industry</td>
<td>1. The original industrial base; 2. Opportunities from the construction of Lanzhou petrochemical base; 3. Platform provided by high-tech industrial zones.</td>
<td>Feasible and potential industrial orientation.</td>
<td></td>
</tr>
<tr>
<td>Energy and new energy industry</td>
<td>1. Abundant coal reserve and water energy resource in Baiyin; 2. Abundant wind energy and solar energy resources; 3. Lithium carbonate, cobalt oxide, hydrogen storage alloy powder, lithium hexafluorophosphate, copper clad and zinc metal etc.</td>
<td>Potential industrial orientation with certain foundation</td>
<td></td>
</tr>
<tr>
<td>Mineral industry and resource reutilization industry</td>
<td>The mineral resources in Baiyin</td>
<td>Optional and potential industrial orientation</td>
<td></td>
</tr>
</tbody>
</table>
4.2.2. Enhance economic & technical cooperation and exchange

Some of the above-mentioned orientations of multi-support for industry are extensions of the existing industries while others are newly emerged industries. Most of them need to import materials, advanced techniques and HR in the open market environment rather than depend in a closed environment under the planned economy. Therefore, fostering multi-industry is a process to build the supply-demand relationship with the raw material areas and R&D and HR intensive regions. It is important to enhance the technology and HR exchange with the universities and institutions in Lanzhou to promote the middle-term trial and transfer of scientific achievements and strengthen the production-education-research combination. Meanwhile, the economic zones and industrial centralized areas should serve as platforms for technology distribution and HR exchange to drive integration of inland resources and industrial development of the counties nearby.

4.2.3. Mobilizing non-public economy

Non-public economy takes a small proportion of the national economy and develops slowly, which is the major reason for the non-dynamic economy in Baiyin. Ownership structure optimization serves as the impetus to multi-support for industry, which can not only reduce the transformation cost of the government, but also can help the emerging industry satisfy the requirements of market mechanism. We should start from the policies in market entry; services and supervision to facilitate the advantageous enterprises of the non-public economy develop related industries and encourage the non-public enterprises to develop high-tech industries as well as the financial, public service and infrastructure industries. The government should also protect the legal rights of non-public enterprises and create a sound environment for business innovation.
Section 5 Thinking and Countermeasures of Promoting Economic Integration of Lanzhou-Baiyin

Regional economic cooperation is an effective way to break the administrative barrier, enlarge regional market, enhance complementary advantages search for win-win collaboration as well as systematically integrate efforts in transportation, communication, industry, resources, market and environment protection. Pursuant to the international experience and the practice of regional integration in “Changsha-Zhuzhou-Xiangtan”, “Zhengzhou-Kaifeng” and “Xi’an-Xianyang”, the integration pattern can promote the regional economic growth.

5.1. Analysis of the Complementariness for Lanzhou-Baiyin Integration

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Lanzhou</th>
<th>Baiyin</th>
<th>Complementary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infrastructure</strong></td>
<td>Traffic hub for the Northwest railway and Gansu highway with international airport.</td>
<td>Among the railway network and highway network in Gansu; advantageous water transportation</td>
<td>Baiyin can be connected with Lanzhou through railways and highways; the airport in Lanzhou can be shared by Baiyin.</td>
</tr>
<tr>
<td><strong>Resource endowment</strong></td>
<td>Short in mineral resources and land resource with narrow city area.</td>
<td>Rich in land, mineral, energy, labor and tourism resources</td>
<td>Baiyin can provide resources for Lanzhou to expand its influence.</td>
</tr>
<tr>
<td><strong>Conditions for industrial development</strong></td>
<td>Strong in petrochemical industry; advanced trade and circulation industry; important node for tourism development in Gansu.</td>
<td>Equipped with foundations for nonferrous metal industry, chemical industry, energy raw material industry and agro-processing industry.</td>
<td>Baiyin can develop fine chemical industry on the chemical base of Lanzhou, merge its trade and circulation industry into the trade center of Lanzhou and provide agricultural products for Lanzhou. The two cities can develop tourism industry together.</td>
</tr>
<tr>
<td><strong>Technologies and HR</strong></td>
<td>Centralized universities, research institutes; rich in HR.</td>
<td>Backward technologies and insufficient HR</td>
<td>Baiyin can develop technical cooperation with the universities and research institutes in Lanzhou and provide HR and platform for</td>
</tr>
<tr>
<td>Regional integration</td>
<td>Typical dual economic development with the neighboring areas</td>
<td>More developed than other areas in the Lanzhou Economic Zone</td>
<td>Baiyin can be the sub-region for Lanzhou’s industrial transfer and technology extension, promoting the development of the neighboring areas.</td>
</tr>
</tbody>
</table>

### 5.2. Strategy for Lanzhou-Baiyin Integration

The Lanzhou-Baiyin integration can be realized by industrial integration following infrastructure integration.

#### 5.2.1. Speeding up integration of infrastructure

Infrastructure integration is the best cut-in point for regional economic integration, which can enlarge Lanzhou’s influence over Baiyin and optimize the regional conditions, decrease the production and transport cost and intensify the economic connection between Lanzhou and Baiyin. At present, there are priorities:

5.2.1.1. Upgrade the transportation between Lanzhou and Baiyin by improving the transportation network. A comprehensive, fast and convenient regional transportation network with multi-forms of transportation should be set up, i.e. to build a coordinated transportation network with the respect integration of network, vehicles, loading, stations, auxiliary infrastructure and management. Efforts should be made to carry out unified planning, management, organization and distribution of all transportation resources (vehicles, infrastructure and information) within the area to realize overall optimization of the transportation system and upgrade the regional transportation level. It is of great importance to the building of the Lanzhou Economic Circle and the economic corridor between Lanzhou and Baiyin as well as form the economic growth point and axis in the region. The transportation system may take railway and highway as its backbone and the Yellow River channel as complement
and plan for the light-tracks and public transportation system to connect the two cities with various transportation forms.

5.2.1.2. Use the same postal code and regional telephone code in the two cities to reduce the cost for economic exchange. Baiyin may use the same regional code, mobile telecommunication system and digits of telephone number with Lanzhou as well as integrated network and postal code to improve regional telecommunication environment.

5.2.2. Promoting industrial integration

Efforts should be made to promote the industrial transfer and integration in line with the thinking of “driving the enterprises out of Lanzhou into the economic zones and Baiyin”. It can not only upgrade the city orientation and improve the urban living environment of Lanzhou by adjusting its industrial distribution, but also strengthening current supporting industry, allocating new industries to substantially to facilitate multi-industrial development in Baiyin. At present, there are three feasible schemes:

5.2.2.1. Relocate the downstream chemical industries of ethylene from Lanzhou to Baiyin. At present, the fine chemical industry in Baiyin, with certain scale and foundations, mainly produce TDI, DNT, TNT, salt fluoride, ore dressing agent, sulfuric acid for industrial use, chromic salt catalyst, fertilizer, chemical agent, diesel oil pour point depressant, etc. In the future, synthetic materials, isocyanate, alkali-oxygen chemicals, fluoride chemicals and acrylamide will enjoy a good prospect. Due to the expanding urban area and limited land resources in Lanzhou and its neighboring with Baiyin, the reallocation of the downstream chemical industries of ethylene from Lanzhou to Baiyin satisfies national policies on industrial distribution and is favorable to the economic integration of the two cities.
5.2.2.2. Make full use of Lanzhou as the trade center in northwest China to promote the integrated advantages and joint development of the service industry in Baiyin. As a trade center in northwest China, Lanzhou has become a center of commodities distribution, shopping, regional circulation, economic and trade exhibition and business tourism. Following the thinking of “by Lanzhou, for Lanzhou and develop Baiyin”, actions should be taken to bringing into full play the geological and transportation advantages, restructure the industry and develop featured economy with the help of the trade center. Meanwhile, efforts should be made to improve the circulation system by developing modern circulation industry with the focus on the setting up of operation chains, modern logistics and middle and high-level wholesale markets, smooth circulation channels and form a big market for commodity circulation and service industry connecting Yinchuan, Jingyuan, Baiyin, Gaolan and Lanzhou.

5.2.2.3. Take the advantage of the concentrated universities and hi-tech personnel in Lanzhou and the CAS economic zone in Baiyin to optimize the hi-tech industrial structure in Baiyin. Lanzhou is a knowledge-intensive city with many research institutes and universities. There are nearly 700 R&D agencies with 200,000 scientific personnel in Lanzhou. Its talent intensity ranks 4th among the large and medium-sized cities in China and 19th of comprehensive technical strength. There are a batch of state or even world class R&D institutes and high-tech enterprises in Baiyin and it is among the top cities in west China in terms of scientific achievements. Lanzhou has a profound basis for education, with 14 universities nurturing graduates for its scientific development. Baiyin High-tech Industrial Zone is the second industrial zone set up by the Chinese Academy of Sciences and the first one jointly established by CAS and the local government. Aiming at developing high technology and its industrialization, the zone starts high and strives to become a technology transfer and hi-tech industrialization base for CAS. It put develop fine chemical industries, new materials of nonferrous metals, new energy technology, eco-reclamation materials and
technology as well as environment-friendly materials. As neighbors, the two cities can take advantage of Lanzhou’s universities and research institutes and the hi-tech zone in Baiyin to promote the basic research and cultivation of high-tech researchers within the integrated region, accelerate the combination of production, education and research and facilitate technology transfer to upgrade the hi-tech industrial structure and level in Baiyin.

5.3. Advancing the Mechanism Design for Lanzhou-Baiyin Economic Integration

5.3.1. Pushing forward the programming and industrial policies into practice

The basic rules for regional economic integration is to properly divide work in the region and reduce obstacles for the circulation of production factors through cooperation and coordination between the member cities. Based on mutual respect, equality and free will and mutual benefit, the member cities are mutually dependant on each other, grow and prosper together. We should speed up the study on industrial planning and policies and ensure substantial progress. At present, the integration of Lanzhou and Baiyin should be put high on the agenda of their strategic development and substantial progress promoted. In fact, it depends, to a great extent, on the acceptability and participation of Baiyin and the change of its status in the progress. The integration project should be set up by the Gansu government or by the city governments, planned strategically by experts and then designed by professional agencies.

5.3.2. Setting up Joint Conference Mechanism between Lanzhou and Baiyin to solve common problems

High-efficient regional cooperation mechanism is an effective path to advance substantial progress of regional integration. The economic and industrial integration does not mean the merging of the two cities, but the integration of industries, markets,
infrastructure and investment environment, including city planning, transportation, communication, market, industries, science and education, tourism and eco-environment. Therefore, the government of the two cities should strengthen contact and cooperation by establishing regional cooperation organizations to set up joint projects. In line with the principle of complementary advantages, mutual benefit and common development, the two cities shall combine the role of government administration with market distribution and make good coordination in socio-economic development strategy, overall city planning, infrastructure construction and layout of dominant industries. Following the thinking of coordinated planning and same financial system, telecommunication system, postal codes, public transportation network, market and industrial distribution and tourism lines and environment protection measures, the two cities shall realize the integration of cities, economy, transportation and environmental protection. However, since both Lanzhou and Baiyin are municipal cities under the jurisdiction of Gansu province and of equal political status, while setting the city development strategy, the two cities can only allocate the resources within their own administrative authority. It is difficult for them to take into consideration neighboring cities to form complementary advantages though they wish to for the lack of jurisdiction. Therefore, a coordination mechanism above the two governments and a more authoritative organization led by the Gansu government is required to identify the functional areas for industrial integration and promote the work.

**Section 6 Thinking and Countermeasures for the Reform of SOEs**

**6.1. Separating the Social Roles from Enterprises**

Similar to many resource-based cities, at the initial stage of their development, the enterprises in Baiyin shouldered some social roles because of the incomplete social service provided by the government. At present, there are 55 high schools and primary schools and 13 hospitals founded by the 13 large and medium-sized
enterprises in Baiyin, with 7,000 employees. In compliance with the policies of the central and Gansu government and over years’ efforts, 5 schools and 1 hospital have been transferred to the local government and other 50 schools and 12 hospitals need to go through the process.

To separate the social roles from enterprises is an important measure to ease the burden of enterprises and deepen the reform. As early as in the 3rd Plenary Session of the 14th Central Committee of CPC in 1993, China put “easing enterprises’ social burden” as a basic requirement for the reform of the SOEs. Since 1995, pursuant to the Opinions on Separating Social Roles from Enterprises and Reassigning Surplus Personnel in Some Cities ([1995] No.184 of the State Economy and Trade Commission) issued by the State Economy and Trade Commission, the former State Education Commission, the Ministry of Finance, the Ministry of Health and the former Ministry of Labor, some pilot cities and areas for “optimizing the financial structure” have actively explored and practiced such activities. In April 2002, the State Economy and Trade Commission, the Ministry of Education, the Ministry of Finance, the Ministry of Health and the Ministry of Labor and Social Security and the Ministry of Construction jointly subscribed the Opinions on Further Promoting the Social Roles from the SOE ([2002] No.267, the State Economy and Trade Commission). In 2005, the Gansu government issued a document ([2005] No.139) to start the work in the province.

The policies set clearly that the main tasks at present is to carry out the work from the following aspects: First, to strictly define the organizations and people to be transferred pursuant to the principle of being practical and realistic; Second, to carefully implement the policies on subsidy to ensure the normal expenditures in the transfer process; Third, to map out precise, practical and focused schemes to ensure the smooth implementation of the work; Fourth, to strictly follow the financial regulations in the transfer of assets and finance so as to protect the state-owned assets
from being lost.

6.2. Separating Secondary Industries from Major Industries and Accelerating the Reform of Secondary Industries

Separating secondary industries from the major industry and reforming the secondary industries is a major step for China’s reform, restructuring and re-employment. As a complicated and systematic project, it involves the change of property right and disposition of assets and workers. Efforts should be made to activate the assets while preventing the state-owned assets from being lost, to ensure the workers’ legal rights and the openness, equality and impartiality of the process. The work is of high policy requirement and thus difficult to carry out. Both the strategic restructuring of the state-owned economy in Baiyin and alleviation of historical burden from the SOEs need to deal with the surplus workers. With rich human resources and heavy burden of employment, it is impossible for Baiyin to simply cut down employment and push the surplus workers to the society. Instead, the enterprises in Baiyin have to expand the channels for disposing the surplus workers while sticking to the reform of reducing employees and increasing efficiency.

For Baiyin, the future reform in this area still faces many difficulties and some in-depth problems need to be solved. In order to advance the reform smoothly, efforts should be made to: First, strengthen the leadership by improving the organization of agencies and nailing down responsibilities, especially for those big enterprises with heavy burden and abundant surplus workers. Second, standardize the operations. Emphasis should be paid to those enterprises with large scale of secondary industry assets, complicated management levels and huge difficulty in operation and supervision. The contributors should lead the reform and necessary auditing and assessment should be made on asset disposition to avoid selling the assets at random discount or a low price. Third, properly control the reform cost and forbid raising the compensation criterion randomly. The state regulation should be strictly applied to the
shareholding of managers; Fourth, protect the legal rights and interests of the workers by making full play of the Party organizations, labor unions and representative committee for workers as well as the political advantages of the SOEs in mobilizing workers in the reform and creating a good environment for reform so as to maintain stability for the enterprises and the society.

6.3. Facilitating the Displacement of Industrial Workers

Most of the industrial workers in Baiyin are engaged in labor work in traditional industries. They master single techniques and are not adaptable to the requirement of industrial transformation and the development of new industries. Therefore, technical training is needed for the transferred workers. Various training centers should be set up according to the requirement of re-employment and industrial development and provide the trainees with focused technical training in line with their education background, future work and the new industries fostered by the government. In this way, the laid-offs can be transferred into re-employed technique workers and it can be achieved through different ways according to local situation: First, make fully use of the unused land, buildings, equipment and take advantage of the edge area to build new planting and breeding industries and provide pre- and post-services for the agricultural industry in the peripheral area of the city. Second, shift to the tertiary industry. Labor transferring from the second to the third industry is the inevitable trend of socio-economic development and is the main growing point for employment. Guidance should be provided to facilitate labor flow to the emerging tertiary industries, such as information service, real-estate industry, financial and insurance industry and intermediary agencies. Third, transfer to the community. A prominent problem of social development in Baiyin is the undeveloped community economy. Its commercialization of housework is very low, but boasts great potential for employment. With low investment and quick yield, the community economy is suitable for the aged laid-off workers with low education background and single skills. The re-employment in the community may start from the minor and easy projects
with low risk, such as leasing, trusting, laundry, processing, repairing, public security, cleaning, medical service, nursery and delivering. Fourth, transfer to private and foreign economies. These economies are flexible in mechanism and employment and serve as important growth point for labor holding. Fifth, transfer to developed areas and abroad. The skilled industrial workers have advantage to shift to the more developed areas or abroad.

6.4. Addressing Cost Payment for the Reform of SOEs.

The cost of the SOEs’ reform in Baiyin is consisted of the following factors: cost of labor system reform, retirement pension, liquidation of non-performing assets, writing off of non-performing loans and divestiture of assets. The enterprises cannot afford such a huge cost and need the support from government policies and input. The local government should make relevant measures based on practice to solve the problem.

6.4.1. Striving for the same preferential policies enjoyed by the resource-based enterprises in the Northeast Industrial Base.

6.4.2. Expanding financial channels to properly share the cost

First, part of the assets and equity may be withdrawn or sold from some of the surplus state-owned assets, infrastructure and some monopolized industries. Second, the enterprises may sell the use right of land given by the state and use the cash to pay for the reform cost; Third, to sell the state-owned housing instead of leasing to help paying the reform cost. Fourth, the government may issue public bonds; fifth, the workers may ask for loans and the government will subsidize the interest. For the laid-off workers who start their own business, the government will subsidize the loan interest to make up their shortage in capital; sixth, share the social security. The society shall shoulder part of the reform cost in line with the “30%-30% principle”.

6.4.3. Promote the systematic reforms

First, accelerating the reform of approval system. For the projects beneficial to the SOE reform in Baiyin, the government should streamline the examination and
approval procedures and take it as a breakthrough for the transformation of government roles. Second, speeding up the capital market development in Baiyin to provide a platform for the capital flow of SOEs and maximize its value in the market; third, expanding the coverage of social security in Baiyin.

6.5. Promoting Baiyin Co. to Transfer from Resource Provider to Technique Exporter

Baiyin Co. owns advanced techniques in nonferrous metal smelting and in-depth processing, of which its new technique combining copper flash smelting method with “Baiyin Copper Smelting Method”, lead smelting technique, high accuracy technique for producing special aluminum sheets and for new-type copper pipes take the lead in China. These core techniques are the advantages for Baiyin Co., which should be fully utilized to transfer the company from a resource provider to a technique exporter: First, the managerial staff of the company should change their old concept to Big Resource Concept and fully recognize the importance of technical resources to Baiyin Co.’s transformation and development; Second, bring into full play of its intensive talents, enhance research input and renovate the traditional advantageous techniques so as to turn from the world followers to world leaders; Third, export the technical patents with the foreign aiding projects to enlarge its influence and market share; Fourth, establish technology investment corporations to build a platform for the export and expansion of its techniques.

（By ZHANG Tao, CHEN Yubao, REN Yanhong and WANG Yujun）
Reference


Study on the Agricultural Development Strategy in Gansu

LI Shuji
Abstract

The report *Study on the Agricultural Development Strategy in Gansu* analyzes the status quo and characteristics of agriculture and rural development, and existing difficulties and problems, taking the perspective of unique features of new countryside development in Gansu province. The report objectively evaluates the level of Gansu agriculture and rural development with the help of two sets of indicator systems, including all-round construction of moderately prosperous society in countryside and new countryside construction. Based on the defining the function of modern agriculture, the report puts forward a guiding principle of agricultural and rural development, goal for the next 10-15 years and the roadmap to reach the goal; it proposes a strategy of “transforming growth pattern, optimizing geographical outlay, protecting ecological environment, and improving industrial system”, as well as priority, measures, and four initiatives to implement the strategy; it suggest the central government to prolong the term of “Sanxi Fund”, continue supporting poverty alleviation, increase investment to Gansu, make ecological compensation, include the integration of agricultural supporting fund into legislation, and solve the difficulties of new countryside construction fund.
The fact that Gansu’s natural endowment is not adequate enough to feed its people is a historical reflection of the agricultural development there. For a long period of time in history, the focus of the work related to agriculture and rural area in Gansu is to feed its own people with its own natural resources. To lift farmers out of hardship and free rural areas from poverty is the most arduous task in Gansu’s modernization drive and the biggest headache in its efforts to build a socialist, harmonious and moderately prosperous society in an all round way. To care about farmers, support agriculture and develop rural areas is not only a practical issue, but also a strategic one.

Ever since China’s reform and opening up, Gansu has been making progress in agricultural and rural development, yet this cannot prevent Gansu from widening its gap with the other parts of China. The agricultural foundation is still weak; the widening income gap between urban and rural residents is still a trend; the urban-rural dual economic structure is still a protruding conflict; the regional economic gap continues to widen, poverty is still a prominent problem; the regional development coordination is still a daunting task; economic globalization and intensified efforts to build a moderately prosperous society in an all round way bring fresh pressure to agriculture and the extensive economic growth mode in Gansu. This shows that there is no breakthrough in transforming the growth mode from an extensive to an intensive one and no substantial improvement in the quality and efficiency of agriculture and rural economic development. This is incompatible with the requirement to realize the coordinated and sustainable socioeconomic development, to improve people’s livelihood and promote harmony, to build a moderately prosperous society in an all round way and to implement the scientific outlook on development. Therefore, for the development of agriculture and rural areas, we should shift to a new strategy, featured by transforming the mode of development, optimizing layout, protecting ecological environment and improving industrial system. We hope we can build an agricultural system with market competitiveness and a flourishing new socialist countryside within 15 years.

Section 1 Status of Agricultural and Rural Development

1.1 Features of the New Socialist Countryside Endeavor in Gansu

Food security is a major problem long pestering the socioeconomic development in Gansu. For a long period of time in history, the focus of the work related to

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1 Speech made by Lu Hao on the opening of the Seminar on Gansu’s New Socialist Countryside Drive on Aug. 1st 2006
agriculture and rural area in Gansu is to feed its own people with its own natural resources. After the founding of new China, Gansu focused its attention on ensuring food security, though it still went through bitter experiences. For the present and future period of time, our attitude and goals on food security issue will still be a major problem in front of us.

Restructuring of agriculture and rural economy has long been constrained by multiple factors. While adjusting to changes at different stages of development, Gansu has been focusing on restructuring agriculture and rural economy and remarkable achievements have been made. However, in general, agricultural restructuring is constrained by multiple factors such as inadequate safeguarding capacity of grain, farmers’ capital shortage, farmers’ lack of education and their poor adaptability to market changes and new industrial development, inadequate exemplary role of leading enterprises and weak social service system. But all in all it is constrained by poor production condition, and low output capacity of land. Therefore, like improving basic production condition of agriculture, the strategic restructuring is still a long and arduous task.

It is more and more difficult to increase farmers’ income by relying on agriculture per se. In Gansu, most places find it hard to increase agricultural efficiency due to unsmooth restructuring. A great proportion of surplus and redundant human resources are not fully tapped, these constitute fundamental constraints for the increase of farmers’ income. To increase farmer’s income by a large margin, we should transfer the surplus rural labors out of farming and ensure their full employment and reduce the number of farmers stuck in rural areas step by step. The transfer of rural surplus laborers and their full employment have a direct bearing on Gansu’s drive to build a new socialist countryside.

Weak infrastructure and scattered settlement of farmers are hard fact in Gansu. To change the visage of rural areas takes the efforts of several generations. Over 70% of Gansu’s rural areas are arid and semi-arid mountains. The high mountains and deep valleys are susceptible to soil and water erosion. Such harsh eco-environment is not suitable for people to live in. Coupled with the weak infrastructure, it is by no means an easy job to change the backwardness of Gansu. Therefore we should be prepared for a long term battle.

Social services are yet to be developed, education is underdeveloped and the quality of laborer falls way short of the need of industrialization and marketization. Due to the historical, social, natural and economic reasons, social services like rural education and health care has long been backward, which seriously hampered Gansu’s economic development. Laborers’ lack of capacity to apply modern science and
technology and adjust to modern market changes prevents them from being employed or self-employed. This is already an important factor crippling Gansu’s socioeconomic development.

It is a practical and thorny issue to find a way out for population lack of basic conditions for survival and development. Some extremely dry mountainous areas, rocky mountainous area, and remote mountainous areas and seriously desert-encroached areas suffer from a severe shortage of water and arable land and isolated transportation and a lack of basic conditions for survival and development. It is ill-equipped for mass migration of farmers. Therefore, it is a thorny issue to find a way out for these people. This makes Gansu’s new socialist drive formidably long and arduous.

1.2 Major Features of Gansu’s Agricultural Development at the Present Stage

The Tenth-Five-Year-Plan period is one in which Gansu achieved rapid socioeconomic development, great leap forward in reform and opening up and most benefits for its people, and also a period when rural economic development was in its best shape and farmers got the most benefits. Over the past five years, the agriculture and rural economy of the whole province went through remarkable transformations.

1.2.1 Remarkably intensify our efforts to invest in agriculture, support and benefit farmers

Since the implementation of the Tenth-Five-Year-Plan, Gansu has persisted in the principle of “giving more to, taking less from and loosening control over” farmers and increased agricultural expenditure. The total agricultural expenditure was increased and the growth speed accelerated. From 2000 to 2005, the total agricultural expenditure of Gansu increased by 1.49 folds, from 1.706 billion to 4.246 billion. The annual average growth rate was 20.01%, 4.86 percentage points higher than that of the Ninth-Five-Year-Plan period, and 20.8 percentage points higher than the annual average growth rate of total fiscal expenditure of Gansu.

Table 2-1   Agricultural Expenditure in Gansu from 1994 to 2005

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<table>
<thead>
<tr>
<th>Year</th>
<th>Fiscal Expenditure of Gansu (million)</th>
<th>Agricultural Expenditure (million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>7238.17</td>
<td>703.50</td>
</tr>
<tr>
<td>1995</td>
<td>8139.08</td>
<td>842.57</td>
</tr>
<tr>
<td>2000</td>
<td>18823.22</td>
<td>1705.85</td>
</tr>
<tr>
<td>2001</td>
<td>23546.43</td>
<td>1964.74</td>
</tr>
<tr>
<td>2002</td>
<td>27401.11</td>
<td>2652.82</td>
</tr>
<tr>
<td>2003</td>
<td>30000.70</td>
<td>2065.08</td>
</tr>
<tr>
<td>2004</td>
<td>35693.66</td>
<td>4699.96</td>
</tr>
<tr>
<td>2005</td>
<td>42934.79</td>
<td>4245.51</td>
</tr>
</tbody>
</table>

1994-2005
annual average growth rate 17.32 17.12

annual average growth rate during the Ninth Five Year Plan period 18.26 15.15

annual average growth rate during the Tenth Five Year Plan period 17.93 20.01

Source: General Financial Statement of Gansu from 1994 to 2005

Rural land policy has been implemented. We have guided and managed the rational transfer of rural land, earnestly implemented compensation policies to farmers whose land is requisitioned, safeguarded the lawful rights and interests of farmers, protected and stimulated their production enthusiasm. Reform of rural taxes and administrative
charges has been carried out. In 2005, despite financial difficulties, the provincial committee and the provincial government earmarked RMB Yuan 150 million from the provincial budget to help with the exemption of agricultural taxes in 43 counties except for the key counties under the national anti-poverty program. Across Gansu, agricultural taxes, livestock taxes and agricultural and forestry specialty taxes except for tobacco tax are rescinded. “Zero Taxation” in agriculture and animal husbandry was realized, saving RMB 610 million for farmers. Thanks to these policies, farmers in Gansu are relieved of a total tax burden of RMB Yuan 1.32 billion, which translates into 72 RMB Yuan for each farmer. The policy of the Three Subsidies has been implemented. In the recent two years, the central government arranged RMB 2 billion as improved plant seed and animal breed subsidy and agricultural machinery procurement subsidy. At the same time, RMB 267 million was set aside from the provincial budget to subsidize grain planting farmers, improved plant seed and animal breed and agricultural machinery. Efforts have been redoubled to implement Grain for Green compensation policy. Gansu got a fund of RMB 3.725 billion to compensate those who returned farmland to forest, which translates into 2,382 yuan for each household or 555 yuan for each farmer engaged in this program.

1.2.2 Agricultural Restructuring scored phased achievement and industrialized operation saw new progress.

The growth rate of agricultural economy was relatively fast, while the proportion of agricultural economy in national economy decreased. Since the implementation of the Ninth-Five-Year-Plan, the output value of the first industry in Gansu shows an upward trend. By 2005, the total output value of the first industry reached 30.393 billion yuan\(^3\), an increase of 19.34 billion yuan over the year 1995, a year-on-year increase of 10.6\%. By 2005, the total output value of agriculture, forestry and fishery reached 52.153 billion yuan, with an added value of 30.806 billion yuan, an increase of 25.208 billion yuan and 19.753 billion yuan over the year 1995 respectively, with a year-on-year increase of 6.8\% and 10.8\% respectively.

The proportion of the first industry in Gansu’s GDP dipped. The proportion in 1996 was 26.30\%, which decreased year by year to 15.72\% in 2005, 0.7 percentage points higher than the national level.

\(^3\) Gansu Statistics Yearbook 2006.
During the Tenth-Five-Year-Plan period, the whole province followed the requirement of displaying relative competitiveness and developing feature economy. We give guidance based on the actual conditions of different localities and press forward the strategic agricultural and rural restructuring from three levels, namely leading industry with strategic significance, regional competitive industry and local special products so as to fundamentally restructure Gansu’s agriculture and rural economy. The agricultural industry structure was further optimized. The ratio of grain, cash crop and animal feed was adjusted from 73.1:21.6:5.3 in 2001 to 69.6:25.7: 4.7 in 2005. The herbivorous animal’s proportion in the whole livestock industry reached 45%, 5 percentage points higher than the year 2000. The competitive feature industry grew rapidly. The area of the competitive industry base for the production of potatoes, brewing raw materials, traditional Chinese herbs, seeds, fruits and vegetables, with their sowing area accounting for 40% of the total crop sown areas, 10 percentage points higher than in 2000. Among them, the planting areas or output of potatoes, alfalfa, beer barley and traditional Chinese herbs rank No. 1 in China and that of gourds, flowers, seeds, hops, edible lilies, all together over 10 crops ranking among top five in China. Moreover, the seed of hybrid corn accounts for more than half of the seed demand in China. Products like dehydrated vegetables, pumpkin seeds and olives are exported in increasingly greater amount. The rapid development of competitive and feature industries is the highlight in agricultural development in Gansu.

Grains are basically self-sufficient and food security can be ensured. Gansu is one of the 11 provinces with balanced grain production and sales. For a long time, Gansu’s total grain output accounts for around 1.7% of the country’s total. During the Tenth-Five-Year-Plan period, grain production of Gansu showed the following features: firstly, grain sown areas registered a recovery. The grain sown area of Gansu decreased year by year from 40.3594 million mu in 2001 to 37.4919 million mu in 2003. Areas sown to grain demonstrated recovery growth from 37.4919 million mu in 2003 to 38.8078 mu in 2005; secondly, grain yields per mu reached a new high, and the average yields per mu reached 215.65 kg in 2005, a historical high. While this
figure is only 69.72% of the national average, a low level in the western region and the country at large; thirdly, the total output increased year on year. The grain output of Gansu was 8.3689 million ton in 2005, the second consecutive year of good harvest, 350,600 tons lower than the 8.7195 million tons in 1998, the peak year in history. During the Tenth-Five-Year-Plan period, the total output increased year on year, from 7.5322 million tons to 8.3689 million tons, with an annual average growth rate of 3.24%.

The total grain output increased at a rate of 2.9% year on year from 1995 to 2005. Compared with the whole country and the five provinces in northwestern China, per unit grain output was relatively low, which was 67.72% of the national average, No. 4 among the five provinces in northwestern China, which was slightly higher than Shaanxi. Among the five provinces, Gansu’s per capita grain availability ranks No. 3 after Ningxia and Xinjiang, 87.16% of the national average.

Industrialized operation quickens its step and the processing capacity of agricultural products is strengthened. By the end of the Tenth-Five-Year-Plan period, the number of organizations engaged in agricultural industrialized operation of Gansu increased to 2476, an increase of 899 compared with the year 2000, up 57%. The number of leading enterprises grew to 1319, an increase of 882 compared with the year 2000, up 201%. The agro-product processing capacity reached 11 million tons, bringing a spill-over effect on 1.7 million households and generating 1891 Yuan’ incomes increase to each household, up by 541 yuan, an increase of 40%. The total fixed assets of agricultural industry organization across Gansu reached 16.5 billion yuan, an
increase of 9.1 billion yuan, up by 123%, among which the fixed assets of leading enterprises totaled 14 billion yuan, an increase of 8.7 billion yuan, up by 164%. With a work force of 330,000 people, the leading enterprises generated annual sales revenue of 13.8 billion yuan. Gansu built over 2300 agricultural product markets of various kinds, 60 of which have a sales volume of above 50 million yuan; there are 4233 farmers’ specialized organizations for economic cooperation and a batch of industry associations were also set up. At present, a benefit linkage mechanism connecting leading enterprises, cooperative organizations and farmers has taken initial shape, which effectively facilitates the development of agriculture and rural economy.

**Topic 1: Emphasize market-based operation and scale up and strengthen the beef cattle industry**

Governments at all levels in Pingliang attach great importance to the development of beef cattle industry and upgrade this industry from a pillar industry in agricultural sector to a leading industry in the whole economy. Relevant policy measures were issued to encourage and support its development. By the end of 2005, the cattle in stock and the marketable fatten stock reached 833,900 and 329,000 respectively and the beef production reached 26,200 tons. Cattle raising is mainly distributed in five counties (districts), namely Kongdong, Jingchuan, Lingtai, Suixin and Huating. The local breed Pingliang Red Bull accounts for over 80% of the cattle stock. There are 10 leading beef processing enterprises in Pingliang, offering over one hundred products in 6 categories, beef, foodstuff, hide, leather ware, bone ware and biochemical drugs, which are sold to over 20 provinces (cities and districts) across China. Live cattle and processed beef products are exported to Hong Kong, Korea and many other places. The revenues from cattle raising, processing and trade totaled 1.2 billion yuan, earning 420 million yuan’s of tax and profits. Per capita income from cattle industry accounts for 30% of farmers’ total income, 50% of their cash income. The cattle industry contributes to over 87 million yuan local fiscal revenue. The large scale cattle industry in Pingliang gave birth to the cattle base. The wholesale market has implications on cattle raising in the vicinity and the transaction price has an influence on the market supply in Shaanxi, Gansu, Ningxia and Inner Mongolia, the market-based operation promoted processing and export. The brand effect of Pingliang Red Bull has gradually shown itself.

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4 *Development* Oct. 10th 2006
Non-agricultural sector has expanded in rural areas. During the Tenth-Five-Year-Plan period, village and township enterprises across Gansu realized leapfrog development. The growth rate was 18% year on year and the added value was over 39 billion yuan, 119% of agricultural added value in Gansu, contributing to half of the rural economic growth, 22% of the GDP in Gansu, thus making it an important component of national economy. The village and township enterprises absorb 19.7 million farmers, making it the major channel for transferring rural surplus labors out of farming and increasing farmers’ income. During the Tenth-Five-Year-Plan period, 7408 projects began construction, and 6800 projects were put into operation. The paid-in capital totaled 33.1 billion yuan. Currently, Gansu has established 87 village and township enterprise demonstration parks at the ministerial and provincial level, housing 43,000 enterprises and employing 390,000 workers, and their industry added value accounts for 27.9% of the added value of all village and township enterprises in Gansu. These demonstration parks lowered infrastructure construction cost, realized the convergence of the flows of talents, materials, capital and information. A strong synergy was forged and a cluster of economic cycling, environmentally friendly and high-tech village and township enterprises take shape.

**Topic 2: Feature agricultural products processing and export in Yima, Qingcheng County scored remarkable achievement.**

Yima, Qingcheng county was identified by the Department of Commerce of Gansu Province as one of the first batch of agricultural product processing and export demonstration park. The whole park covers an area of 2 sq km. By the end of 2005, there were 802 agricultural products processing enterprises of various kinds, employing 8,124 people. Infrastructure investment of the park accounts for over 60% of Qingcheng county’s project construction investment during the same period. From 2001 to 2005, the export earned foreign exchange increased from 200,000 USD to 26.02 million USD, with total amounting to 47.37 million USD. The total value of exported products increased from 13.429 million yuan to 201.5 million yuan, increasing by 15 folds. From 2000 to 2005, the scale of exported-oriented economy reached 835.012 million yuan. According to statistics, the park processed 150,000 tons of special agricultural products such as pumpkin seeds, oil sunflower, day lily, preserved fruits, jam and dehydrated vegetables, with a total production value of 330 million yuan, and a industry added value of 92.56 million yuan, accounting for 60% of the industry value of the whole county, generating a sales revenue of 280 million

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6. *Development Mechanism and Strategic Study on the Special Agricultural Products Processing and Export Garden in Yima Town, Qingcheng County, Gansu Province 2006 investigation report by Li Hanlin*
yuan. The exported products valued 210 million yuan, earning 26 million USD, accounting for 70% of the amount of similar processed and exported products. The whole park paid 2.89 millions of taxes and paid over 58 million yuan on labor service and transportation. The per capita annual income of workers in the park reached over 7,000 yuan. Thanks to the construction and development of the export park and the rapid development of foreign trade, Qingcheng becomes the biggest special agricultural products processing and export park based on counties.

International agricultural exchanges and cooperation proceeds well and direct export of agricultural products increased dramatically. Agriculture attracts more and more foreign investment, and the paid-in capital reached more than 800 million yuan. Export-oriented agriculture continues to grow. Feature products such as traditional Chinese herbs, sunflower seeds and pumpkin seeds, cider and juice, dehydrated vegetables find their markets in over 20 countries and regions. The export of agricultural products earned a total of 500 million USD; more than double that during the Ninth-Five-Year-Plan period. Last year, more than 6 million tons’ agricultural products were sold out of Gansu.

1.2.3 Farmers’ income increases, the urban-rural gap widens.

Since 1978, farmers’ income showed an upward trend. By 2005, the net income of farmers increased by 18.6 folds over 1978. The annual growth rate during the Ninth-Five-Year-Plan period was 10.08%, and that of the Tenth-Five-Year-Plan period was 6.74%. The average annual growth rate was 8.40% from 1995 to 2005.

There is still a big gap between Gansu and the whole country in terms of the net income per farmer. Since 1985, the gap has been widening. By 2005 the absolute gap of per capita net income reached 1,275 yuan, a 9-fold increase over 1985. In the western region, the per capita net income of Gansu is only higher than Guizhou and Yunnan.

<table>
<thead>
<tr>
<th>Table2-2 Per capita net income of western provinces from 1996 to 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monetary Unit: Yuan</td>
</tr>
<tr>
<td>Chongqing          - 1643.21720.51736.61892.41971.22097.62214.62510.42809.3</td>
</tr>
<tr>
<td>Sichuan           1453.41680.71789.21843.51903.6 1987  2107.62229.92518.92802.8</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>Chongqing</td>
</tr>
<tr>
<td>Sichuan</td>
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<tr>
<td>Guizhou</td>
</tr>
<tr>
<td>Yunnan</td>
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<tr>
<td>Tibet</td>
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</tbody>
</table>

Source: China Statistic Yearbook

Table 2-3 Per capita net income growth rate of farmers in western provinces

from 1996 to 2006
The income gap between urban and rural residents is widening. The ratio of urban to rural income was 2.63 in 1980, 2.78 in 1990, 3.44 in 2000 and 4.08 in 2005.

Table 2-4 income of urban and rural residents in Gansu from 1978 to 2005

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Net income per farmer</td>
<td>101</td>
<td>153</td>
<td>257</td>
<td>431</td>
<td>884</td>
</tr>
<tr>
<td>Disposable income of urban residents</td>
<td>408</td>
<td>403</td>
<td>641</td>
<td>1197</td>
<td></td>
</tr>
<tr>
<td>Urban-rural income ratio</td>
<td>4.04</td>
<td>2.63</td>
<td>2.49</td>
<td>2.78</td>
<td>3.27</td>
</tr>
</tbody>
</table>

Source: 2006 Gansu Rural Area Yearbook
1.2.4 Strengthened infrastructure construction and improved comprehensive agricultural productivity

During the Tenth Five Year Plan period, western provinces took the rare opportunity of western development, focused on strengthening infrastructure construction and eco-environment improvement and implemented a batch of infrastructure projects. These efforts greatly improved the basic conditions for living and production in rural areas. Key water conservancy projects began their construction and remarkable achievement was made, including the comprehensive agricultural development of Shule River, Dongxiang Nanyang Canal project, first phase of the comprehensive treatment of Heihe Valley and reinforcement of hazardous reservoirs, reconstruction of large scale irrigated areas, renovation for water conservation, rainwater collection and storage program, water conservancy facilities construction, fresh water project and artificial rainfall project. The central government invested a total of 1.538 billion yuan to carry out comprehensive treatment of the Heihe valley and arranged 77 ecological protection and water conservancy projects, which prevented the eco-environment in the river valley from worsening. Water-saving society demonstration pilot in Zhangye saw initial progress. The coordinated diversion of Heihe water realized breakthrough and our efforts to divert water to the long-dried Dongjuyan Sea 9 times for 4 consecutive years won recognition from relevant departments of the central government. By the end of 2005, Gansu developed 20.33 million mus effectively irrigated area, built 28.17 million mus of terrace and treated 780,000 sq kms of water and soil eroded areas, providing drinking water to 53.7 million rural residents. Forestry and ecological environment saw remarkable achievements. Gansu planted 31.52 million mus of trees, among which 21.176 million mus used to be farmlands. Gansu planted 5.376 million mus of public welfare forests which are under the natural forests protection project, 2.814 million mus of forest for the fourth phase of the Three North Shelter Belt project and 700,000 mus of sand shifting control forests with Japanese loans in the Hexi Corridor, and 411 million stems of trees on a voluntary basis. Currently, the forest coverage of Gansu reached 9.9%. The construction of 6 small projects in rural areas has been promoted. In Gansu, 26.65 million mus of grasslands were fenced, raising the total area of fenced grassland to 34.85 million mus; Gansu brought biogas to 90,000 households, bring the total number of household accessible to biogas to 133,000; the added installed capacity of rural hydropower reached 437,000 kilowatts. Meanwhile, we constructed 24,897 kms of rural roads. 4,257 villages have access to tarred road and the Phase 2 project of the rural power grid renovation was completed.
1.2.5 Strengthened Science and Technology Application Capacity, New Achievements scored in Agricultural Science, Research and Promotion.

During the Tenth Five Year Plan period, Gansu strengthened the research and development of agricultural science and technology by relying on scientific innovation and progress, thus increasing the contribution of science and technology to agricultural production. Gansu studied and developed new varieties and new products. Centering on developing feature and competitive industries, Gansu engaged in fine variety promotion and technology research and development. Gansu studied and cultivated new varieties, products and technologies which are of high quality and can be extended across China, among which Longjian 301 wheat, Longshu 6 potato and Ganpi 3 barley are of the highest quality in China, and products like the nanometer fresh keeping fruit vinegar are up to advanced international standards.

Scientific and technological findings are extended and transferred. There are more than 2200 practical technologies including water efficient agricultural technology, protective farming technology, and standardized crop planting, safe, green and organic fruits and vegetables production technology. In total, these technologies are demonstrated and extended to over 12 million mus of land. Longshu potato extension area accounts for 1/3 of the potato sowed areas across Gansu, Ganpi barley’s extension area accounts for over 95% of the total barley sown areas. The technology transfer rate reached over 40%, the coverage of major fine crop seeds coverage reached over 85%, the transfer rate of improved breeds of livestock and poultry reached over 65%. Gansu actively organized and implemented the program to bring agricultural science and technology to households. Through setting examples and demonstrations, we strengthen trainings to farmers. Across Gansu, we have 100,000 science and technology demonstration households and 1.5 million trained farmers.

1.2.6 Anti-poverty campaign scored notable achievement, poverty reduction is still a daunting task.

We follow the principle of relieving poverty through development, actively explore and innovate ways of poverty reduction, improve the mechanism for poverty alleviation and development and focus our work on village-scale progress, poverty reduction through industry development and the labor transfer and training. Remarkable achievement was made. Within five years, 1,600 villages in Gansu participated in the village-scale project. We basically provided food and clothing to 480,000 extremely poor people. The poverty coverage shrank from 9.7% to 7.21%.

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7 Empirical Analysis of Poverty Situation in Rural Area in Gansu by Chang Lianying, Provincial Situation Message Gansu Statistics Bureau Edition 5, 2006
Meanwhile, 2.02 million low incomers can have enough food and clothing.

Poor population and low incomers are mainly dispersed in the southern, eastern and central parts of Gansu, the southern and eastern parts in particular. Those places have the highest occurrence of poverty and the highest density of low incomers, thus making them the key areas and the hard nut for anti-poverty campaign in Gansu. Seen from a region-wise point of view, southern Gansu (Longnan, Gannan and Tianshui) has 561,400 poor population with a poverty occurrence of 9.34%, 2.14 percentage points higher than the provincial average; eastern Gansu (Pingliang and Qingyang) has 376,200 poor population with a poverty occurrence of 9.04%, 1.84 percentage points higher than the provincial average; central Gansu (Lanzhou, Dingxi, Baiyin and Linxia) has 425,800 poor population with a poverty occurrence of 6.03 %, 1.17 percentage points lower than the provincial average; Hexi area has 122,100 poor population with a poverty occurrence of 3.58 %, 3.62 percentage points lower than the provincial average, with the lowest poverty occurrence in Gansu.

<table>
<thead>
<tr>
<th>Topic 3: more than 2 decades of anti-poverty campaign reduced Dingxi’s poverty coverage by 70%</th>
</tr>
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<tbody>
<tr>
<td>At the end of 1982, to relieve poverty in Gansu and Ningxia, mainly Dingxi, the CPC Central Committee and the State Council set up a special fund for poverty alleviation and organized a leading group for the agricultural development in these areas. Following the requirement of the State Council and considering the actual conditions in these areas, the leading group put forward the principle of taking the land road if the waterway is not workable and finding other roads if the land road and the waterway all lead to nowhere, After over 2 decades of efforts and especially after entering the new century, Dingxi acts in accordance with the strategy of taking the village-scale participatory approach and focusing on industry development and labor training, restructuring agriculture, developing pillar industry and making every attempt to increase farmers’ income. We should first satisfy the food and clothing requirements of farmers and then pursue a moderately prosperous life. We should create a new road of poverty alleviation suited to local conditions. By the end of 2005, rural population living in absolute poverty was reduced from 1.7 million in 1982 to 850,000, the coverage of absolute poverty reduced from 78% in 1982 to 3.19%, farmers’ net income increased from 105 RMB Yuan in 1982 to 1670.</td>
</tr>
</tbody>
</table>

Anti-poverty campaign in Gansu made notable achievement, which laid a solid foundation for the further development of the province.
foundation for shaking off poverty, but there are still many challenges and difficulties ahead. Firstly, poverty coverage in Gansu is extensive. According to the analysis of national poor population by the National Statistics Bureau, Gansu’s poverty coverage tops the whole country. Secondly, poverty situation is grim. Infrastructure and social services of the impoverished regions are lagging behind. Of all administrative villages of poor counties, 19.1% have no access to roads, 3% have no access to power supply and 15.3% have no access to telephone. 16 million people have difficult access to drinking water. 17.4% of the workforce is illiterate, 3.3 percentage points higher than the national average. According to relevant study, tuition induced poverty accounts for 24%, and disease induced poverty accounts for 18%. Thirdly, poverty alleviation faces greater difficulties. During the Tenth Five Year Plan period, Gansu lifted an annual 100,000 people out of absolute poverty, less than 1/3 of the 330,000 being lifted out of poverty during the Four Year Poverty Alleviation Program period. At present, people living under absolute poverty are mainly dispersed in the rocky mountainous areas, remote mountainous areas, cold, dark and humid mountainous areas, forest edge and extremely dry belts and expanse of land. These places are the hardest nuts to crack and the cost for poverty alleviation grows by many times than that of the last century. Fourthly, it is difficult to consolidate the results achieved. According to statistics, 1.9682 million people slipped back to poverty in Gansu.

1.2.7 Large number of surplus rural laborers and slow process to transfer them out of farming

According to calculation\(^9\), in 2005, there were 12.5 million rural labors in Gansu,

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among which, 5.4 million were needed for agricultural production and 7.1 million were surplus. At present, around 2.4 million of the redundant laborers have been transferred, and deducting over 1.6 million students above the age of 16 and household laborers, there are still 3.1 million surplus laborers to be transferred.

During the Tenth Five Year Plan period, Gansu transferred a total of 15.24 million persons (times), earning a total income of 28.25 billion RMB Yuan. Among them 4.1 million persons (time) were transferred, up 26% over the previous year. They generated an income of 10.1 billion RMB Yuan, up 55% over the previous year, accounting for over 1/3 of the total labor service income during the Tenth Five Year Plan period.

At present, the majority of the farmers are inadequately educated. According to the study of Gansu team of the National Statistics Bureau\(^{10}\), of all rural households, illiterate and semi-illiterate ones account for 10.66%, those with no more than elementary school education 26.91%, those with no more than primary middle school education 41.05%, those with no more than senior middle school education 18.36%, those with no more than technical secondary school education 1.8% and those with three-year technical college education and those with four-year university education 1.15% and 0.07% respectively. That is to say, 80% of the workforce in Gansu received no more than primary middle school education. With few people mastering professional skills, the land is extensively managed and farmers can only earn a living by doing physical work. The employment and transfer of labor force remains a daunting task. The incompetence of labor force has seriously hampered the efforts to build a new socialist countryside. We should promote the shift from doing physical work to selling skills, from unorganized and short term working to organized and stable export of labor services, so as to promote faster and sustainable development of labor service economy. We still have a long way to go.

1.2.8 More investment brings forward the development of rural social services

During the Tenth Five Year Plan period, Gansu further increased investment in public services, including rural education, culture and health, and the rural social services quicken their steps. Rural compulsory education achieved rapid development, especially in 2005; Gansu implemented the “Two Exempts and One Subsidy” policy. Gansu raised 218 million RMB Yuan to exempt text book expenses, miscellaneous fees and subsidize boarding expenses for students from poor families during their compulsory education. This helps facilitate the education of poor students and promote rural compulsory education and rural cultural undertakings. By the end of
2005, 90% of rural population had access to radio and TV services, and 1.727 million households had access to cable TVs, 1,033 villages established culture stations, and 5115 villages established culture offices. Telecommunication network saw some progress, and the campaign to bring science, technology and culture to villages were well under way. Health care enjoyed progress in rural areas. During the Tenth Five Year Plan period, we strengthened the construction of village and township clinics and gradually improved the health care system in rural areas. Since 2003, we have conducted pilot work in the new rural cooperative health care system. Up to now, there are 40 pilot counties in Gansu, covering 3 million people. To better carry out work related to population and family planning, we actively explored new mechanism for comprehensive management of population and put in place family planning reward and support policy to a proportion of the families. We carried out pilot program in “Fewer Children Equals Faster Prosperity” in 68 counties and 520 villages and award money and materials to 6,359 couples and exempted tuition, miscellaneous fees and textbook expenses valued at 43 million RMB Yuan for students in 410,000 villages.

1.3 Barriers in Rural Development

The position of agriculture as a weak industry is not fundamentally changed and the progress of modern agriculture is far lagging behind industrialization and urbanization. We still have a long way to go to meet the requirements of modern agriculture in agricultural structure, production level, material equipment, scientific and technological contribution, farmers’ organization and education level. This is visibly reflected in the following areas, namely small scale crop plantation and animal breeding industry, limited concentration of competitive agricultural products, irrational regional layout and underdevelopment of livestock industry.

Institutional factors affect industry interaction. After carrying out rural household contract responsibility system, Gansu greatly promoted the rejuvenation of agriculture and the adjustment and optimization of agricultural structure. However, with the progress of agricultural commercialization, marketization and modernization, the urban-rural dual economic structure has become more serious. Low efficiency of agriculture, slow rural land transfer and the hangover from planned economy in today’s agriculture management, such as fragmentation between industries, monopoly, broken linkage between domestic and foreign trade, market irregularities, has led to scattered investment and inefficient management, which has seriously crippled the vigor of agriculture.

Agricultural investment is inadequate and the transfer rate of science and technology is relatively low. Despite remarkable increase in agricultural investment in Gansu during the Tenth Five Year Plan period, there is still a big investment gap because of
insufficiency in agricultural investment at different levels of government, scattered fund at the provincial level, few agricultural science and technology extension projects and few extension funds at the primary level. On the one hand, this has affected the extension, application and effective transfer of agricultural science and technology. On the other hand, this made it hard to implement high-tech agricultural engineering and infrastructure construction projects.

Resource constraints bring huge disadvantages. The pressure of land resources is big. Study shows that the pressure index of land resources in Gansu is 0.17, ranking 11 in China after Shanghai, Beijing, Tianjin, Qinghai, Fujian, Guangzhou, Guizhou, Zhejiang, Sichuan and Shaanxi. On the whole, Gansu’s land resources and arable land resources enjoy relative advantages in China. But because of the low quality of arable land, the per capita availability of grain and huge pressure of food security, the land resources pressure is relative big.

Water resources suffer shortage and uneven distribution. The pressure index of water resources in Gansu is as high as 0.60, ranking No. 9 in China. The water resource index is 0.18, ranking No. 25 in China only higher than Hebei, Shanxi, Tianjin, Inner Mongolia and Ningxia. Water shortage has already become one of the barriers hindering the socioeconomic development in Gansu. Due to the influence of monsoon, rainfall in Gansu is unevenly distributed and varies from year to year and at different times of the year. The total amount of population, arable land and water account for 2%, 4% and 1% respectively. There is poor matching between water and land resources.

Gansu has a dense population and its resources are at a disadvantage. The population density in Gansu is 54.2 people per sq km, just at the level of the carrying capacity of land. But if 40% of the land that can hardly be used is deducted, the population density of Gansu is 90.3. If calculated at 50 people per sq km, the population density is 80% higher than the carrying capacity of land; even if calculated at 70 people per sq km, it is still 29% higher than the land’s carrying capacity. The total resource index of Gansu is 0.27, ranking No.10 in China, the same as Shanxi, Henan and Qinghai, after Shanghai, Shandong, Beijing, Tianjin, Hebei, Guangdong, Ningxia, Jiangsu and Zhejiang. This shows that although high-output arable land, per capita water resources and mineral resources enjoy comparative advantages in China, on the whole, there is no resource advantage to speak of; on the contrary, there is obvious disadvantage.

Industrialized operation of agriculture is at a low level and the structural gap between supply and demand of agricultural products is protruding. There are few leading

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enterprises; the existing enterprises are small in scale and weak in capacity. Especially, there is fewer leading processing, storage and fresh-keeping enterprises which can drive forward the development of crop plantation. The agricultural products have few brand effects, low added value, weak market competitiveness and small radiation effect. The industrialized level is low, the comparative efficiency is low and it is difficult to increase farmers’ income. The standardized production is at a low level, there are few safe, green and organic agricultural products. The brand, high quality and special production base is of small scale and cannot meet the market demand for quality, diversified, refined and convenient food, thus deterring market expansion. Meanwhile, some large and medium sized cities have introduced the market access system, which makes it difficult for Gansu to expand market in other provinces.

Basic conditions and agricultural comprehensive production capacity are weak. Although the Central Government and Gansu intensified investment in agricultural infrastructure construction and improved agricultural production conditions and grain production, saw a recovery, agriculture in Gansu is still susceptible to natural disasters especially major and sudden disasters. In lack of safety protection, agricultural production fluctuates in case of major natural disasters. This prevents the sustainable and stable development of agriculture. Besides the economic development, population growth, shortage of water resources, it is still a daunting task to increase the comprehensive capacity of agriculture and grain productivity.

The comprehensive competitiveness of agriculture is weak. Through the evaluation of comprehensive competitiveness of agriculture by revealed comparative advantages index, we can see that the comprehensive competitiveness of agriculture in northwestern China is relatively weak; most of them are in the W category. The competitiveness of Gansu in both agricultural scale and basis is weak, belonging to the W category; the efficiency and structure competitiveness belong to the M category, which means medium competitiveness. It shows that the quality and restructuring of Gansu agriculture has achieved progress. In the long run, the agriculture in five northwestern provinces enjoys growth advantage.

\[
RCA_i = \frac{X_i/X_{iw}}{X/X_w}, \quad X_i \text{ is the overall industrial value of Place } i, \quad X_{iw} \text{ is the overall industry value of Country I, } X \text{ is the total industrial value of a certain place, } X_w \text{ is the overall industrial value of a certain country.}
\]

When RCA is higher than 2.5, it shows the place is highly competitive, and it is labeled S; when RCA is smaller than 2.5 and bigger than 1.25, it shows relative strong competitiveness and is labeled as R; When RCA is smaller than 1.25 and bigger than 0.8, it shows medium competitiveness and is labeled as M; when RCA is lower than 0.8, it shows low competitiveness and is labeled as W.
<table>
<thead>
<tr>
<th>Provinces</th>
<th>Scale competitiveness</th>
<th>Basic competitiveness</th>
<th>Efficiency competitiveness</th>
<th>Structure competitiveness</th>
<th>Modernization competitiveness</th>
<th>Growth competitiveness</th>
<th>Comprehensive competitiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RCA</td>
<td>Grade</td>
<td>RCA</td>
<td>Grade</td>
<td>RCA</td>
<td>Grade</td>
<td>RCA</td>
</tr>
<tr>
<td>Gansu</td>
<td>0.47</td>
<td>W</td>
<td>0.37</td>
<td>W</td>
<td>1.15</td>
<td>M</td>
<td>0.98</td>
</tr>
<tr>
<td>Shaanxi</td>
<td>0.58</td>
<td>W</td>
<td>0.73</td>
<td>W</td>
<td>1.25</td>
<td>R</td>
<td>0.88</td>
</tr>
<tr>
<td>Ningxia</td>
<td>0.81</td>
<td>M</td>
<td>1.87</td>
<td>R</td>
<td>1.17</td>
<td>M</td>
<td>0.95</td>
</tr>
<tr>
<td>Qinghai</td>
<td>0.37</td>
<td>W</td>
<td>0.00</td>
<td>W</td>
<td>1.27</td>
<td>R</td>
<td>1.07</td>
</tr>
<tr>
<td>Xinjiang</td>
<td>0.83</td>
<td>M</td>
<td>10.00</td>
<td>S</td>
<td>2.50</td>
<td>S</td>
<td>0.98</td>
</tr>
<tr>
<td>Beijing</td>
<td>0.58</td>
<td>W</td>
<td>4.68</td>
<td>S</td>
<td>1.20</td>
<td>M</td>
<td>0.27</td>
</tr>
<tr>
<td>Shanghai</td>
<td>0.67</td>
<td>W</td>
<td>3.67</td>
<td>S</td>
<td>0.82</td>
<td>M</td>
<td>0.22</td>
</tr>
<tr>
<td>Liangning</td>
<td>1.00</td>
<td>M</td>
<td>6.78</td>
<td>S</td>
<td>0.59</td>
<td>W</td>
<td>0.95</td>
</tr>
<tr>
<td>Guangdong</td>
<td>0.98</td>
<td>M</td>
<td>4.10</td>
<td>S</td>
<td>0.99</td>
<td>M</td>
<td>0.73</td>
</tr>
<tr>
<td>Henan</td>
<td>0.66</td>
<td>W</td>
<td>5.68</td>
<td>S</td>
<td>0.69</td>
<td>W</td>
<td>1.15</td>
</tr>
<tr>
<td>Sichuang</td>
<td>0.87</td>
<td>M</td>
<td>4.27</td>
<td>S</td>
<td>0.77</td>
<td>W</td>
<td>1.30</td>
</tr>
</tbody>
</table>

Source: 2006 China Statistics Yearbook
There is stark conflict between the quality and safety of agricultural products and the need to increase farmers’ income. With socioeconomic development and the increase of people’s living standards, on the one hand, consumers are putting higher and higher demand on the quality and safety of agricultural products; on the other, the new pricing mechanism is yet to be formed, high quality products do not always mean high price. With the increase of production cost and the decrease of income and relative benefits, farmers can hardly gain benefits. At present, to some extent, to increase the quality of agricultural products is a government behavior and can hardly stimulate the enthusiasm of farmers and can affect the safe production and increase of quality of agricultural products to a certain degree.

1.4 Comprehensive Evaluations of Agriculture and Rural Development

1.4.1 Evaluation of the Building of a Moderately Prosperous Society in an All-round Way in Gansu’s Rural Area

The Sixteenth National Congress of the CPC Central Committee put forward the objective to build a moderately prosperous society in an all-round way, and major tasks for this purpose are to invigorate rural economy, speed up urbanization, balance socioeconomic development in urban and rural areas, build modern agriculture, develop rural economy and increase farmers’ income. Acting in accordance with the requirements of building a moderately prosperous society in an all-round way, and referring to the preliminary comprehensive evaluation of relevant agencies and 18 indicators to build a moderately prosperous society in an all-round way in rural areas, we come up with the comparison between Gansu’ goals and status quo with the whole country.

On the whole, the realization degree of building a moderately prosperous society in Gansu’s rural areas in 2005 was negative (-5.4%), 6.7 percentage points lower than the western region and 33.6 percentage points lower than the national average. So the gap is big and the task is daunting.

The status quo of Gansu’s drive to build a moderately prosperous society is divided into 6 parts, and compared with the preliminary targets, we can see that the realization degree of Gansu’s rural production development in 2005 was negative (-17.5%), 8.2 percentage points lower than western regions, 38.3 percentage points lower than the national average. The realization degree of social development was 24.9%, the same as the western region, 9 percentage points lower than the national average. The realization degree of population quality was negative (-71.8%), a big gap with the national average. The realization degree of living quality was 13.1%, 0.7 percentage points lower than the western region, 25.4 percentage points lower than the national average.
average. The realization degree of democracy and rule of law was 46%, 24.3 percentage points higher than western region, 26.7 percentage points lower than the national average. The realization degree of resources and environment was negative (-4.5%), 8.7 percentage points higher than the western region and 3.8 percentage points lower than the national average.

**Table 2-6 Comprehensive Comparison between Gansu the Whole Country in Building a Moderately Prosperous Society 2005**

<table>
<thead>
<tr>
<th>Index</th>
<th>unit</th>
<th>Overall well-off value</th>
<th>All-round well-off value</th>
<th>China</th>
<th>Western region</th>
<th>Gansu</th>
<th>Realization degree (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A production development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net income of rural residents</td>
<td>RMB Yuan/pers.</td>
<td>2000 6000 2866 2029 1726</td>
<td>20.8 -9.3 -17.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor proportion of the first industry</td>
<td>%</td>
<td>50 35 45 56 58</td>
<td>33.3 -40.0 -53.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population proportion of small town</td>
<td>%</td>
<td>16 35 20.1 17.0 16.4</td>
<td>21.6 5.3 2.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B social development</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coverage of rural cooperative health care</td>
<td>%</td>
<td>10 90 24 14.0 12.3</td>
<td>33.9 24.5 24.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>1.8 60 8.2 5.1 1</td>
<td>11.0 5.7 -1.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coverage of old age pension in rural areas</td>
<td>pers.</td>
<td>1 4 1.7 1.2 1.6</td>
<td>23.3 6.7 20.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of</td>
<td>0.35 0.3—0.4 0.38 0.34 0.33</td>
<td>100.0 100.0 100.0</td>
<td></td>
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<tr>
<td></td>
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<tr>
<td>Agricultural technicians among every 1 million population</td>
<td></td>
<td></td>
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<tr>
<td>Gini coefficient of rural residents</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td><strong>person quality</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average years of schooling</td>
<td>7.4</td>
<td>9</td>
<td>7.7</td>
<td>6.5</td>
<td>6</td>
<td>18.8</td>
<td>-56.3</td>
</tr>
<tr>
<td>Average life expectancy</td>
<td>69.5</td>
<td>75</td>
<td>69.5</td>
<td>68.4</td>
<td>69</td>
<td>0.0</td>
<td>-20.0</td>
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<tr>
<td><strong>living quality</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Engel coefficient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living quality index</td>
<td>%</td>
<td>49</td>
<td>40</td>
<td>45.5</td>
<td>50.5</td>
<td>47.2</td>
<td>38.9</td>
</tr>
<tr>
<td>Proportion of farmers’ cultural and recreational expenses</td>
<td>%</td>
<td>18</td>
<td>75</td>
<td>37.5</td>
<td>29.0</td>
<td>17</td>
<td>34.2</td>
</tr>
<tr>
<td>Degree of IT application in rural life</td>
<td>%</td>
<td>2.5</td>
<td>7</td>
<td>4.0</td>
<td>3.4</td>
<td>3.5</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>28</td>
<td>60</td>
<td>44.2</td>
<td>35.1</td>
<td>39.2</td>
<td>50.6</td>
</tr>
<tr>
<td><strong>democracy and rule of law</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>degree of Satisfaction with the transparency of village</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>administration</td>
<td>%</td>
<td>55</td>
<td>85</td>
<td>77</td>
<td>78</td>
<td>67</td>
<td>73.3</td>
</tr>
<tr>
<td>degree of Satisfaction with rural public</td>
<td>%</td>
<td>60</td>
<td>85</td>
<td>78</td>
<td>76</td>
<td>73</td>
<td>72.0</td>
</tr>
<tr>
<td>security</td>
<td>F resources and environment</td>
<td>Extent of the Change of arable land area</td>
<td>Forest coverage</td>
<td>Water usage for every 1 million RMB Yuan of GDP</td>
<td>Comprehensive realization degree</td>
<td></td>
<td></td>
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<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>Cubic meter/million RMB Yuan</td>
<td>2600</td>
<td>1500</td>
<td>2090</td>
<td>2976.0</td>
</tr>
<tr>
<td></td>
<td>-0.3</td>
<td>0</td>
<td>16.5</td>
<td>23</td>
<td>18.2</td>
<td>13</td>
<td>6.7</td>
</tr>
<tr>
<td></td>
<td>0.1</td>
<td>1.3</td>
<td>1.3</td>
<td>-50</td>
<td>33.0</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.7</td>
<td>-13.2</td>
<td>-0.7</td>
<td>-50</td>
<td>33.0</td>
<td>100</td>
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</tr>
<tr>
<td></td>
<td>-4.5</td>
<td></td>
<td>-4.5</td>
<td>-50</td>
<td>33.0</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Source: Monitoring Report of the Building of a Moderately Prosperous Society in an All-round Way in Rural China 2006

China Statistics Press Sept. 2006

1.4.2 Basic Evaluation of Gansu’s Building of a New Socialist Countryside

Acting in accordance with 5 requirements to build a new socialist countryside put forward in the Fifth Plenary Session of the Sixteenth National Congress and referring to the preliminary comprehensive evaluation of relevant agencies and 26 indicators to build a new socialist countryside, we come up with the comparative comparison on the goal vs. status quo of building a new socialist countryside in Gansu and the country at large.

On the whole, the comprehensive realization degree of the building of a new socialist countryside in Gansu in 2005 was 46.3%, 10.4 percentage points lower than the national average, which was 56.7%. That is to say, the overall development of Gansu's rural area is no more than half way towards the envisaged goal of the building of a new socialist countryside by 2020. According to the lofty goal of building a moderately prosperous society in an all-round way by 2020 put forward in the Sixteenth National Congress of CPC Central Committee, Gansu’s new socialist countryside drive is still a long and arduous task. In the future 15 years, the realization degree of Gansu’s new socialist countryside drive should increase by 3.6 percentage.
points annually.

The status quo of Gansu’s drive to build a new socialist countryside is divided into 5 parts, and compared with the preliminary targets in 2020, we can see that the realization degree of Gansu’s rural production development in 2005 was 55.4%, 8.1 percentage points lower than the national average (63.5%) in 2004, of which the grain self-sufficiency is the same as the national average, the proportion of non-agricultural laborer in rural area lags behind, and the other indices are lower than the national level.

The realization degree of affluent life is 27.7%, 4.4 percentage points lower than the national average (32.1%), of which the rural poor population occurrence rate is lower than national average, per capita net income of rural residents, housing condition in rural area and the coverage of rural old age pension are lagging far behind.

The realization degree of advanced cultural atmosphere is 72.1%, 6.1 percentage points lower than the national average (78.2%), of which the average per capita schooling and the coverage of village and township library are lagging behind, and the degree of farmers’ satisfaction with public security is higher than the national average.

The realization degree of clean rural environment is 32.5%, 27.6 percentage points lower than the national average, which was 60.1%, of which the proportion of safe drinking water, proportion of clean energy, proportion of clean toilets, coverage of outdoor roads and the forest coverage are lagging behind.

The realization degree of democracy and rule of law is 80.9%, 8.7 percentage points lower than the national average of 89.6%.

We can see that the gap in terms of farmers’ life and clean and tidy rural environment is the biggest.

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**Table 2-7 New Socialist Countryside Status Quo Comparison**

<table>
<thead>
<tr>
<th>indices</th>
<th>unit</th>
<th>New countryside standards</th>
<th>Actu al value</th>
<th>Realization degree (%)</th>
<th>Comprehensive value (%)</th>
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297
<table>
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<tr>
<th></th>
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<th>China</th>
<th>Gansu</th>
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<td><strong>A production development</strong></td>
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<td>Grain self-sufficiency</td>
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<tr>
<td>Proportion of effectively</td>
<td>%</td>
<td>≥95</td>
<td>96</td>
<td>97</td>
<td>100</td>
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<td>irrigated area</td>
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<td>Contribution rate of</td>
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<td>≥60</td>
<td>44.3</td>
<td>40</td>
<td>73.8</td>
<td>66.7</td>
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<tr>
<td>Per capita availability of</td>
<td>kg</td>
<td>≥80</td>
<td>45</td>
<td>33</td>
<td>56.3</td>
<td>41.3</td>
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<tr>
<td>Per capita availability of</td>
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<td>28</td>
<td>63.3</td>
<td>46.7</td>
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<tr>
<td>Proportion of nonagricultural</td>
<td>%</td>
<td>≥35</td>
<td>19.5</td>
<td>16.4</td>
<td>55.7</td>
<td>46.9</td>
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<tr>
<td>laborers in rural areas</td>
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<td>Proportion of small town</td>
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<td>population</td>
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<td><strong>B affluent life</strong></td>
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<tr>
<td>Per capita net income of rural</td>
<td>R</td>
<td>≥6000</td>
<td>2936</td>
<td>1980</td>
<td>48.9</td>
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<tr>
<td>residents</td>
<td>M</td>
<td>≤40</td>
<td>47.2</td>
<td>47.2</td>
<td>21.3</td>
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<tr>
<td>Engel coefficient of</td>
<td>B</td>
<td>≤40</td>
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<td>47.2</td>
<td>21.3</td>
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<tr>
<td>rural residents</td>
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<td>Housing condition in rural</td>
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<td>areas</td>
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<td>Car ownership in rural areas</td>
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<td>%</td>
<td>≥85</td>
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<td>39.2</td>
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<td>Degree of IT</td>
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<td>%</td>
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<td>application in rural life</td>
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<td>17.6</td>
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<tr>
<td>Coverage of rural cooperative health care</td>
<td>%</td>
<td>78.2 72.1 11.7 10.8</td>
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<td>Coverage of rural old age pension</td>
<td>%</td>
<td>70.7 73.0 85.6 81.1 5.1 4.9</td>
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<tr>
<td>Poor population occurrence rate in rural areas</td>
<td>%</td>
<td>78.2 54.0 30.0 6.7 23.1 12.5</td>
<td></td>
<td></td>
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<tr>
<td><strong>C culturally advanced rural atmosphere</strong></td>
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<tr>
<td>Average years of schooling</td>
<td>year</td>
<td>≥9 7.7 7.3 85.6 81.1 5.1 4.9</td>
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<td>%</td>
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<td></td>
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<tr>
<td>Coverage of village and township library</td>
<td>%</td>
<td>100 78 54 78 54 2.3 1.6</td>
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<tr>
<td>Degree of farmers’ satisfaction with public security</td>
<td>%</td>
<td>≥85 77 80 90.6 94.1 2.7 2.8</td>
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<tr>
<td><strong>D clean and tidy rural environment</strong></td>
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<tr>
<td>Proportion of safe drinking water</td>
<td>%</td>
<td>≥80 70 54 87.5 67.5 3.5 2.7</td>
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<td>Proportion of clean energy Proportion of clean toilets</td>
<td>%</td>
<td>≥70 40 16 57.1 22.9 2.3 0.9</td>
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<tr>
<td>Coverage of outdoor roads</td>
<td>%</td>
<td>≥80 50 31 62.5 38.8 2.5 1.6</td>
<td></td>
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<tr>
<td>Coverage of forest</td>
<td>%</td>
<td>≥23 18.2 6.7 79.1 29.1 3.2 1.2</td>
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Section 2 Function Positioning and Strategic Options

2.1 Function Positioning of the Building of Modern Agriculture

Modern agriculture has two functions, namely economic production and non-economic production. The primary task to build a new socialist countryside is to promote production and the building of modern agriculture and give full play to the role of agriculture as the foundation and pillar of economic and social development and cultural and ecological progress. So we should take a broader view at agriculture in building a new socialist countryside and correctly grasp the multi-functionary nature and function positioning of agriculture.

Food security and agricultural product supply should be guaranteed. We should safeguard the supply of agricultural products, especially the supply of grains. This is the most important function of agriculture and the strategic task of building a new...
socialist countryside. The total grain output of Gansu accounts for around 1.7% of the national total\textsuperscript{14}, while Gansu’s population accounts for 2% of the national total. The slight fluctuation of grain output in Gansu will not affect the overall food security of China, but we should ensure the basic stability of total grain output and rational grain strategy. In the building of a new socialist countryside, we should strengthen industry’s support for agriculture, improve grain production conditions, rely on science and technology, upgrade the comprehensive productivity of agriculture so as to supply more quality, safe and diversified agricultural products to the market and meet people’s needs for raising their living standards. Meanwhile, agriculture can provide raw materials to industry and agro-processing industry.

Anti-poverty campaign can provide opportunities for poverty alleviation and development. Agriculture has a remarkable role in alleviating poverty and ensuring the subsistence of farmers. Poverty is a headache for the world. After reform and opening up, Gansu scored remarkable achievements in poverty reduction, however, anti-poverty campaign is still a long and arduous task for the whole province. Agriculture is not only an important source of living necessities of poor people, but also a viable option for income increase, poverty alleviation and development.

Agriculture provides job opportunities to rural labor force. Constrained by the overall economic development, urbanization process, the traditional land system and the household registration system, the transformation of the urban-rural dual economic structure is rather slow. The transfer of rural surplus labor faces many constraints, and the unemployment relief system is yet to be developed. Against this backdrop, the function of agriculture to provide job opportunities to rural laborers is of great significance to the building of a new socialist countryside and to the development of national economy and maintenance of social stability.

Multiple sectors of agriculture should be developed to increase farmers’ income. Since China’s reform and opening up, incomes from agriculture production dipped, and the downward trend is very serious in Gansu. Because, on the one hand, with the land transfer system in Gansu yet to be developed, the scale of agriculture is small, and the room for income increase by relying on the output of agricultural products is limited; on the other hand, given the dual constraints of resources and market, it is hard to increase income by relying on the price surge of agricultural products in an open economy. Therefore, we should further tap the potential to increase income by relying on agriculture itself and develop feature economy through restructuring. We should combine the building of small towns, the development of village and township enterprises and industrialized management of agriculture so as to extend the industry chain of agriculture. Based on the resources endowment for agricultural development in different regions, we should carry out specialized, regional and rational scale

\textsuperscript{14} Speech by Lu Hao on the New Socialist Countryside Seminar in Gansu on Aug. 1, 2006.
operation and promote the development of multiple sectors of agriculture so as to increase agricultural production’s contribution to the increase of farmers’ income.

We should integrate resources utilization with environmental protection. Through speeding up the change of growth mode of agriculture, we can combine the improvement of the quality and efficiency of resources utilization and environmental protection so as to ensure a clean and safe agriculture production process and sustainable utilization of land and species. We should quicken our steps to build a new type of agriculture, which is rationally structured, vigorous and environmentally friendly. To realize this goal, we should protect natural resources and eco-environment in agricultural production technically; control the harm of agricultural input to natural resources and environment in policy making. The most immediate and arduous task now is to reduce and control the negative impact from the use of highly toxic pesticide and the irrational application of chemical fertilizers.

We should develop a new type of agricultural industry, making rural areas a new place for sightseeing, traveling, living and shopping. In the building of a new socialist countryside, the merging of modern agricultural technology and concept with the traditional fine agriculture will give full play to the role of feature agriculture such as horticulture and grass growing. The popularization of shaped tree plantation, facility planting and garden planting will create beautiful scenery. Coupled with the natural and human landscape, it will greatly promote the rapid development of sightseeing agriculture, recreational agriculture and urban agriculture. Agriculture will become a new heaven for sightseeing, tourism, living and consumption.
2.2 Guideline, Objective and Development Strategy

2.2.1 Guideline

The guideline of agricultural and rural development in Gansu is to fully implement the scientific outlook on development, balance the socioeconomic development in urban and rural areas, follow the principle of industry nurturing agriculture and urban area supporting rural areas and giving more to, taking less from and loosening control over farmers. Acting in accordance with the requirement of building a new socialist countryside, we should implement the strategy of transforming the mode of development, optimizing regional layout, protecting eco-environment and improving industrial system. We should take building a moderately prosperous society in an all-round way as our objective, and protecting eco-environment, increasing efficiency of agriculture, increasing farmers’ income and developing rural areas as our major tasks. We should take science and technology as strong support, modern industrial equipment as material basis, and modern logistics as an approach to build a market system and take industrialized operation as an important path. We should guide development with the concept of modern industry and modern market economy and give full play to the fundamental role of market in allocating resources. We hope that with 10 to 15 years’ concerted efforts of skilled farmers and modern managers, we
can build an integrated and multifunctional agricultural industrial system with relative strong market competitiveness, and the new socialist countryside with coordinated economic, social, cultural and political development, so as to get closer to the goal of building a moderately prosperous society in an all-round way.

2.2.2 Strategic Goals

We should identify the strategic goals of Gansu in future agricultural and rural development, i.e. we should identify the development concept Gansu should take, the road for agricultural and rural development Gansu should choose and the development mode to innovate agriculture and rural development patterns and the approach to reach such goals.

The lofty goal of building a moderately prosperous society in an all-round way by 2020 brings both pressure and opportunities to Gansu. It is pressure because firstly, we should change the backward mode of economic development; secondly, we should change the disadvantaged position of agriculture, and backwardness of rural area and the sustained poverty of farmers; and thirdly, we should curb the ever worsening eco-environment. The Eleventh Five Year Plan period is crucial for Gansu to adjust strategy and grasp opportunities for development.

After 10 to 15 years of development, Gansu will become a place with sustainable economic development, vigor and vitality and stable and harmonious society. Our major development goals are as follows:

Regional agriculture shows its leading function and enjoys coordinated development. And a layout fostering harmony between man and nature takes shape.

Agriculture should be market oriented and hi-tech driven. By 2020s, we hope that agriculture in Gansu should become modern and capital, knowledge and technology intensive and the three most important indices i.e. land output, resources utilization rate and productivity could reach national average of the same period.

We should focus our attention on building a batch of industrialized engineering projects with intensive technology and remarkable returns so as to lay a foundation for the emergence of new industries.

We should foster and expand our edge in seeds, potatoes, vegetables, fruits, traditional Chinese herb industries and malting barley, rough cereals, lily, day lily and oil olive. We should snatch more market shares and lay a foundation for the long term industrialized development of agriculture.

We should speed up the transfer of surplus rural labor force and try to realize the
stable increase of farmers’ per capita income by a large extent to 6,000 RMB Yuan by 2020.

Key projects of industrialized management of agriculture should be at the forefront in China. The contribution of science and technology to agriculture should be over 60% so as to realize agricultural modernization in all respects by 2020.

Great breakthrough will be made in anti-poverty campaign, and the proportion of poor population and low incomers in the total rural population should dip to 1% and 5% respectively.

Projects to protect eco-environment in Hexi area will see initial outcome. And the new socialist countryside can realize coordinated economic, social, cultural and political development, so as to get closer to the goal of building a moderately prosperous society in an all-round way.

2.2.3 Development Thinking

The work to develop modern agriculture and invigorate rural economy should start from changing strategy and implementing new development strategy.

The sound and rapid development of agriculture, rural areas and farmers relies on the transformation of the mode of economic development, which relates to the change of development of concept and the selection of development road and the innovation of development model. In essence, it is an issue of better developing undertakings related to agriculture, rural areas and farmers. Therefore, Gansu should take the change of mode of economic development as an important strategy to develop agriculture and rural areas. This is the requirement of implementing the scientific outlook on development, and it can help keep the good momentum of stable and fast development of rural economy, to promote the change from extensive to intensive growth of agriculture, improve the quality and efficiency of agricultural development and move the socioeconomic development onto the track of all-round, coordinated and sustainable development.

Gansuis is located at the convergence of northwestern dry area, Tibet plateau area and eastern monsoon area, spanning different regions with complicated climatic conditions and uneven distribution of water resources. We should take comprehensive consideration of rural socioeconomic development and the present development status based on the carrying capacity of land, water, soil and environment so as to optimize the strategic layout. That is to identify functional zones for agricultural development, i.e. to identify the leading function of different regions so as to guide local agricultural development. We should map out strong policy measures to form a layout where agricultural resources are effectively used, coordinated development of regional
agriculture is realized and the man and nature can develop in harmony.

Gansu is a region with special ecological function and important ecological position. Its ecological safety not only bears on the sustainable development of Gansu but also the ecological safety in China. Therefore, it is an important safeguard of sustained agricultural development in Gansu to strengthen agricultural eco-environmental development and protection to integrate the protection with utilization of agricultural resources, the protection of eco-environment with the prevention and control of pollution and to display the regional ecological, resources, agricultural industrial development edge and to create the production model of conservation and cyclical utilization of agricultural resources.

After reform and development, agriculture and rural economy has made great progress. Agricultural restructuring and high-efficiency agriculture has enjoyed in-depth development and there is a momentum of specialized production, green production and industrialized operation. Especially, with the quickening of industrialization, urbanization and IT application, agriculture has entered a new stage of development. In the face of the new situation, problems with the underdeveloped industrial structure, low efficiency and weak safeguarding capacity are more obvious. The agricultural system cannot meet the development demand of modern agriculture development in the context of market economy. Therefore, there is an urgent need to consolidate resources competitive edge so as to enrich, refine and upgrade the system and construct a new type of agricultural industrial system. To improve the industrial system is an urgent requirement and important guarantee of building a moderately prosperous society in an all-round way and speed up agricultural modernization, and also an important responsibility to change the function of agricultural and rural economic management authorities, improve working style and strengthen public service and management. In the present and future period of time, we should improve, upgrade and strengthen the building of 4 systems in agriculture, namely industrialized management system, scientific and technological renovation and extension system, public service system and rural management system.

2.2.4 Development Strategies

It is the goal of successive governments of Gansu to dramatically transform the weak, backward and disadvantaged position of agriculture, rural areas and farmers. After reform and opening up, the basic agricultural operation system was practiced across the province. Based on that, the provincial committee and government put forward different agricultural development programs at different stages of development while taking into account actual conditions in Gansu. In 1980, Gansu formulated the agricultural development principle of developing agriculture and livestock side by side, with the focus on agriculture, and developing agriculture, forestry, livestock, sideline industry and fishery in a comprehensive way, fitting into local conditions and
promoting general development with priority areas; in 1982, Gansu issued the strategic principle of growing grass and planting trees, developing livestock industry, transforming landscape and alleviating poverty and enriching farmers; in 1983, while launching the regional anti-poverty campaign, Gansu implemented the principle of taking the land road if the waterway is not workable, and finding other roads if the land road and the waterway all lead to nowhere, and Gansu also set an immediate target of stopping deforestation in three years and ensuring enough food and clothing in five years. In 1985, Gansu adopted a new idea to develop rural economy, i.e. integrating planting, breeding and processing, taking developing village and township enterprises as a breakthrough to invigorate rural economy, forging rural-urban synergy and interaction; developing and opening up and processing and increasing added value. In the latter part of the Eighth Five Year Plan period, given the uneven development of regional economy, Gansu put forward the development strategy of giving classified guidance, firstly, carrying out anti-poverty campaign, secondly, working for a moderately comfortable life and giving special help to the central region. In 1995, the provincial committee and government made the important decision of speeding up the development of pillar industry and integrated operation. Forest, fruit, livestock, vegetables, and agricultural product processing were taken as pillar industries, which can contribute greatly to the development of rural economy and the increase of farmers’ income. In 1997, Gansu launched the strategy of rebuilding Hexi.

After 2000, taking the opportunity of western development and China’s entry into WTO, Gansu followed the agricultural development policy of taking developing feature agriculture as the core and increasing farmers’ income as the objective. During the Tenth Five Year Plan period, Gansu developed 22 key agricultural industries and stressed the need to develop feature agriculture. In 2002, the provincial committee and government followed the idea of strengthening big enterprises and building big bases, developing big industries and taking big market share, and consolidated key agricultural industries and gave priority to the development of ten competitive industries, i.e. seeds, vegetables, potatoes, traditional Chinese herbs, brewery raw materials, quality forage grass, dairy products processing, beef cattle and mutton sheep, slim-pork pig and quality fruits. Since 2003, Gansu has implemented policies of the Central Government to benefit farmers and pressed forward the industrialized management of agriculture, developed county economy and labor service and increased farmers’ income.

Over the past thirty years, agricultural and rural development in Gansu was making progress. However, its gap with the other parts of the country was widening. The agricultural basis is still weak, income gap between urban and rural areas keeps widening, and conflicts of the dual economic structure between urban and rural areas are stark; with economic gaps between different regions expanding and no unique regional industry in place, coordinated regional development is a must and a daunting task; new pressures on the province’s agriculture and extensive economic growth
mode are on the horizon due to globalization and the deepening of the building of a well-off society. The agriculture and rural economic growth are still driven by huge consumption of resources instead of a cost-effective approach, and their quality and benefit are yet to be improved. In light of this, Gansu needs a new strategy to develop its agriculture and rural economy, which can be summarized as “change the growth mode, optimize geographic distribution, protect eco-environment, and improve industrial system.”

Strategy One: change the growth mode

To change the growth mode is to lead the agriculture and rural development into the trajectory of scientific development by expediting the building of modern agriculture under the guidance of modern development concepts, integrating it with the province’s industrialization and urbanization, bringing agriculture’s functions in economy, ecology, daily lives, and society into full play, using natural resources and production factors in a cost-effective way, and transforming the traditional agriculture into a modern one.

“Three Transformations” are essential to the change of rural economy growth mode.

Firstly, the driving force of economic growth should be shifted from mere investment to balanced consumption and investment. To boost the contribution of consumption to economic growth, farmers’ income needs a steady increase. Therefore rising farmer’s income is the very core of rural development, and to achieve this goal, township enterprises and county economy must be developed to provide more channels for absorbing rural labor.

The further progress in the building of a new socialist countryside and the healthy growth of urbanization is not only necessitated by the need to expand rural demand, but also an important way to transform the economic growth mode. Farmers take a large proportion in China’s population, promising huge potential in rural markets. To ensure a sustained, steady, and fast growth for the province-wide economy, issues relating to agriculture, farmers and rural areas must be put high on the agenda, farmers’ income increased through various ways, and rural markets, particularly rural consumption markets expanded by a great margin. The rural and urban dual economic structure needs to be replaced by an integrated one through coordinated rural and urban development and a long-term mechanism in which industry boosts agriculture and cities help the countryside. Large, medium and small cities as well as towns also must be developed in a balanced manner and rural labor surplus needs to be transferred to other areas orderly, which is very crucial for farmers’ income increase and domestic demand expansion.

Secondly, the backbone of rural economy should be transformed from a single secondary industry to balanced development of the first, secondary, and tertiary
industries. Since the beginning of the Tenth Five Year Plan, though all three industries in Gansu’s rural areas have witnessed big progress, basis for agricultural development is still weak, industry suffers from low quality, and the service industry is still lagging behind other provinces.

If the industrial structure is to be optimized and upgraded, the first industry must be consolidated, the tertiary industry strengthened and secondary industry lifted. A modern agricultural industrial system is also indispensable. The first task is to expedite the development of modern agriculture by strengthening and optimizing policies in favor of agriculture and farmers, equipping agriculture with modern tools, reforming it with modern technology, promoting it with modern management methods, developing it by training new types of farmers, promoting water conservancy, mechanization, and information technology application in agriculture, increasing land output rate, resource utilization ratio, and labor productivity, boosting the efficiency and competitiveness of agriculture, and developing unique and modern agriculture. The second task is to develop modern service industry in rural areas. More attention should be paid to production services including comprehensive transportation, modern logistics, finance and insurance, information service, technology service, business service etc. while household services continues its momentum of growth. The market force shall play the biggest role in the development of the service sector to realize commercialization and so that this sector can become the pillar industry in the rural economy. The third is to foster industrial cluster by strengthening township enterprises specialized in agro-processing and high technology industries, such as agriculture information, agriculture biology, and agriculture energy, stepping away from disadvantageous industries given the constraints resources and environment, and reforming traditional industries with high technologies to inject more vitality into rural industry.

The land development also needs to be optimized while more efforts should be made in rural industries restructuring. The overall strategy on regional development shall be carried on with more assistance channeled to old revolutionary bases, ethnic group inhabited areas and poverty-stricken areas. The dominant functions of agriculture for different regions must be identified as a guide for their agricultural development. The spillover effect of cities and towns shall play its role in helping nurturing new growth points for rural economy.

Thirdly, the basis for rural economy growth should be shifted from consumption of more resources to relying on progress in science and technology and competency of the labor force. Efforts should be made to promote the building of agricultural technology innovation and distribution system as a solid foundation for modern agriculture and rural prosperity. Human resources in rural areas are to be further tapped and equipped with more skills so that they can play their due role in economic growth. Education is a top priority as a means to boost the literacy of farmers, nurture innovative talents and provide a steady flow of human resources for the building of
modern agriculture. The social vitality in rural areas shall also be reinforced by expanding job opportunities and helping farmers start their own businesses.

**Strategy Two: Optimize Geographical Distribution**

More efforts should be made in land planning and geographical distribution. The province shall be divided into multiple regions based on agricultural functions and each region assigned with one dominant function. Regional policies need to be further improved to better the layout of rural economy. Division of labor and cooperation of industries shall be promoted to make use of each region’s comparative advantages so that they can be mutually beneficial as each will have a unique industry in dominance and be connected to one another by the market.

Based on the requirements of dividing the province into several types of functional zones including optimized development zone, priority development zone, limited development zone, and forbidden development zone, and pursuant to the Eco Functional Zoning of Gansu Province, we divide the province into recreational agriculture zone, suburban demonstration zone of modern agriculture, precision agriculture zone in Hexi Corridor, grassland agriculture zone in central Gansu, dry farming zone in eastern Gansu, cash forest zone in southern Gansu, grassland and stockbreeding zone in southern Gansu, and water conservation zone in the upper stream of the Yellow River and Chilien Mountain.

We also need to develop core competitiveness of agriculture so as to boost the benefits of agriculture and increase farmers’ income. More efforts should be made to establish a modern agricultural industrial system and integrate agriculture into the secondary and tertiary industries so that the three can reinforce each other. Competitive industries with specialty should be given priority to and strengthened and scaled up according to the requirements of regionalized distribution, macro-production, and industrialized operation. Special attention should be given to agro-processing backed by advantageous industries and the set-up of a market system for agriculture produce. Recreational and sightseeing farming in both cultural heritages and natural sceneries also calls for full attention.

As an important agricultural zone in the province, Hexi Corridor has become one of the seed bases of China, particularly for hybrid corn. The seeds of gourds, potatoes, and flowers are also produced here. It is also well known for beer barley, hop and grapes, which are raw materials for vintage. Grass-livestock, highland vegetables, edible fungus, high land aquaculture, and cotton are taking the lead in the local industries with advantages. However, the fragile eco-environment, scarce water resources, and land salination have resulted in widespread desertification in the Shiyang River and downstream of the Black River. Shule River was a latecomer in terms of development, but similar pollution is already there, as evidenced by Crescent
Moon Spring. Special attention must be paid to explore a joint development and operation process for reservoirs both on and under the ground so that part of the ground water can be transformed to underground water to feed the ecosystem in the downstream and protect the environment.

Strategy Three: protect the eco-environment

Eco-environment and its protection are critical to agriculture’s sustainable development. Gansu geographically is at the convergence of three natural zones of China, showing the features of the three zones and transitional belt. Soil erosion, desertification, drought, sparse plants, degenerated grassland, unevenly distributed water, frequent sand storms and other natural disasters all add up to a very daunting task of protecting the eco-environment. Efforts must be made to create optimal environment, promote green industries, and upgrade the competitiveness of agricultural products based on the Eco Functional Zoning of Gansu Province. It is also important to promote technologies for green farming, dry farming, water conservation and circular agriculture starting from key projects as a means to tackle pressing problems. Clean production shall be carried out to control non-point source pollution and ensure rural economy’s sustainable growth.

Production structures conducive to sustainable eco-systems shall be designed according to the particularities of different economic and environmental conditions. Oasis areas with abundant water, heat, and light shall be designed to protect the environment and increase output with less resources consumption; in rain-fed regions, the eco-system can be designed to keep water and soil and promote dry farming; in the outskirts of big and medium-sized cities, the design shall enhance the utilization ratio of land and increase output with less consumption of resources; in the transitional belt from subtropics to warm temperate regions of South Shaanxi and Gansu, the design shall make full use of the potential of mountains and forests.

Strategy Four: improve the industrial system

From a mid-and-long-term perspective, Gansu needs to improve and expedite the building of Four Systems of modern agriculture, namely, the industrialized business system, technology innovation and distribution system, social service system, and rural operation management system.

To build an industrialized operation system for agriculture, we must bear in mind the pressing need for balanced rural and urban development and modern agriculture. Led by market needs and driven by advanced technologies, we need to put emphasis on exploring markets, push ahead strategic restructuring to enhance efficiency and increase farmers’ income, give priority to building bases of unique agricultural
produce, foster champion enterprises and specialized cooperative organizations, bolster the organization level of agricultural production and farmers, improve technological and information services, boost the competitiveness of our agriculture produce in both domestic and overseas markets, and enhance overall quality and efficiency of agriculture and rural economy as a sound foundation for modern agriculture.

To build a technology innovation system for agriculture, we must give priority to upgrading agricultural technologies, commercializing research findings, and enhancing farmers’ technological competency; make efforts to boost the competitiveness of agriculture products, integrate technological resources, optimize structures, change existing mechanisms, set up a new platform for technology innovation, distribution, and training, featuring sound arrangement and high efficiency, reinforce the foundation, innovation and application of technologies so that this innovation and distribution system can provide technological support for modern agriculture and rural prosperity.

To build a social service system for agriculture, we must give more weight to the tertiary industry in rural areas. The service industry as the pillar in rural economy is essential to restructuring and transforming economic growth mode, critical to enhancing the efficiencies of resources, and conducive to a leap-forward of agricultural productivity. Efforts must be made to build and improve a socialized service system in rural areas, covering production and sales, technologies, information, quality and safety of agriculture produce, legal protection, animal and plant disease control, and finance before, during, and after agriculture production.

To build a business management system in rural areas, we must keep in mind the task of building a new socialist countryside and a moderately prosperous society, deepen our reforms and innovate existing systems to meet farmers’ needs. Farmers shall be an equal player in the market, have their fair say on the political stage, and enjoy similar treatment as every one else in terms of social security. Efforts must be made to strengthen the administration, enforcement, and oversight on land contract and collectively owned properties and accounting. Farmers are expected to be responsible for oversight and management, and specialized cooperative organizations shall also keep growing.

Section Three Strategic Priorities

3.1 Preserve and Enhance Comprehensive Grain Production Capacity and Expedite the Development of Quality and Efficient Grain Industry

For Gansu’s self-sufficiency, steady growth in grain production, revenue, and capacity must be ensured. It is important to upgrade the comprehensive grain
production capacity, protect farmland, stabilize sowing area, push ahead the “Action Plan for Technology-based Output Increase”, the seed project, as well as the plant and fertile soil preservation project; make more efforts to select and cultivate fine varieties, control major diseases, build standard cropland, and promote modern equipment; give priority to unique grain production, including quality wheat for special use, corn seeds, potato and other grain for special use, improve infrastructure construction and farmland cultivation in areas returned to forests, enhance physical preparedness against risks, and guarantee a steady growth of the comprehensive grain production capacity.

Efforts must be made to accelerate the integration, distribution, and application of key technologies in key regions for key crops at key links so as to provide technological support for promoting unit output and quality. Enterprises engaging in agriculture produce processing, seeds marketing, and agriculture technology must be built and upgraded. Stockbreeding is expected to gain more support as a driving force for grain processing.

Considering the water resources distribution, eco-environment restoration, and sustainable development strategy, we also need to rely on the market to make up for the grain shortage.

3.2 Transform Production Mode and Build Grass-feeding Stockbreeding into A Strategic Leading Industry

Thanks to the huge development in the Tenth Five Year Plan period, the mode of production of grass-feeding stockbreeding is undergoing enormous change, taking on features as a leading industry, and contributing to income rise for farmers.

Grass-feeding stockbreeding is meant to meet the needs of rural economic development and people’s ever-increasing living standards. Guided by the scientific outlook on development, it aims at increasing farmers’ income. So efforts must be made to enhance the comprehensive production capacity of stockbreeding, push forward restructuring, change the mode of production based on the particularities of different regions to achieve scale economics and high quality, expand breeding scale, and raise the rate for sale. The strategy is aimed at bringing the industry into a virtuous cycle featuring high output, quality, and efficiency as well environment-friendliness and safety by building famous brands, opening up bigger market, creating more benefits.

To reinforce this industry, priority shall be given to grassland protection, feeding grass cultivation, fine varieties breeding and supplying, high-quality livestock
products producing, quality and safety inspection, deep processing, technologies distribution and animal protection, as well as modern marketing and market cultivation.

3.3 Push Ahead Agricultural Restructuring and Develop Industrialized Operation

The mix of agricultural produce should be optimized. Efforts must be made to adjust the varieties so that every village can have a unique one. Products with high-quality, unique characteristics, and high added value shall be put more emphasis on. Crops and livestock must be updated more quickly. Products with unique edge shall be channeled to advantageous regions. In terms of food crops, varieties with high quality and for special use should be given priority to, and for economic crops, technologies must be fully applied to enhance their competitiveness. Grass-feeding and food-saving livestock, the dairy industry, meat cows and sheep, quality poultry and wool production shall be given more weight to.

Regional arrangements for agriculture should be optimized. More efforts will be made to promote the building of industrial belt of competitive farm produce and foster regionalization of agriculture production. A host of bases for competitive products of large scale and stable market demand will be established in identified industrial belts. Skilled planters, culturists, and machine owners will be fostered. Champion enterprises in terms of agricultural industrialization will be encouraged to build raw material bases, improve the infrastructure including producing, processing, information and markets, and develop a variety of business modes. Agriculture with uniqueness, green agriculture, organic agriculture and ecological agriculture will also be supported. More efforts will be channeled to building bases of production, processing and export, protecting famous brands, and fostering leading industries.

The industrialized management of agriculture should be pushed ahead. We shall extend the industrial chain of agriculture and push forward industrialization. Efforts must be made to foster role models such as leading companies and demonstration bases with high competitiveness. Leading companies must be guided and encouraged to forge stable relationship with farmers by building standardized production bases and developing order agriculture. A revenue sharing system shall be established and improved to spread more benefits from industrialized operation to farmers. Meanwhile, farmers will also be encouraged to form all kinds of specialized cooperative economic organizations and forge diversified cooperation before, during, and after production. These organizations shall play a very positive role in policy delivery, technological services, communication, and products distribution.
3.4 Accelerate the Setting-up of Advantageous Industries and Develop Deep Processing

Township enterprises will be encouraged and supported to develop processing industry and its supporting industries, including the storage, preservation, and delivery of farm produce, so that different industrial zones for producing and processing will gradually take shape. Factors such as capital, technology, equipment, and talents are encouraged to flow to advantageous areas and towns so that the processing industry can be adjusted to its best position. R&D centers and project technology centers for processing will be set up to promote innovation. Processing enterprises will be organized for technical upgrading and innovation so that their capacity in deep processing and comprehensive utility will be enhanced. Demonstration companies will be fostered and products and industries characterized by high-level technology application, deep processing, long industrial chain, high added value, stronger exportability, and those that are better prepared for comprehensive utility and circular economy will be put more emphasis on. Township enterprises are encouraged to become champion companies in agriculture’s industrialization and form a benefits sharing system with farmers. These champions will set up processing bases according to market demand, and these bases will be connected to farmers with the help of intermediaries. Champion companies are also encouraged to provide training and marketing service for farmers. Processing enterprises are expected to introduce corporate governance and expand their scales to become more profitable and competitive.

Priorities and Distribution:

Wheat and corn industry. Industrialized operation for wheat growing and wheat products processing in wheat growing areas, including Hexi Corridor, Yellow River banks, East Gansu, and Hanyuan and Shuichuan areas in South Gansu (including Tianshui), shall be given more attention to. Corn processing industry shall be encouraged in Hexi areas, Yellow River banks, suburbs, Shuichuan, Tianshui, Longnan, Pingliang, Qingyang, etc. More efforts shall be made to cultivate and develop high oil corn and quality protein maize, and other corn food, industrial materials, and high value-added products, including corn powder, corn steep liquor, corn gluten meal, fiber dregs or corn husk, corn embryo, corn starch, modified starch, citric acid, starch sugar.

Seeds industry. Primarily in Hexi Corridor. Wheat, corn, potatoes, vegetables and fruit, beer barley, herb, high-quality forage grass that can grow in the Hexi areas, arid areas in central and eastern Gansu, South Gansu and cold and moist areas shall be cultivated with the help of advanced technologies, equipment, and fine varieties both home and abroad. The purpose is not only to meet local needs but also to expand
these fine varieties to other parts of the country and build Hexi Corridor the largest seeds base and market in the northwest of China.

Potato industry. Primarily in potato growing counties and districts of Dingxi, Baiyin, Lanzhou, Tianshui, and Longnan, efforts must be made to make use of the established virus-free potato breeding system and build a host of raw material bases for potato processing, develop potato products including potato starch, modified starch, potato powder, stackable potato chips, and frozen chips. The purpose is to add value to the crops by multiple processing and achieve industrialized operation, make the province the biggest virus-free potato base, and commercial potato producing and processing base in China.

Vegetables and fruit industry. Vegetables are primarily grown in Hexi Corridor, Yellow River banks, basin of Jing and Wei River, and Huicheng Basin; gourd vegetables in Hexi and central Gansu; fruit in Qingyang, Pingliang, and Tianshui; dried fruit in Tianshui and Longnan. Efforts will be made to build an industrial system covering management before harvest, processing after harvest, storage and preservation, processing, and sales.

High-quality forage grass industry. Primarily in Hexi area, dry area in the center, and Longdong area. Efforts must be made to develop high-quality forage grass processing industry to meet the needs of the breeding industry. And it is expected that the forage grass be processed to granules and for special use. The abundant crop stalks shall be made full use of to develop forage processing industry and enhance the value of crops.
Meat cattle and sheep industry. Primarily in cattle and sheep breeding areas of Hexi Corridor, Baiyin, Pingliang, Qingyang, Linxia, and Gannan, efforts must be made to develop cattle and sheep processing, fine varieties breeding, and the building of source bases. Meat processing shall be oriented to mechanized butchering, deep processing, cold storage, and comprehensive development. Fresh meat products shall be made into chilled meat and put into small packages. Cooked meat must give people more choices, be rich in nutrition, meticulously packaged, easy to keep and eat. Products made of the head, hoof, tail, and innards of cattle and sheep must be developed and provide materials for biochemical medicine so that more value can be added to these livestock. Meat products processing enterprises are encouraged to be part of the food distribution network, and sell processed products through supermarkets and chain stores. Bones and furs shall also be utilized to reduce pollution and enhance economic benefits.

Beer raw materials industry. Primarily in Hexi Corridor and cities of Baiyin and Lanzhou. Driven by beer manufacturers such as Jianiang Beer Group, efforts must be made to develop raw materials industry so that the two can be mutually reinforcing and build the province one of the bases for beer materials of the country.

Traditional Chinese Herb industry. Primarily in herb growing cities of Dingxi, Longnan, Zhangye, and Pingliang, efforts must be made to standardize the growing of herb and build a host of GAP growing bases. Efforts should focus on research and development of health-care products made from herb to expedite the industrialization of herb extracts and granules. Supercritical CO2 extraction and other modern technologies shall be applied in herb production to develop new medicine. The purpose is to build Gansu into an important herb producing, processing, and logistics hub in China.

Dairy products industry. Primarily in cities of Lanzhou, Baiyin, Linxia, Gannan, Hexi, efforts must be made to restructure the product mix, control the quality of fresh milk and dairy products, and develop new products targeting different consumer segments. Milk sources must be expanded, large-scale cow bases developed, scattered-feeding cows and sheep centralized, mechanized milking encouraged, cold chain facilities improved, and standardized, high-quality milk source bases established. Emphasis shall be given to liquid milk, long-life milk, sterilized milk, a variety of yogurt drinks, milk deserts, immune milk, functional milk, and flavor milk. In big and medium sized cities, priority is developing liquid mild and related products. In milk source areas, priority is to develop dehydrated dairy products and related products. Efforts will also be made to implement the “Milk for Students” plan as a support for the government’s nutrition plan and promote people’s living standards by introducing dairy products to the diet of its people, rural residents in particular.
3.5 Develop Hi-tech Agriculture\textsuperscript{15} and Transform Traditional Agriculture to Modern Agriculture

Hi-tech agriculture in Gansu mainly refers to facility agriculture, agricultural biotechnology R&D and the agricultural information industry.

3.5.1 Promote Intensive Farming by developing facility Agriculture

Facility agriculture is the most vigorous industry in rural areas in the twenty-first century. Since China’s reform and opening up, particularly since 1990s, facility agriculture in Gansu has witnessed huge progress, reaching a total of 305,200mu\textsuperscript{16} in 2005. New development is around the corner and some regions are in very good position.

Based on the climatic and eco-environment resources, we can make arrangements for installation agriculture, build production bases in energy-conserving places with most convenient transportation, and realize industrialization. More progress is expected to be scored in building structure, materials projects and water and power conserving projects. Supporting facilities’ capacity is also expected to grow.

More efforts must be made to breed new varieties for installation cultivation, improve the management on cultivation and increase unit output, standardize the installations and products, including the performance, structure, design, setting, building, and use standards of greenhouse and supporting facilities, cultivating techniques and producing procedures, products quality and inspection specifications, etc. Research and development on processing techniques also need more attention, including cleaning, classification, pre-cooling, processing, packaging, storage, and delivery, so as to increase added value and competitiveness on the international market.

Facility agriculture must be integrated with computer control technologies to automatically control light, heat, water, fertilizer, air and working machine. Information technologies are also to be incorporated to set up a management network.

\textsuperscript{15}Scientific agriculture is to take the development of modern science and technology as the basis and modern agricultural science and technology as the approach, take maximizing economic, social and ecological returns as the target and increase science and technology’s contribution to agricultural development through applying science and technology into pre-production, production and post-production stages. In this way, the agricultural industrial chain can be extended and new agricultural scientific industry can take shape.

\textsuperscript{16}Extending Sunlight Green House Production Technology across Gansu by Crop Plantation Division of Department of Agriculture and livestock in Gansu. Gansu Agriculture Edition 23, 2006.
on products, technologies, and market and provide distance service. Biotechnologies are also encouraged to be integrated with facility agriculture to develop new long-keeping varieties with stronger stress resistance, pest resistance, and high yield so as to boost the output and quality of greenhouse crops. Biological agent, pesticide, and fertilizers shall be made use of to develop precision agriculture, enhance land use rate, productivity, and quality crops output rate, and provide more pollution-free, safe and healthy food to the society.

3.5.2 Develop Bio-agriculture Industry and Change the Driving Force of Agriculture from Resources to Technologies

The hi-tech reform in agriculture, mainly biotechnology and information technology, is transforming the driving force of agriculture from resources to technologies. The strategic priority of the province is to develop hi-tech industries, foster biotechnological industry as the pillar in the hi-tech field and the economy.

Gansu is rich in biological resources, has a fairly established R&D system, a group of specialized talents, and a well-developed industry. The agriculture biological industry has been put on top of the agenda. Efforts will be made to create favorable environment and make use of unique resources and technologies led by system and technological innovations to expand the scale of the industry and bring the market into play. New breakthroughs are expected to be made in key technologies and products to meet the great demand. More attention should be given to biomedicine, bio-agriculture, bio-energy, bio-manufacturing and environment protection to protect and develop biological resources and reinforce the biological safety management system. Priorities are listed as below:

a. Biomedicine and new medicine industry. Priorities will be given to vaccines, genetic engineering drugs, and biological herbs based on the abundant herb resources in Dingxi, Longnan, Hexi, and Gannan as well as Gansu’s comparative advantages in biological pharmacy. Biological diagnosis reagent, blood products, and biochemical drugs will also be developed. Vaccines for common diseases and major diseases in China will be developed to update the existing bank, and change the whole-cell, univalent, injecting and preventive vaccine to genetic engineering, multivalent, oral, and treatment vaccine. With respect to genetic engineering drugs, more efforts will be made to expand the application of new dosage form of recombinant protein, develop new genetic engineering products while boosting the production and sales of existing products. As to biological herbs, efforts will focus on accelerating the application and innovation of modern biotechnology and theories in traditional herbs, build a theoretical system for biological herb, and develop new technologies that have the merits of both modern herbs and bio-pharmacy. In the field of modern herb industry, more weight will be given to standardized herbs and set up herb bases by planting herb, processing herbal medicine, developing new drugs, building common technology platform, etc. New herbal products with proprietary IPR are encouraged
through adopting biotechnologies, compound extracting technology, high throughout screening technology, standard testing, and other advanced technologies, so as to expand the size of traditional Chinese herb products with good effect and in large numbers. Independent research and development and innovation will be promoted to establish a platform for modern herb development and quality control and enhance the herb industry’s creativity and competitiveness.

b. Agricultural biology industry. New technologies, such as modified genetic technology or molecular mark-assist modifying technology, embryo biological engineering, fine genetic breeding technology, industrialization breeding technology, safe biological forage, and microorganism agent, shall be developed based on the province’s comparative advantage in biological agriculture to expedite the growth of key sectors, including fine seeds breeding, livestock embryo engineering, bio-pesticide and fertilizer, and bio-preventative technology. Surrounding Hexi area, industrial bases for agricultural biotechnologies shall be set up to foster a cluster of modern agricultural enterprises with integrated techniques, outstanding advantages, and big markets. Major industrialization projects, such as the deep processing of corn and potatoes must be accelerated to make full use of the by-products of agriculture.

c. Industrial biology industry fed by agriculture produce. Efforts must be made to develop organic acid through transforming the traditional industry by biotechnologies and developing new products, including amino acid, diaminocaproic acid, glutamic acid, L-lactic acid, and polylactic acid; industrial enzyme preparations including cellulase, amylase, glucoamylase, and lipase; as well as food additives and healthcare products including high fructose, malt sugar, oligosaccharide, xylosic alcohol, etc. Products with high added value including granulesten, soya protein peptide, and isoflavones shall be encouraged and the development of biological materials and energy also must be accelerated.

3.5.3 Expand IT Application in Agriculture

The application of information technology in agriculture is an important component of modern agriculture. Progress has been scored in this field in Gansu, but we still lag behind developed countries in the research and application of agricultural information technology. For example, information standardization is yet to be realized as the legal system is not well established; information resources cannot be fully shared as the application and development of agricultural information is not centralized; large amount of information resources are underexploited without adequate commercialization of information technology achievements; high-quality database is not enough and the sharing system between each of them is yet to be improved; redundant construction is commonplace; information technology is not fully utilized
in agriculture’s industrialization; e-commerce for agriculture has not taken off and e-governance needs further improvement; human resources with adequate competency are in short supply.

Three priorities in the application of information technology in Gansu are as follows: first, apply information technology in the industrialization of agriculture, accelerate the upgrading of traditional industries, elevating the overall quality of agriculture-related industries, and bring technological progress into full play in modern agriculture development; second, strengthen the building of e-governance, encourage the government to change its functions, build up its capabilities in decision-making and administration, and enhance working efficiency and service quality; third, expedite the building of e-commerce, build and improve the modern logistics system for agriculture produce, cut down cost and raise benefits, and be more competitive in the global market.

The focus is to improve the monitoring and pre-warning system for agriculture, provide information for various sectors and the general public on agriculture management and decision-making; improve the monitoring system for agriculture produce and means of production market, strengthen market supervision and ensure safety both in production and in agriculture produce’s quality; improve the information service system for rural market and technology, provide accurate and timely information for market players; improve the information collecting system, build a service platform for agriculture information (including information service stations in towns), train a group of talents specialized in information technology and improve the information administration system.

Information network application system should be built and developed to support scientific management and sustainable development of agriculture. The network should include: emergency information system for animal disease control, surveillance and report system for regional agricultural resources, evaluation system for agriculture production, disaster report and analysis system, forecast and report system for pest control, pest and disease control expert system, etc. Various types of management and functional support system for agricultural production should be established and developed, in order to promote comprehensive agricultural production capacity. The system should include: growth simulation and expert system for crops in various regions, optimum irrigation consultation system, crop fertilizer consulting system, breeding livestock and poultry database management system, automatic management system for large-scale farms, stocking density research and production plan design for intensive animal industry, etc. Logistical information system for agriculture produce and agricultural E-business platform should also be established and developed to boost IT application in agricultural enterprises and improve agricultural markets.
3.6 Develop resource-conservation agriculture to promote sustainable development

Resource and environmental constraint will be a serious challenge for future development of Gansu’s agriculture. To meet the requirement of building an energy-efficient and environmentally friendly society, we should promote circular economy, and make limited natural agricultural resources sustainable.

3.6.1 Boost grassland development and crop planting together to make the two complimentary.

In Gansu, agriculture production is generally sole crop production, which neither makes full use of the land, solar energy and water, nor let the land rest. Unsophisticated crop-planting, which does not compensate organic substance to the soil, will cause degradation of land fertility. In addition, it consumes large amount of water, causing lack of water in grassland and local environment, leading to ecological degradation. In response, the province should actively promote the development of grassland-crop system, combining crop production with grazing grass production, and encouraging deep-processing industry which uses animal and plant products as raw materials. Such a system will increase the agriculture and husbandry production by multiple times, fully utilize natural resources such as water, land and light, and at the same time, protect and restore ecological environment efficiently. The priority should be placed on projects or products that consumes little water and have high yields. In the past, emphasis was placed on crop-dominated agriculture, now it should be shifted to grassland agriculture which focuses on grazing-grass growing for animal husbandry, greenhouse planting and commercial husbandry production. Farmers should be educated to be more conscious of water efficiency, so as to get the maximum return possible from limited water resources.

3.6.2 Establish a modern water-conservation technology system to promote water-efficient agriculture

Lack of water resources is a long-term constraint for Gansu’s agriculture development. Water conservation should be emphasized and water-efficient agriculture should be promoted. The development of water-conserving agriculture should take water security, food security and ecological security as the strategic targets; focus on improving water-efficiency; strive to develop water-conserving plant
structure, increase agricultural output and farmers’ income, and improve ecological environment of farmland. Special attention should be paid to establishing and improving a modern water-conserving technology system. While strengthening technological innovation, key equipment and major product for water-saving that suit the specific provincial condition should be applied and commercialized, and various types of technology-cluster models should be developed according to various specific local conditions. Efforts should be made to achieve breakthroughs and innovations in biological water-conservation, non-traditional water resource development, precise control of water management, and commercialization of water-saving products. The objective is to make Gansu’s agricultural water-conservation technology to reach the domestic advanced level, and establish a modern agriculture R&D system that boasts independent innovation capability for water-saving technologies.

Priorities in the development of water-saving agriculture: 1. Apply comprehensive water-saving methods to accelerate the development of water-conserving agriculture. By establishing a comprehensive system for research and application of water-saving technology, water conservation in engineering, farming, biology and management will be integrated. Equal emphasis should be placed on water-saving in irrigation and dry-land farming. Existing water-saving techniques should be combined and integrated with new high-techs to speed up application of those technologies and development of relevant engineering. Profits generated through industrial and residential water-saving should in turn support agricultural water conservation, further alleviate water constraint in this province, and promote the overall development of a water-efficient society. 2. Upgrade traditional technologies to improve the agricultural water-saving technological system. Efforts should be made to strengthen research on traditional field irrigation, farming and welling techniques, and upgrade them into precision surface irrigation technique, high-performance fined-tuned sprinkling irrigation technique, effective water-saving chemicals and materials, etc. 3. Develop water-conservation industry. There are two pillars for this industry: one pillar is water-conserving products and equipment, including sprinkling irrigation equipment, anti-drought machinery, and laser control equipment in farmland leveling, canal lining machinery, canal and pipe water measurement instrument and equipment, precision control irrigation equipment for crops, etc. The other pillar is water conservation chemicals and materials, including agricultural chemicals, agricultural liquid membrane, canal seepage control, pipes for agricultural water supply and distribution, etc. 4. Build a new platform for technological innovation. The province should strengthen platform-building for water conservation, increase input in relevant information surveillance and scientific research bases, carry out show-case projects of high-performance water-conserving agriculture and commercial projects of agricultural water-saving technologies, apply and spread effective agricultural water-conserving technologies and products.
3.6.3 Development of agricultural circular economy

According to the philosophy and basic principle of circular economy, the priority of the development of agriculture is to conserve energy and resources, such as land, water, seeds, fertilizer, chemicals, electricity, oil, grain, etc. The input of resources and energy should be reduced, in a bid to establish a resource-saving agricultural production pattern. Furthermore, agricultural circular production pattern should be developed to build circular industrial chain, and try to shift the agricultural production from a one-way linear economy with the “resource—products—pollution” cycle to a self-rewarding and circular economy with multiple “resource—products—renewed energy” cycles.

Key circular agricultural production patterns that should be vigorously promoted:

a. Circular economy combining crop-planting with animal husbandry. It is the most typical circular agricultural development model. It has a long circular chain involving multiple sectors, contributing to full utilization of resources. The bio-gas project serves as the linkage between crop-planting sector and animal husbandry sector, forming a circular industry chain of “plantation—animal husbandry—bio-gas—plantation”. The most typical models include “four sectors integrating into one” and “five matching sector”, etc.

b. Circular economy featuring deep processing industry. Firstly, emphasis should be placed on the research and development of circular agricultural processing industry and the extension of the industrial chain, with plantation (crops, forestry) processing as the priority. Efforts should be made to promote feed industry based on grain-processing; encourage mushroom culturing based on forest products processing; and strengthen R&D on other plant products processing. Secondly, R&D should be strengthened on the economic model and extension of the industrial chain of the circular economy featuring deep processing industry. Advanced technology should be applied to enhance resource efficiency. Deep processing industry should be boosted,

17 The notion of circular economy is brought up by the American economist Boertin. Circular economy emphasizes harmonious relations between economy and ecology, and aims at achieving maximum development effect with minimum resource consumption and pollution through renewal and conservation of resources.

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with new products constantly developed to extend the industrial chain of major products. R&D and processing of animal by-products, such as animal organs, blood and fur, should also be stressed, as many of those by-products may become valuable high-grade commodities after processing. As for those animal wastes that cannot be utilized at present, they should be put together for biogas engineering to provide clean energy for the rural area, and the biogas dregs and liquid should be used as organic fertilizer for field crops.

c. Other types of circular economy. Other types of circular economy mainly include models such as crops-fishing, crops-forestry, animal husbandry-fishing, animal husbandry-forestry, etc. More specifically, there are industrial chains like: "timber processing—wood dust processing—base substance for cultivating mushrooms—mushroom production—mushroom wastes—organic fertilizer"; "crop straw—straw gasification—energy for rural areas"; "crop straw—methane from straw fermentation—wastes—organic fertilizer"; "crop straw—paper-making from straw—wastes—organic fertilizer", etc.

3.7 Develop labor economy to achieve leapfrog development of rural labor transfer

One of the strategic priorities of Gansu’s social and economic development is to accelerate the labor economy development. The overall scale and benefits of labor economy should be further expanded. Experience of labor economy development should be earnestly accumulated in the context of provincial, national and international economic development, so as to explore new horizons of labor service economy. Firstly, emphasis should be placed on both inter-and intra-provincial labor market development to realize multi-channel transfer of surplus labor force. Efforts should be made to reinforce existing labor force export bases, expand new labor market in other provinces, explore international labor cooperation, while digesting intra-provincial labor transfer. Seasonal labor supply in the province should be stabilized; regular long-term labor supply to the Pearl River delta, Yangtze River delta, Bohai-Rim economic belt and Xinjiang should be vigorously expanded; and overseas labor market in Central Asia and Southeast Asia should be explored. While encouraging surplus labor force to be transferred to non-agricultural sectors, efforts should be made in adjusting agricultural structure to fully tap the employment potential.

Secondly, strive for mutual openness in urban and rural areas, which requires rational and orderly organization of and guidance for farmer to engage in urban secondary and tertiary industries, and mobilization of urban workforce to participate in comprehensive rural development, in a bid to resolve employment problems through interaction of urban and rural labor force. Thirdly, equal attention should be paid to
outflow and return of local labor force. While organizing large scale labor outflow for employment, measures should be taken to attract outside financial and knowledge resources. The labor force with capital, managerial expertise and entrepreneurship should be welcomed and encouraged to start business to develop local economy. Fourthly, government guidance and market operation should both be utilized. In accordance with the guideline of “independent choice of the job-seeker, market regulation of the employment, and employment facilitation by the government”, government guidance and management should be fully utilized; legitimate intermediary agencies and job-seekers should be both motivated to solve employment problems; and market mechanism should be fully used to promote employment. Fifthly, organic development featuring brand strategy should be promoted. Labor export should be promoted through organized, commercial manner with brand consciousness, so as to reduce cost and market risk, and enhance credibility, scale and benefits of labor export.

3.8 Step up poverty reduction and development efforts, and improve the village-based measures and mechanism of poverty reduction and development.

Special attention should be placed on villages with large amount of poor population. Village-based comprehensive poverty-alleviation development with priorities on “three basics” (namely infrastructure, basic industries and basic quality of the population) should be implemented in accordance with specific local conditions. For poverty-stricken regions with basic living conditions, emphasis should be placed on improving the primitive production and living conditions, developing characteristic industry, and implement development-oriented poverty alleviation programs. Assistance mechanism should be established for the poor population with disabilities. For poor population in regions lacking basic living conditions, they should be relocated to other areas for poverty alleviation. Education aid should be provided for students from poor families. Through enforcement of 9 year compulsory education and skills training, inter-generation poverty persistence could be prevented. Integration of general education and vocational training should be promoted so that poor population could command employment skills. Fiscal input for poverty reduction should be increased, and small loan projects for poverty reduction should be continued, so the poverty-stricken regions can enhance their capacity of lifting themselves out of poverty. The Party and government organizations should pool their resources to combat poverty; while enterprises, social groups, NGOs and individuals should also be encouraged to engage in poverty-alleviation programs.
Section Four Strategic measures and action plans

4.1 Strategic measures for rural and agricultural development

4.1.1 Study and formulate the regional planning of provincial agricultural functions

In 2004, the National Agriculture Resource and Regional Planning Office of the Ministry of Agriculture launched the program of “planning on rational utilization and protection of agricultural resources”, an important task to conduct nationwide studies on agricultural functions and regional planning. Such national research provides guidance for the Gansu province to study and formulate regional planning of provincial agricultural functions.

Establishment of major function-oriented zones is a new measure stated in the Eleventh Five Year Plan. As the basis for the planning of major provincial function-oriented zones, regional planning of agricultural functions is a prospective work, which holds great significance for the Province to stick to the orientation of modern agriculture; prioritize functional, institutional, and technological innovation; optimize comprehensive agricultural production; expand social service and stabilize ecological functions; step up agricultural structure adjustment; substantively shift agricultural development pattern; promote scale, modernization and market operation of agriculture; and improve agricultural infrastructure and industrial system.

4.1.2 Accelerate institutional building of modern agriculture

First, institutional building for agricultural investment should be promoted. Modern agricultural requires considerable amount of investment. Apart from the investment of farmers, external inputs are also needed. In recent years, a variety of measures are taken to establish investment institutions for agriculture. For instance, the Central Government and local governments above county level are required to keep the investment growth rate above the general fiscal revenue growth; national fiscal expenditure, budgetary fixed assets investment and credit extending should be made according to the principle of adjusting principal assets and channel increased inputs mainly to agriculture; the increased national expenditure on education, public health and cultural programs as well as fixed assets investment should be mainly used in rural areas, and the proportion of government revenue from land transfer used for rural programs should be increased. The institutional building of rural investment includes: stabilized national input growth mechanism for agriculture; state investment and assistant measures for farmland water conservancy works and other infrastructure;
subsidies for advanced seeds and other modern production factors; incentives for social resources to invest in agriculture; financial service institution that fit agriculture and rural areas, etc. The aim is to establish a modern material supporting system for agriculture.

Second, institution building for agriculture operation should be facilitated. The double-layer management system that integrates unified and separate management on the basis of household contract operation should be stabilized and improved; the land system and operation pattern of “company plus farmers” should be further improved. The aim is to establish the micro-management foundation for modern agriculture.

Thirdly, institutional building for training of farmers should be bolstered. Modern agriculture requires educated new type of farmers with rich knowledge and skills. Compared to other sectors, the inner division of labor of agriculture is relatively low. Generally speaking, farmers need to command various kinds of tasks, such as truck driving, agriculture machinery repair and maintenance, diagnosis of regular plant disease and pests, production management, information research on the Internet, analysis of the future market, contact with wholesale market, etc. Institutional building in this regard includes education system for agricultural vocational skills, subsidy system for various rush-courses, etc. The objective is to produce a new type of farmers who have knowledge, skill and know how to manage business.

Fourthly, institutional building for agricultural circulation system should be boosted. As a highly commercialized industry, modern agriculture depends on market access to purchase input and sell output, so a sound market circulation system is an important foundation for modern agriculture. Since the launch of reform and opening-up program, Gansu Province has gradually implemented reform on agricultural produce and resource circulation system, and achieved remarkable results. However, it still remains an arduous task to establish a circulation system that fully fits the development of modern agriculture. Institutional building in this regard includes abolishment of regional blocks in the circulation of agricultural products; improvement of the market system of agricultural wholesales and futures; development of chain store supply and other new types of circulation, etc. The aim is to establish a high performance modern network for agricultural circulation.

Fifthly, institutional building for the R&D and dissemination of agricultural technology should be furthered. An important aspect differentiating modern agriculture from traditional one is the way how production technology is generated and disseminated. Modern agriculture is a scientific sector whose technology is based on scientific experiments, and the technology advancement is increasingly fast, involving more and more fields. Institutional building in this area includes establishment of innovation system for agricultural science and technology; subsidy system for dissemination of major technology achievements; expenditure guarantee
system for grass-roots public technological services, etc. The target is to establish a modern technological supporting system for agriculture.

Sixthly, agricultural risk prevention system should be built. In early stages of industrialization, prevention of agricultural risks focuses on farmland water conservancy works and other infrastructure, which are very necessary and requires long-term building in the future. With deepening of industrialization and changes in socio-economic structure, better risk prevention system has become an important component of modern agricultural development. Institutional building in this field includes: improvement on emergency response system for natural disasters; improvement on prevention and control mechanism of serious animal epidemics as well as plant diseases and pests; establishment of policy insurance system for agriculture; better grain and cotton reserve system and floor price for grain purchase; improved market regulation on agricultural products export and import, etc. The aim is to establish modern agricultural risk prevention system that can effectively fend off both natural and market risks.

4.1.3 Improve rural market system and develop logistics industry that meets the requirement of modern agriculture.

The establishment of market system for agricultural products should be accelerated. Wholesale markets and designated markets in the origin place of agricultural products should be developed; various types of players of the agricultural products market should be fostered; market functions should be improved; areas of market operation should be expanded; the quality of products on the market should be graded; and the packaging should be standardized. The logistics system for agricultural products should be promoted. A rational, comprehensive provincial agricultural logistics network should be established with wholesale markets as the core, and with retail markets, chain supermarkets, convenient stores, self-employed stores as the base. An inter-provincial logistics system which integrates production areas with sales markets will also be gradually established. The “green channel” network for fresh and live agricultural products should be improved to connect cities and counties within the Province. Modern logistics, such as direct sales and supply, chain store operation, E-business, should be actively promoted, so as to form new mechanisms that combines inter-and –intra provincial sales as well as domestic and international sales of agricultural products.

Rural logistical industry system building should be strengthened. A chain supply management system of agricultural production resource should be established with the provincial-, city-, and county-level agricultural resources companies as the leading force; regional supply distribution centers as the backbone; local supply and marketing cooperatives and village service stations as the base, featuring centralized
procurement and distribution. Centering on regional characteristic advantageous industries and based on existing sales companies, processing enterprises, wholesale markets and professional cooperatives; the procurement, processing, storage and sales of agricultural products can be integrated to form a completed logistical service industry for agriculture products. Chain management system of consumer goods should be improved to gradually achieve consolidated procurement, centralized distribution, and standardized label and service. Operation network for renewable resources should also be upgraded to establish a scientific, orderly and scaled trading market which has clearly defined functions and provides multiple services such as storage, distribution, primary processing, trading, and information collection and disclosure.

Agriculture sector should be further opened up to the outside world. International trade of agricultural products should be further promoted. Agricultural processing enterprises should be guided to accommodate internationally accepted trading rules. Support should be given to export of labor intensive products such as horticulture products, husbandry products and special local produce. Existing target markets should be stabilized and potential market should be tapped to enhance international competitiveness of Gansu’s agricultural products. International cooperation and exchanges should be strengthened and capacity building guaranteed to constantly expand channels of cooperation and exchanges with the outside world. Overseas advanced technologies, human resources, capital and service should be rigorously introduced to promote the upgrading of local agricultural technology and industry, and to expand market space for Gansu’s agriculture.

4.1.4 Establish rural financial system to ensure successful building of a new countryside.

To solve the tough problem of rural financing, measures should be taken from a variety of aspects such as financial system, financial environment and policy support.

Assistant measures for county-level financial institutions should be made to support pro-agriculture credit extending. By establishing compensation mechanism for pro-agriculture credit lose, deposit insurance system for financial agencies and agricultural insurance system, the business tax and income tax on rural financial agencies’ “rural, agricultural and farmer” related operations will gradually reduced and abolished. Policies such as interest discount should be implemented to support the development of rural areas, agriculture and farmers, in a bid to achieve leverage effect by combining fiscal support with financial resources.
The deposit-lending proportion of county-level financial institutions should be specified to make county-level financial resources to return to local agricultural development. There should be explicit provision that requires commercial banks to use certain proportion of their deposit from rural households as pro-agriculture development loans, in order to change the phenomenon that county-level commercial banks are purely “deposit-taking” institutions. If the banks could not make the shift, they should gradually withdraw from the rural financial market. After the postal saving offices have been reformed into postal deposit-taking banks, they also should reinvest certain proportion of the deposit to rural areas. Only in this way can the rural financial market be better cultivated.

Small financial organizations such as rural household cooperative banks should be developed. The establishment of rural household cooperative banks plays an important role in regulating rural financial market, engaging social financial resources, solving loan-taking difficulties for farmers, and developing agriculture and rural economy. Piloting projects are well received by local farmers. To lower entry threshold for rural financial organizations, reference can be made to registration capital requirement and relevant policy governing rural credit cooperatives. Leading agriculture enterprises and farmer organizations should be guided to take shares voluntarily to establish small financial organizations such as the rural household cooperative banks, and carry out credit business to local farmers to meet their demand for small loans.

Various financial supporting resources for agriculture development should be integrated. Such integration is the starting point for finance to cover overall county-level tasks. There are multiple channels of direct fiscal allocation and other financing, which requires market integration and financing promotion to change the chronic inefficiency of capital utilization and ensure safe operation of those financial resources. The integration should be conducted through financing platform account management, and form a unified, high-performance credit supporting and management pattern by pooling fiscal allocations from various levels of government, extending loans and collecting principal and interests. At present, the majority of counties in the Province, especially the poverty-stricken ones, have very limited financial resources and their working capacity is considerably weak. Therefore, the work should get off ground through cooperation between financial institutions and fiscal authorities.

4.1.5 Develop county economy to speed up rural public service programs

Scientific layout of counties based on major provincial function-oriented zones should be designed to achieve coordinated progress. Establishment of regional development
pattern based on major provincial function-oriented zones is a concrete representation of the scientific outlook on development, an important strategic move to promote balanced and sustainable development of counties, and a high-light in the theoretical innovation of the Fifth plenary session of the 16th CPC National Congress and the Eleventh Five Year Plan.

Firstly, the function design of a county (city, region) should be determined based on specific local conditions and proceed gradually. The function should be specified when conditions are mature. Apart from defining the dominant function of a county, what should be determined are the county’s population in the future, distribution of towns and villages as well as important infrastructure. Relevant policy coordination mechanism should be made clear. Secondly, regional development structure based on function distribution will be established in light of the carrying capacity of each county (city, region)’s resources and environment; relevant policies and evaluation targets can be formulated accordingly. As those policies and evaluation mechanisms are beyond pure administrative zones, they are more specific, better targeted, and more capable of generating tangible benefits.

Program guidance and pilot project demonstration should be strengthened; reform on investment and management system should be accelerated to boost the vitality of county economy. Small towns and special county industries will be emphasized according to regional economic layout, so as to make sure the stability of the county economy. Rural tertiary industries such as financial, insurance and logistical sectors should be promoted to enhance service capacity of small towns.

With the generous fiscal support from the Central Government, the coverage of public finance over rural areas should be expanded, and development of rural public services should be accelerated. Rural education should be promoted with joint efforts from the local government and other relevant agencies, in order to popularize and reinforce nine-year compulsory education. Various types of cultural activities should be organized, especially for delivering technology, cultural entertainment and health knowledge to the countryside. Science and technology bookstores in rural areas should be established to enrich farmers’ cultural lives. Healthy and modern lifestyles as well as social morals should also be advocated in the countryside. Rural public health and basic medical service system should be established together with new rural cooperative medical care mechanism. Efforts should also be made in exploring and building rural social security network.
4.2 Four major projects for the development of modern agriculture

4.2.1 Promote the development of facility agriculture

To promote the development of facility agriculture is mainly about R&D system of organic ecological soil-less cultivation in solar greenhouses. Firstly, the research should find organic or inorganic materials that are abundant in the locality, such as crop straw, animal and bird manure, mushroom residue, wine residue, grass ash, slag, etc. Those that fit local conditions can be selected for base formula of the organic ecological soil-less cultivation; and the processing techniques, low-cost low-consumption cultivation skills and other production technologies can be determined accordingly. Secondly, researches are supposed to discover water-conservancy irrigation techniques for organic soil-less cultivation, recycling of organic base material residues, standard technique protocol for organic soil-less long-season cultivation of various kinds of vegetables in solar greenhouse, and vegetable varieties with high added value. Thirdly, feasibility study should be carried out on whether organic ecological soil-less cultivation can be implemented in regular greenhouse and open fields, and perspective experimental research should be conducted on applying the cultivation technique in non-arable land for vegetable production.

4.2.2 Promotion of dry-land agriculture and water-conserving technology in agricultural irrigation.

The demonstration bases for water-conservation technology in agricultural irrigation include: Suzhou, Ganzhou, Minle, Yumen, Dunhuang, Jinta, Gaotai, Linze, Shandan, Yongchang, Gulang, Taijing, Jingyuan, Gaolan, Yongden. In those counties (regions), techniques such as drop irrigation under film and root-divided alternative irrigation have been promoted, monitoring stations for soil moisture and fertilization have been set up, and relevant supporting equipment has been purchased.

The demonstration bases for water-conservation in dry-land farming include: Zhengning, Ningxian, Qingcheng, Jingchuan, Jingning, Zhuanglang, Anding, Taian, Gangu, Wushan, Heshui, Zhenyuan, Xifeng, Chongxin, Tongwei, Huining, Qincheng, Beidao, Longxi, Zhangxian, Yuzhongm Xihe, Lixian. In those counties (regions), precipitation -collection and water-saving irrigation projects have been implemented; water-saving techniques such as supplementary irrigation for large fields and water-collection from grooved film to increase moisture have been promoted.

Demonstration bases of small stream interception for water-saving irrigation in southern mountainous regions: Kangxian, Wenxian, Wudu, Diechang, Chengxian,
Weixian, Minxian, Lintan, Liangdang, Linxia. In those counties, small stream interception construction has been carried out; demonstration water-saving techniques for tea and herb medicine have been disseminated, and supporting equipment has been purchased.

4.2.3 Promote the training of new types of farmers

Training programs should meet the requirements of modern agriculture, and be combined with other projects, such as training program for young farmers, green certificate training course, science for rural household project, and Sunshine training project for rural labor transfer. Training for practical farming skills should be actively carried out to improve farmers’ scientific knowledge, enhance their understanding of advanced technologies, and improve their vocational skills, all in a bid to strengthen their employability on the labor market.

4.2.4 Promote agricultural industrialization and processing of agricultural products

A catalogue should be compiled for priority agricultural processing industries and products; a number of demonstration deep-processing and export-processing enterprises should be especially supported. Policies for development of agricultural processing industry should be formulated and improved, and VAT pilot reform for deep processing of agricultural products should be boosted. Banks should be coordinated to render support to processing industry by providing loans for application of chattel mortgage, warehouse voucher mortgage, and pledge.

<table>
<thead>
<tr>
<th>Project</th>
<th>Implementation period</th>
<th>Content of implementation</th>
<th>Fixed asset investment</th>
<th>cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified starch</td>
<td>2005～2007</td>
<td>Adding a production line of oxidized starch with an annual capacity of 10,000 tons</td>
<td>26 million RMB Yuan</td>
<td>1 million RMB Yuan</td>
</tr>
<tr>
<td></td>
<td>2005～2007</td>
<td>Adding a production line of cationic starch with an annual capacity of 10,000</td>
<td>26 million RMB Yuan</td>
<td>1 million RMB Yuan</td>
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Table 2-8 Recommended project of Potato Processing, Dingxi City
<table>
<thead>
<tr>
<th>Year</th>
<th>Production Line</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005~2007</td>
<td>Adding a production line of modified starch</td>
<td>24 million RMB Yuan</td>
</tr>
<tr>
<td></td>
<td>with an annual capacity of 10,000 tons</td>
<td>1 million RMB Yuan</td>
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<td></td>
<td>Adding a production line of ester starch</td>
<td>16 million RMB Yuan</td>
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<tr>
<td></td>
<td>with an annual capacity of 10,000 tons</td>
<td>1.5 million RMB Yuan</td>
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<td></td>
<td>Adding a production line of chemical modified</td>
<td>16 million RMB Yuan</td>
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<td>dextrin starch with an</td>
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<td></td>
<td>annual capacity of 10,000</td>
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4.3 Support from the Central Government is needed for agriculture development and the building of a new countryside in Gansu.

4.3.1 The Central Government has decided to extend the fiscal allocation for “Hexi, Dingxi and Xihai” for ten years to further support poverty-reduction and development in Gansu.

On December 10, 1982, the State Council decided to provide an annual special fiscal allocation of 200 million RMB Yuan to Hexi and Dingxi in Gansu province and Xihaidu in Ningxia province, with 166 million going to the two regions in Gansu, within a period of ten years. The allocation is used for development of agricultural infrastructure to implement the guideline of “revitalize the west and develop the east”. The objective is to alleviate grain shortage around the Dingxi region. In September 1992, the State Council agreed to extend this special fiscal allocation for ten years, with resource allocation proportion between the two provinces unchanged. The priority is to provide sufficient food and shelter for the poor population in the central regions. On July 29, 1997, the Leading Office of Poverty-alleviation and Development of the State Council agreed the requests by Gansu and Ningxia to use the allocation of 2001 and 2002 ahead of schedule, with the aim of providing sufficient food and shelter for the poor population in those three regions. Therefore, the third ten-year allocation of fiscal resources for the three regions will be completed.
Remarkable achievements have been made in poverty-reduction and development in Hexi and Dingxi of Gansu province. However, such achievements only serve as the primary foundation for those regions to shake off poverty. There is still arduous task ahead with multiple difficulties and problems to overcome. Therefore, we hope the special fiscal allocation could be extended again for another ten-year, so as to support the poor regions in Gansu to achieve radical changes.

4.3.2 Increased government fiscal allocation to Gansu would help reach the objectives set in the Poverty-reduction and Development Guidelines

According to the overall plan of Gansu’s poverty-alleviation and development, 8,790 poor villages of the Province have carried out the whole-village-based poverty-reduction and development projects with broad public engagement. Over 2,300 of those villages will complete the projects by the end of 2006, with still over 6,500 villages in poverty. Calculated at the amount of 1.5 million RMB Yuan of fiscal input for each poor village, roughly ten billion RMB Yuan is needed for the poverty-reduction projects to be completed for all those villages, which equals around an annual input of 2.5 billion RMB Yuan. Currently, there is around 800 million RMB Yuan allocation (including the above mentioned special allocation for the three areas and allocation for welfare-for-work) from the Central Government to Gansu for poverty reduction. For the 2010 target to be reached, it requires an annual increase of 1.7 billion RMB Yuan. Therefore, we hope the Central Government can increase its allocation to Gansu for poverty reduction to make the input proportionate to the task, so as to ensure the successful achievement of the Guideline’s target and the establishment of a new countryside. Furthermore, we hope the Central Government would continue to give preferential policies and more investment to the development of agricultural infrastructure, education, public health and other public programs in poor regions.

4.3.3 Implement ecological compensation and make it the major source of income for residents in the ecologically fragile regions.

Most parts of Gansu are ecologically fragile regions, and the majority of the residents undertake the responsibility of ecological protection, which generates better ecological environment and passes on benefits to some eastern regions. Those eastern regions, whose GDP and public health has been benefited, should make certain compensations for the rural residents in Gansu. On the other hand, good ecological environment generated by protection is typical public goods, which can neither be
sold on the market nor get compensation from market exchanges. Therefore, ecological compensation should be made through taxation and fiscal transfer. The Central Government could collect taxes from those benefited eastern regions and make fiscal transfer to western regions for their protection activities. As ecological protection is the major responsibility and production activity for Gansu’s ecological regions, ecological compensation should become the major source of income for those areas, and ecological compensation mechanism should become the major income mechanism for those areas.

4.3.4 Integration of agriculture-assistance resources should be put into the legislation process to solve financial difficulties in building a new countryside

Currently, the management of agriculture-supporting resources is decentralized, lacking consistency, overlapping, and inefficient. The No. [2004]1 Document issued by the Central Government emphasizes that “in accordance with the requirement of centralized planning, clearly defined labor division, and coordinated arrangement, various sources of agricultural investment should be integrated, better prioritized, and better utilized”. The No. [2005]1 Document issued by the Central Government proposes that “we should further enhance the integration of government investment in agriculture. We encourage investment based on counties, and improve investment efficiency through planning and guidance, coordinated arrangement, clarified responsibility, and rolling projects.” The No. [2006]1 Document issued by the Central Government reiterated that “we should enhance the integration of government investment in agriculture; strengthen working mechanism of investment planning, coordination and inter-agency communication; improve investment management; focus on key areas and projects; and improve investment efficiency. Government investment in agriculture should serve as a leverage to channel financial resources from farmers and other walks of life to rural development.” Meanwhile, “we should accelerate legislation process on agriculture investment and strengthen law enforcement”.

Practice has demonstrated that the building of a new countryside in Gansu and other parts of the western regions should not be entirely dependent on massive fiscal allocations from the government, especially at a time of economic transition when the government fiscal resources is relatively limited. In order to successfully build a new countryside, government investment and social financial resources should be integrated; the immense potential of social resources should be tapped, so as to channel various source of recourses to the development of the new countryside.

(Research fellows participating in this project: Luo Zhe, Qu Wei, Zheng Huijuan, Wang Jianbin, Wang Junfeng, Liu Qijun, Jia Qiong, Hu Miao)
Appendixes

1. Empirical Study on Development of Potato Industry in Dingxi City, Gansu Province
2. Analysis on Agricultural Restructuring in Gansu Province
3. Analysis on the Economic Performance of Agricultural Investment in Gansu Province
4. Review and Comment on Agricultural Development Policies in Gansu and their performance

Appendix 1

Empirical Study on Development of Potato Industry in Dingxi City, Gansu Province
Li Shuji, researcher with Gansu Academy of Social Sciences

Potato is one of the most promising high-yielding cash crops in the new century. It is also among the top 10 most popular nutritious and healthy food. As a kind of grain crop, its importance is only next to rice, corn and wheat. It is highly valued around the globe due to its high and stable output, universal applicability, all-sides nutrients and long industry chain. Seed potatoes and various kinds of converted potato products have become an important part in the global economy and trade.

In recent years, Dingxi City continues to play its comparative advantage, develops economy with local characteristics, guides the development of primary industry with the concept of the secondary industry, and places the potato industry as the number one predominant industry of the city. As the result of scale-expanding to increase output, science-and-technology-supporting to enhance level, market-exploring to boost export, storage-developing to balance the market and processing-strengthening to establish good brand, potato in Dingxi has turned from a traditional grain food into the most profitable cash crop, the potato industry has become the most preponderant and distinctive, and also the most promising industry in the city in regards of
commercialization of agriculture.

1. Basic characteristics of commercialized potato industry in Dingxi

1.1 Planting is becoming more sophisticated.

Seed potato production, which was mainly supported by the government, is now moving towards intensive and market-oriented production and corporate management. With xindaping, longshu potato NO.3 and other fine varieties playing the dominant role, potato planting in the city is having bigger scale, improved varieties of seeds, more machines, higher standards and more scientific and technological supports. There are now three distinctive regionalized production base: valley plain area around Yaohe River, Weihe River and Zhanghe River to plant quality potatoes to be eaten as vegetables or processed into different varieties; production base in the South arctic-alpine dank area to plant quality potatoes to be eaten as vegetables and virus-free seed potatoes; and production base in the North arid and semi-arid area to plant starch-rich potatoes for export. In 2006, potato planting in Dingxi covered an area of 3,185,700 mu (1 mu=0.1647 acre), accounting for 55% of the gross grain planting area with a total output of 4.5 million tons. 2.095 million mu, or 66% of the potato planting area was put to use upon order. In Anding District, the planting area has expanded from 730,000 mu last year to 900,000 mu this year, about 10% of the total planting area of Gansu Province. Among the 900,000 mu of planting area, 300,000, or 30% were used for standardized planting. The coverage of improved varieties of potatoes, dominated by Xindaping, Longshu series and specialized potato types, exceeded 70%. Even in drought years, the aggregate output will reach 900,000 tons, making Dingxi the Top 1 county for potato production in China.

1.2 Marketing system is constantly being improved

Dingxi city adopts the operational pattern of “company plus association plus peasant household”, actively develops a marketing team and improves marketing network to

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19 Report on the Development Mechanism of Potato Industry in Dingxi, by CPC Dingxi City party committee, November, 6, 2006
make sales more organized and networked. At present, there are in total four major potato specialized wholesale markets, including Linyao Kangjiaya, Longxi Wenfeng, Anding Lujiaogou and Minxian Meichuan, 26 medium-and-small sized potato trading centers, 185 farmers’ market in trade and over 1500 purchasing outlets scattering in all villages of the city. Potato distribution associations and starch industry associations at city, county and district levels make full play of their connection role in marketing, lead the two driving forces of sales and processing, actively expand the market by maximizing export dominated by fresh potatoes and starch in order to further increase the market share and enhance marketing level with the motto of “go marketing wherever there’s a market”. Governments at city, county and district levels established a joint transport office to materialize the marketing pattern of “brand plus specialized trains plus team work” to penetrate the market with government, association and railway co-managing the allocation of carriages. Members with Anding Potato Distribution Association established two potato export companies: New Silk Road Agricultural Product Import and Export Limited Company of Dingxi and Dingxi Shiyang Beili Industry And Trade Co., Ltd. The two companies have obtained self-managed import and export trading right, and signed contracts with clients from United Arab Emirates and Saudi Arabia to export 9000 tons of potatoes.

1.3 Processing capability is increasingly strengthened.

In accordance with the development concept of “supporting companies regardless of their size, and growing potatoes regardless of their variety”, Dingxi City makes great efforts to develop leading companies, let sales and processing go side by side, and steadily raises the price. Among the 443 starch processing companies, 33 produce fine potato starch and food made from it with a capacity of over 1000 tons, and 20 produce processed starch products with a designed capacity of over 10,000 tons. The aggregate designed capacity of the city to produce potato starch and food made from it reached 350,000 tons, with a dozen of varieties: fine starch, modified starch, granules, fries, puffed food, etc. In Anding District, production capacity of fine starch has reached 120,000 tons, that of granules 6000 tons, modified starch 30,000 tons, and quick frozen fries 3000 tons. Longxi Qingji and other three companies are leading companies at provincial level in regards of agriculture commercialization, while Lintao Tengsheng Company is takes a leading position at national level.
1.4 Storage facilities are increasingly improved

Guided by the concept of “digging deep ovens to store potatoes, balancing the market to stabilize the price and developing processing to increase income”, Dingxi City mobilized leading companies, associations (major distributors) and peasant households to build up various ovens. By the end of 2005, there were 76.21 ovens in total, with an actual storing capacity of 1.7 million tons. This year, as the storing capacity increased by 350,000 tons, the aggregate storing capacity will exceed 2 million tons. In Ziding District, over 90,000 new ovens were dig in 143 depot clusters, with capacity rising from last year’s 300,000 tons to around 500,000 tons. A four-tier storage system was formed: homo-thermal depots, thousand-ton level ventilated depots, hundred-ton level oven clusters and small-sized peasant-household ovens. This system balances supply and demand, and further strengthened controlling capability of transportation, sales and price.

1.5 The potato industry is becoming increasingly organized.

Dingxi City has developed more than 180 specialized economic organizations mainly engaging in intermediary services like seed variety improving, planting, and processing, storing, exporting or technology and information service. They provide improved varieties and materials before production, skill training amid production, and price information after production for peasants, thus making peasants more organized, safeguarding output and income, greatly enhancing peasants’ awareness of market economy and ability of negotiation, and effectively solving the problem of peasants being vulnerable on the market. As a result, all economic actors gradually moved on a sound development path of interaction and win-win.

2. SWOT analysis on the development of potato industry in Dingxi

2.1 Strength (S)

Firstly, macro trade environment and policies. In the perspective of international trade
environment, greater liberal trade and more intensive international competition brought by WTO accession will stimulate and boost the development of characterized agricultural industries in China and provide opportunities for Dingxi potato industry to realize leapfrog development and go global. In the perspective of domestic trade environment, the two decades of reform and opening-up as well as improvement of socialist market economy has broken the old pattern of division and local protectionism, and brought about a unified domestic market, in which various production factors such as cash, technology and labor can move without barriers. This has laid a foundation for the rapid development of Dingxi potato industry. Gansu Province and Dingxi City have both enacted a lot of policies and measures to encourage and promote potato industry development. It needs to be pointed out that on the occasion of West Region Development, a strategy implemented by the central government, Dingxi City came up with a strategic restructuring of agricultural industry, placing highlight on the potato industry as a kind of crop farming. The potato industry was listed as one of the four dominant industries of the city in order to build Dingxi into the largest and best production and processing base for seed potatoes and fresh edible potatoes.

Secondly, rich natural resources. The climate and ecological conditions in Dingxi are particularly good for growing potatoes with a relative high altitude, cold weather, rich sunshine, simultaneous heat and moisture, great day-and-night temperature difference, long growth cycle and thick yellow soil. With such a bestowed natural condition, the potato products here boast high quality, great taste and nation-wide reputation, making Dingxi one of the major production bases of fine potatoes with a natural advantage in producing potatoes and virus-free seed potatoes. As the average output per unit in Dingxi is higher than the national average, Dingxi is one of the major production bases of fine potatoes in China; it is also one of the ideal places to cultivate fine varieties, develop virus-free seed potatoes and quality potatoes for commercial use. Anding District and Weiyuan County of Dingxi City were named “home to Chinese potatoes” and “home to improved varieties of Chinese potatoes”.

Thirdly, comparative advantage in terms of economic return. In recent years, potato products enjoy stable price and sound market perspective. Every mu of potatoes brings about an income of 600 to 800 yuan. In high-yielding areas, it’s 1000 yuan. The economic return of potatoes is remarkably higher than that of other grain crops. The economic return of one mu of potatoes on the drought mountainous area in
Dingxi is equal to that of two to four mu of wheat. According to a cost study, the output of potatoes per mu (2500g potatoes equals to 500g wheat) is lower than that of corn, but higher than those of wheat, rape seed, angelica, and benne by 44.93%, 62.41%, 79.49% and 272.84% respectively.

| Table 2-9 Potatoes versus other crops in terms of output per mu (Dingxi) |
|-----------------|-------|------|----------|--------|--------|
|                 | potato | wheat| corn     | benne  | rape   | angelica |
| output per mu(kg) | 280   | 193.20| 509.70   | 75.10  | 172.40 | 156 |
| absolute value(±)| /     | 86.80 | -229.70  | 204.90 | 107.60 | 124 |
| relative value(± %)| /     | 44.93 | -45.07   | 272.84 | 62.41  | 79.49 |

The potato industry is featured by high investment and high economic return. Its cost is relatively high. It’s lower than those of corn and angelica, but much higher than those of benne, rape seed and wheat.

| Table 2-10 Potatoes versus other crops in terms of cost (Dingxi) |
|-----------------|-------|------|----------|--------|--------|
|                 | potato | wheat| corn     | benne  | rape   | angelica |
| cost per mu(RMB)| 504.98| 422.20| 579.89   | 283.39 | 361.14 | 533.75 |
| absolute value(±)| /     | 82.78 | -74.91   | 221.59 | 143.84 | -28.77 |
| relative value(± %)| /     | 19.61 | -12.92   | 78.19  | 39.83  | -5.39 |

The output value of potatoes per mu is relatively high. It’s lower than those of corn

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20 Research and Analysis on Potato Production Cost in Dingxi City, by work team of survey on the cost of industrial and agricultural products in Dingxi, December, 18, 2006
and angelica, but much higher than those of benne, wheat and rape seed. Calculated at output value per mu, the aggregate output value of potatoes in Dingxi is 2.111 billion yuan, and per capita value is 791.50 yuan.

<table>
<thead>
<tr>
<th></th>
<th>potato</th>
<th>wheat</th>
<th>corn</th>
<th>benne</th>
<th>rape seed</th>
<th>angelica</th>
</tr>
</thead>
<tbody>
<tr>
<td>output value per mu(RMB)</td>
<td>662.57</td>
<td>266.95</td>
<td>685.47</td>
<td>255.56</td>
<td>495.18</td>
<td>936.00</td>
</tr>
<tr>
<td>absolute value(±)</td>
<td>/</td>
<td>395.62</td>
<td>-22.90</td>
<td>407.01</td>
<td>167.39</td>
<td>-273.43</td>
</tr>
<tr>
<td>relative value (± %)</td>
<td>/</td>
<td>148.20</td>
<td>-3.34</td>
<td>159.26</td>
<td>33.80</td>
<td>-29.21</td>
</tr>
</tbody>
</table>

The net profit of potatoes per mu is lower than angelica, but much higher than other crops. It’s twice as much as those of corn and rape seed and four times more than that of wheat, and 60 times more than that of benne. Based on the net profit per mu, the net income of potatoes in Dingxi is 1.166 billion yuan, and per capita income is 437.18 yuan, about 25.72% of per capita net income of peasants. The profit rate on cost of potatoes is as high as 72.5%. It is lower than that of angelica (84.31%), but higher than that of rape seed, and still higher than grain crops. Its comparative advantage is well marked.

<table>
<thead>
<tr>
<th></th>
<th>potato</th>
<th>wheat</th>
<th>corn</th>
<th>benne</th>
<th>rape seed</th>
<th>angelica</th>
</tr>
</thead>
<tbody>
<tr>
<td>net profit per mm(RMB)</td>
<td>366.10</td>
<td>-108.30</td>
<td>166.96</td>
<td>5.95</td>
<td>147.28</td>
<td>450.03</td>
</tr>
<tr>
<td>absolute value(±)</td>
<td>/</td>
<td>474.40</td>
<td>199.14</td>
<td>360.15</td>
<td>218.82</td>
<td>-83.93</td>
</tr>
<tr>
<td>relative value (± %)</td>
<td>/</td>
<td>438.04</td>
<td>119.27</td>
<td>6052.94</td>
<td>148.57</td>
<td>-18.65</td>
</tr>
</tbody>
</table>

Fourthly, scientific and technological advantage. It’s been nearly five decades since Gansu Province started potato breeding, generating over 40 varieties including Long potato. Gansu Provincial Academy of Agricultural Science used to take the lead in regards of anti-potato-late-blight and breeding of starchy potatoes; while Gansu Agricultural University in biotechnological breeding and basic theory. Gansu is an early starter in terms of the breeding technology of virus-free potato stem tips. Since
the Ninth Five-Year Plan, Gansu Provincial Academy of Agricultural Science and many other scientific institutes have made joint efforts to commercialize the technology, and achieved success. In the new century, the potato industry of Gansu becomes one the national top by taking advantage of science and technology.

Fifthly, advantage in market development. In recent years, Gansu set up four large-sized potato wholesale markets: Lintao Kangjiaya, Longxi Wenfeng, Anding Lujiaogou, and Minxian Meichuan. The business booms. Lintao Kangjiaya Potato Wholesale Market was designated by the Ministry of Agriculture as the national potato wholesale market. Potato goods produced in Dingxi was awarded the title of “choice Gansu goods”; while “Qingji”, “Tengsheng”, “Jinding” and “Lujiaogou” potatoes and “Wuzhu” potato varieties have registered their trademarks. Lintao Tengsheng Company was entitled by the Ministry of Agriculture the national leading company in agricultural commercialization. Longxi Qingji Company and other potato marketing companies were entitled leading companies in agricultural commercialization in Gansu Province.

Sixthly, advantage in processing. In recent years, Gansu Province developed a batch of potato processing companies of different types and sizes, resulting in the basic advantage featured by relatively large scale of fine starch processing, relatively comprehensive varieties including granules, fries and modified starch, and advanced national level of some companies in terms of technology, equipment and production scale. Also, the potato industrial chain of Gansu Province is prolonged. This has blazed a new path for the potato industry and enhanced the added value of potatoes, thus promoting a rapid development of potato industry and increasing the income of peasants.

2.2 Weakness (W)

Firstly, the promotion of improved varieties and application of virus-free seed potatoes lag far behind. There are two reasons. One, due to backward breeding and introduction, the application rate of fine varieties suitable for processing and export is rather low. Except for starchy varieties “Longshu No.3”, “Longshu No.6”, “Weishu No.1”and “Xindaping” which is eligible for export, most introduced varieties are still adapting to the local ecological environment. The biological characteristics of the introduced varieties are not yet well learned, and the integration technology is not yet
well digested. The existing bred varieties cannot meet the need for the development of the industry. Meanwhile, the dominant varieties have been in use for so long that they have begun to degenerate, and output per mu begins to decline. The other reason is the low application rate of virus-free seed potatoes. The decrease of potato output in some parts of Dingxi in 2005 had much to do with potato diseases, if not seasonal drought. The clone technology, a mature technology and key measure to tackle the disease-caused degeneration was adopted to produce and propagate virus-free stem tips. At present, Dingxi has got a production scale of 20 million virus-free seedlings and 30 million mini-potatoes, or original seed. Sadly, due to too big an input in original seed propagation, which is 7,000 to 8,000 yuan per mu, peasants cannot afford it, companies can but not willing to, and government subsidy is insufficient. As a result, the application rate of virus-free seed potatoes is still quiet low.

Secondly, neglect of rotation worsened the diseases. When it comes to potato growing, rotation is even more important than scale. However, some parts of Dingxi neglected the importance of rotation, and overemphasized on scale. Years of absence of rotation worsened diseases, particularly potato late blight.

Thirdly, the market operational mechanism is flawed. The operational pattern of “company plus association plus base plus peasant household” and “association plus base plus peasant household”, a development pattern accepted by both market and mass is there, however, due to non-standard contract-signing and weak binding, contracts are not very well delivered. With the market-oriented operation still at an early stage, lack of strong interest link among companies, bases and peasant households, inefficient connection among production, processing and sale as well as loose interaction between household production and market constitute certain restriction over the development of commercialization.

Fourthly, deep processing capacity is inadequate. In 2005, all the 31 fine potato starch producers were faced with the following problems: one, due to the scarce raw materials, production capacity could not be fully released, and the processed fine starch was only one sixth of the total capacity of 350,000 tons; two, the layout of processors was not flawless; three, the quality of the majority of the products fell within the range between national primary and secondary standard. In other words, the quality is not quiet satisfactory, and there’s gap between different companies.

Fifthly, supply system for improved varieties is not full-fledged. The problem of variety is the bottleneck for potato industry to seek for quality-based performance. To
be more specific, there are not many companies engaging in seed potato breeding, and not enough input in scientific research; product upgrading lags behind market needs; high cost and high prices frightens people away; customization and diversity is not well developed; and the instability of variety affects the stability of output and quality.

2.3 Opportunity (O)

From the global perspective, it is expected that in the next two decades to come, the demand of developing countries for food will be up by 40%, and the demand for potatoes will be twice as much as that in 2000. From the domestic perspective, with China’s per capita GDP surpassing $1,000 dollars, the market demand for processed potato food is increasing rapidly. The world sales volume of fries and crisps alone is as high as $1.7 billion dollars. And China’s market is just emerging. In the words of Pepsi and McDonald, China will become potato production and consumption center in the Asia-Pacific region by 2010. The prospect of potato starch processors is exciting. At present, China’s annual import of potato starch is over 200,000 tons; it is expected to reach 3 million tons by 2030\(^\text{21}\). The prospect of export market is also encouraging. Japan is one of the major importers of potatoes in the world, and demand from other Southeast Asian countries is also large and growing. China’s export of fresh potatoes in 2002 was almost three times as much as that of 2000.

China’s potato processing industry is still at an early stage of modernization, featured by low ratio of processing, inadequate varieties but bright prospect. In comparison, the processing ratio of potatoes on average is over 40% in developed countries, but less than 10% in China. Moreover, China’s processed potato starch is dominated by rough starch with low added value\(^\text{22}\).

The current import price of potato starch is 5500-6000 yuan per ton, while that of home-made is 4000-5000 yuan per ton. It is possible to penetrate into the international market provided that quality stays stable\(^\text{23}\).


\(^{22}\) The Development of Potato Industry helps to enhance China’s grain security, Xinhua News Agency, June, 26, 2006

\(^{23}\) The Situation and Analysis on the Commercialization of Potato Industry, by Zhao Xiaoyan, July, 27, 2005
2.4 Threats (T)

Low-price dumping by EU fine starch producers is a big blow to China’s starch market, slashing prices and squeezing profits. With a total output of 1.8-2 million tons, EU potato starch producers boast great production and export capacity\textsuperscript{24}. The export volume grows on annual basis. In 2003, the export of EU potato starch grew by 17.4\% compared with previous year; in 2004, it was 1.58\%; and in 2005, it was 11.83\%. EU export to China grows at a fast pace, and is taking an increasingly larger share in the aggregate EU export of potato starch. In 2005, the share of EU exports to China to its aggregate export increased by 78.33\%. Due to the fast increase of EU export, domestic producers suffered from a big drop of sales and profits, slow liquidity and overstock.

3. Suggestion on the development of Dingxi potato industry

3.1 To improve the supply system of virus-free seed potatoes

To improve varieties is the foundation for the healthy development of potato industry. It’s essential to establish and develop seed companies to speed up propagation of improved varieties, and further enhance quantity and quality. Anding and Weiyuan can be the key area for production and propagation of virus-free seed potatoes. Government support and financial assistance to City Hannong Center, Weiyuan Weihe Seed Company, Ailan Potato Industry Company, and other leading seed potato companies should be strengthened. It’s necessary to build up and improve a virus-free seed potato supply system, centering on manufacturing of virus-free seedlings and mini original seed. There should also be strictly isolated rooms to propagate virus-free original seeds, and production bases for primary and secondary original seeds at different levels and in different regions.

\textsuperscript{24} Ministry of Commerce of PRC’s Initial Decision on the Anti-dumping of Imported Potato Starch Originated in EU, Announcement NO. 4, 2006
3.2 To have an insightful understanding about the developing direction of customization in potato industry

There are three major developing directions for customization in the world potato industry: potatoes as quality vegetable to meet the need of vegetable market or that of exporting fresh potatoes; starchy potatoes to be processed into starch; and potatoes to be processed into fried food. Generally speaking, priority should be given to the market for potatoes as vegetable and potatoes to be processed into starch, because this market is mature and Dingxi has got its advantage on this market. Meanwhile, despite the rapid growth of the market for potatoes to be processed into fried food, this market should be developed with caution because of complicated production technique and food safety issue besetting the sales market of fried food.

3.3 To establish and improve an organization system for the potato industry

Much work needs to be done to develop economic organizations on the basis of cooperation among peasants. Major producers and sellers will be encouraged to establish organizations voluntarily, and regulate producers and sellers’ behavior with written rules so as to enhance the standard of production and quantity and quality of products. Moreover, to cooperate with leading companies in the name of organizations will help enhance peasants’ ability of negotiating, risk-resisting and profit-making. Regional guilds can be developed. Organizations and individuals in production, processing, sales and scientific research can be encouraged to jointly and voluntarily establish a guild in response to the need of industrial development. By linking production with scientific research, operation with market, and companies with peasant households, the guild can play an active role in a wide range of fields: production, processing, storage and transportation, sales and information technology service. In this way, production and operation of the industry will be better standardized and the organization system will be upgraded.

3.4 To innovate system and vigorously develop processing industry

To promote Dingxi potato processing industry, efforts should be made in three aspects:
one, fine potato starch and its deep processing, which is and will still be in large
demand; two, upgrading of traditional rough starch, vermicelli and mungbean noodle
processing industry which has a relatively sound market basis; three, snack food, fast
food and instant food which enjoys great market potentiality.

There should be stronger support to leading companies. Priority should be given to
deep and fine processing companies consistent with market requirement, such as
companies engaging in deep processing of fine starch and processing of snack food,
in regards of short-term cash in purchasing and technology upgrading. Conditions
can be created to introduce strong and large leading processing companies to join the
industrial development. For example, tax preference will be an incentive for
processing companies to engage in storage and thus avoiding waste and degeneration
caused by traditional simple storing by individual households.

Market for processed potato food needs to be explored with greater effort. While
processed food has already become the mainstream of potato consumption in
developed countries, the domestic potato market is still dominated by fresh potatoes.
In China, processed potato food is almost another name for fries and crisps, whose
market developed rapidly thanks to the fast food industry. In today’s society where
people expecting something more nutritious and wholesome to eat, large guild
should work with nutrition and health society to further promote the development of
potato processing industry by informing people that potatoes are low-fat, low-cal,
vitamin-rich and fiber-rich, and that there are new varieties of processed potato food,
mashed potatoes, potato bread, instant potato noodle, potato cake and potato drink.

3.5 to develop and improve potato market system

The rating storage system should be improved to balance supply and demand. The
successful experience of Anding District in constructing storage facilities is worth
learning. It takes storing as an important part in promoting commercialization,
marketization and modernization of potato industry, provides flexible and specific
guidance, divides potatoes into seed potatoes, fresh potatoes and commodity
potatoes, and stores them at companies big players and associations and peasant
households. It links a storage system dominated by large-sized storage depot clusters
and supplemented by peasant households with market development, builds up
high-standard storage facilities which forms a sophisticated network to balance
market supply, bring more profits to peasants, safeguard supply of raw materials, lengthen processing period and improve economic return.

The logistics system should be improved to support the industrial system. While keeping the planting scale and product quality, Dingxi should strengthen the potato guild, and make it a joint-stock organization consisting of different stakeholders to eliminate petty dealers and reduce intermediary links. The construction of logistics system should pick up its pace to build a large market place with multiple functions of packing, storing, preserving, wholesale, direct sale, chain operation and import and export. The added value can be further raised by increasing market share, exploring high-end market, having direct connection with end-users and going global. Modern marketing style such as brokerage, auction, electronic accounting and trade online should be explored vigorously, and a cross-regional intermediary logistic center should be set up to enhance potato logistic capacity.

The new system of quality service should be improved to have sound interaction with the market. An operational mechanism and management system consistent with the requirement of market economy should be developed by carrying out administrative management system reform, and establishing program and cash management and service system which will meet the need of deep development of potato industry. While the existing preferential policies should be implemented, other policies should be adjusted and improved, and new policies need to be made to support further development and minimize government interference in corporate operation. Strong players should join hands and build up brands to avoid vicious competition. Supervision over quality and environment security should be intensified, especially for those small, money-losing, poor quality and contaminating companies which should be eliminated. It’s also important to make sure that the market competition is open, just and fair.

A new system should be set up to ensure sufficient cash inflow. Financing capability should be strengthened as an important measure to promote industrial development. Financing obligations should be clarified and delivered, an incentive and check system should be built up and improved, and government at all levels should be mobilized to work on financing for commercialization and lead the society to increase input in potato industry. Efforts should be made to convince the central government to include potato in the list of “direct subsidies to grain producers” and “subsidies for improved variety of seed”. Resources of various kinds should be
better integrated. Dingxi should work harder to obtain fiscal support from provincial and central government. To be more specific, Dingxi should be more active in applying for various fiscal supports while optimizing the utilization of the 15 million yuan earmarked by the provincial government. The channel for financing can be expanded and credit environment can be improved by taking advantage of policy-related loans issued by China Development Bank, Agricultural Development Bank and Export-Import Bank. It’s also important to attract more foreign investment in the potato industry by implementing preferential policies for foreign investors.

<table>
<thead>
<tr>
<th>project</th>
<th>period</th>
<th>content</th>
<th>fixed asset investment</th>
<th>cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>modified starch</td>
<td>2005～2007</td>
<td>Build up an oxidized starch production line with an annual output of 10,000 ton</td>
<td>2600 万元</td>
<td>100 万元</td>
</tr>
<tr>
<td></td>
<td>2005～2007</td>
<td>Build up a cationic starch production line with an annual output of 10,000 ton</td>
<td>2600 万元</td>
<td>100 万元</td>
</tr>
<tr>
<td></td>
<td>2005～2007</td>
<td>Build up an acid modified starch production line with an annual output of 10,000 ton</td>
<td>2400 万元</td>
<td>100 万元</td>
</tr>
<tr>
<td></td>
<td>2005～2007</td>
<td>Build up an esterified starch production line with an annual output of 10,000 ton</td>
<td>1600 万元</td>
<td>150 万元</td>
</tr>
<tr>
<td></td>
<td>2005～2007</td>
<td>Build up a chemically modified dextrinised starch production line with an annual output of 10,000 ton</td>
<td>1600 万元</td>
<td>150 万元</td>
</tr>
</tbody>
</table>

Appendix 2

Analysis on Agricultural Restructuring in Gansu Province
By the end of 1990s, the supply of agricultural products not only met with but even exceeded market demand. Under the new circumstances, the central government came up with a major policy of agricultural restructuring in 2000. In this round of strategic restructuring of agriculture and rural economy, Gansu Province identified and prioritized its competitive industries and dominant products in accordance with market demand, local climate conditions and economic development level. Gansu optimized the structure of its primary industry and rural economy by adjusting crop farming industry, speeding up the development of forestry, animal husbandry and fishery, and developing the secondary and tertiary industries.

There are quite a few problems with agricultural restructuring in Gansu: insufficient financial input, pressure on water resources to support the full utilization of arable land, and imbalance between income growth and ecological protection, to name just a few. Due to small aggregate output, per capita consumption of farm produce, especially that of livestock products is far behind the national average (Table 1). Bean and oil bearing crops, major crops of Gansu, are not fully developed, though they are among China’s four major trade-deficit-making agricultural products. The other two are cotton and tropical fruit. Another problem with the existing agricultural structure in Gansu is that the mix of crop farming, animal husbandry and fishery was adjusted from 73.70:23.47:0.3 in 2001 to 69.58:24.76:0.21 in 2005. That means the share of crop farming is down by 4.12 percentage points within five years, while the share of animal husbandry is up by less than 2 percentage points. In 2005, the output value of animal husbandry in Gansu contributed 24.76% of agricultural added value, compared with national 33.74% of the same period. The natural and regional advantages of the Province are not fully played, the agricultural performance is unsatisfactory and production factors are not producing as much as those in other provinces.

<table>
<thead>
<tr>
<th>Table 2-14</th>
<th>Per capita consumption of major agricultural products in 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>grain</td>
</tr>
<tr>
<td>nation</td>
<td>371.26</td>
</tr>
</tbody>
</table>
In the long run, various structural problems will become major obstacles for agricultural development in Gansu. Therefore, it is important to recognize these problems, make an objective analysis over restructuring on the basis of general norms, and optimize the structure of agriculture and rural economy through system and technology innovation, so that the overall agricultural competitiveness will be enhanced, and peasants’ income will go up. In the paper, the author picks several major competitive agricultural products in Gansu, and makes an analysis on factors that affect consumption and production with log-linear model and Cobb-Douglas Production Function as well as Gansu agricultural production and consumption data from 1978 to 2005 before policy suggestions are drawn to optimize structure of agricultural products.

1. Analysis on factors that impact on demand for major competitive agricultural products in Gansu

1.1 factors that matter

Generally speaking, the major factors that affect demand for agricultural products include relative price, income, population, and urbanization level. Change in prices, either of one commodity or of its substitutes will affect the demand of this very commodity. Usually, consumption is in inverse proportion to price. Per capita income also counts, and so does the income elasticity. Demand for products with large income elasticity is highly sensitive to income increase, and therefore, greater input on such products will be worthwhile. Demand grows along with population, but urban population and rural population have different preference. Rural people prefer grain products, while urban people favor meat and vegetables, making the share of urban population an important factor.
1.2 Model-building

For a specific kind of agricultural product, its demand can be formulated as following:

\[ Y = F() \]

\( Y \) - demand, \( P \) - price of the product and its substitutes, \( c \) - rural population, \( I \) - income of urban population

In real life estimation, there are a lot of models available. Here, the author adopts the most popular log-linear model.

\( \ln \)

Three kinds of agricultural products are involved in the model, wheat, vegetable and meat. The per capita demand for these products constitutes explained variables, while the explaining variables include consumer price index (CPI) of these products, income of urban citizens and rural population. Rural per capita net income, urban population and urbanization level were considered as three variables, but then excluded because their impact on the three products was found to be insignificant.

The data used for analysis is time series data from 1978 to 2005, and is quoted from Gansu Rural Yearbook and China Agricultural Yearbook. Stepwise regression method is applied to imitate consumption of the major agricultural products and estimate parameters. Significant factors are in bold type. The result is as the following:

Table 2-15 Parameter estimation of demand for major agricultural products in Gansu from 1978 to 2005

<table>
<thead>
<tr>
<th>Explaining variables</th>
<th>Consumption price of wheat</th>
<th>Consumption price of vegetable</th>
<th>Consumption price of meat</th>
<th>Per capita income of citizens</th>
<th>Rural population</th>
<th>Coefficient of determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat parameter</td>
<td>0.53</td>
<td>0.32</td>
<td>0.46</td>
<td>-3.37</td>
<td>2.63</td>
<td>0.7</td>
</tr>
<tr>
<td>T value</td>
<td>1.32</td>
<td>0.44</td>
<td>1.09</td>
<td>-4.06</td>
<td>3.16</td>
<td>3</td>
</tr>
<tr>
<td>Vegetable parameter</td>
<td>-0.61</td>
<td>0.28</td>
<td>0.18</td>
<td>1.56</td>
<td>-0.30</td>
<td>0.9</td>
</tr>
<tr>
<td>T value</td>
<td>-7.09</td>
<td>1.70</td>
<td>1.68</td>
<td>18.20</td>
<td>-1.76</td>
<td>9</td>
</tr>
<tr>
<td>Meat parameter</td>
<td>-0.73</td>
<td>0.78</td>
<td>0.02</td>
<td>0.89</td>
<td>-0.03</td>
<td>0.9</td>
</tr>
<tr>
<td>T value</td>
<td>-4.27</td>
<td>2.73</td>
<td>0.05</td>
<td>3.69</td>
<td>-0.10</td>
<td>7</td>
</tr>
</tbody>
</table>
1.3 Analysis on the roles of affecting factors

Further analysis on Table 2 leads to the following conclusion:
The fitting rates of the three kinds of products are all relatively high, with coefficient of determination above 70%.
Demand for wheat is mainly affected by two factors, income of urban citizens and rural population. Negative income elasticity means that wheat, like other inferior commodities, suffers from consumption decline when urban citizens' income goes up. Rural population, on the other hand, has considerably positive influence on demand for wheat, because wheat, as the most important grain crop in Gansu, is not highly commercialized. Prices of neither wheat nor its substitutes have much impact on wheat consumption.
Demand for vegetables is mainly affected by two factors. It is highly affected by the income of urban citizens, and it's highly elastic, for every 1% growth of income brings about 1.56% consumption increases, as opposed to its complement, wheat. Yet the cross-price elasticity is inadequate. Change in demand is not as drastic as change in price. When the grain price goes up, the demand for vegetables follows, but in tiny steps.
Demand for meat is mainly decided by the following three, but all elasticity-inadequate. Increase of wheat price can have somewhat negative impact on consumption of meat, while increase of vegetable price will do the opposite. Increase of urban citizens' income will also bring the meat price up, but not as drastic as the income rise.

2. Analysis on factors affecting the production of major competitive crops in Gansu

2.1 affecting factors

Here, the analysis includes eight major competitive crops: wheat, corn, potato, bean, oil-bearing crops, fruit, vegetable and traditional Chinese medical herb. The main factors that affect their output include production price, labour, arable land area, agricultural input, machinery capacity and fertilizer rate. In general, rise in prices will encourage peasants to increase input, and thus increase the output. Agricultural input,
a policy factor, includes central and local governments' fiscal input and agricultural loans. Fiscal subsidies will bring about more resources to agricultural programs, help improve infrastructure, guide industrial restructuring and enhance productivity, and thus increase product supply.

### 2.2 Model building

One of the most used functions for building production model is the Cobb-Douglas Production Function, the general form of which is the following:

\[ Y = AX^{a_1}X^{a_2}\cdots X^{a_n} \]

\(Y\) stands for explained variable; \(X_i (i=1\ldots N)\) for variables ranging from 1 to \(N\); and \(a_i (i=1\ldots N)\) for constant and its pending powers. There are two good things about this function: it can become a linear regression model (LRM) when the two sides take their logarithms simultaneously. Then the estimation coefficients of each variable represent each variable's elasticity to output; they can tell the corresponding percentage change of explained variables when their respective explaining variables change 1%.

In this essay, the explained variable is output of agricultural products, while the explaining variable is input of relevant factors. When logarithms are taken on both sides simultaneously, the model becomes the following:

\[
\ln Y_j = a_j + b_j \ln P_j + c_j \ln L_j + d_j \ln K_j + e_j \ln S_j + f_j \ln M_j + g_j \ln F_j + \mu_j
\]

\(Y\)- yielding, \(P\)- production price, \(L\)- labor, \(K\)- area of arable land, \(S\)- agricultural investment, \(M\)- machinery capacity, \(F\)- fertilizer

In the above crop production model, the explained variable is output of the eight major competitive crops, including wheat, corn, vegetable, meat, etc. The explaining variable includes production price index, labor, and area of arable land, agricultural input, and machinery capacity and fertilizer volume. The data used for analysis originates from Gansu Rural Yearbook and China Agricultural Yearbook, dating from 1978 to 2005. Statistic software SPSS is used for calculation and the result is the following:

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.46</td>
<td>3.71</td>
<td>29.44</td>
<td>-0.26</td>
<td>0.18</td>
<td>-0.97</td>
</tr>
</tbody>
</table>
Table 2-16 parameter estimation on production function of major crop farming products in Gansu from 1978 to 2005

<table>
<thead>
<tr>
<th>explaining variables</th>
<th>product</th>
<th>labor</th>
<th>area</th>
<th>agricultural investment</th>
<th>machinery capacity</th>
<th>fertilizer</th>
<th>Determination coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>price</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>wheat</td>
<td>Param 0.17</td>
<td>-0.1</td>
<td>0.74</td>
<td>3.13</td>
<td>-2.82</td>
<td>0.97</td>
<td>0.63</td>
</tr>
<tr>
<td></td>
<td>T value 0.54</td>
<td>2</td>
<td>1.82</td>
<td>3.01</td>
<td>-2.23</td>
<td>1.03</td>
<td></td>
</tr>
<tr>
<td>corn</td>
<td>Param 0.08</td>
<td>0.18</td>
<td>0.45</td>
<td>0.08</td>
<td>-0.16</td>
<td>0.55</td>
<td>0.97</td>
</tr>
<tr>
<td></td>
<td>T value 0.08</td>
<td>1.99</td>
<td>3.51</td>
<td>0.45</td>
<td>-1.02</td>
<td>4.25</td>
<td></td>
</tr>
<tr>
<td>potato</td>
<td>Param 0.34</td>
<td>-0.2</td>
<td>0.66</td>
<td>-0.38</td>
<td>-0.88</td>
<td>0.02</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>T value 3.44</td>
<td>0</td>
<td>6.74</td>
<td>-1.07</td>
<td>-2.01</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>bean</td>
<td>Param 0.08</td>
<td>-0.2</td>
<td>0.66</td>
<td>0.07</td>
<td>0.07</td>
<td>0.32</td>
<td>0.93</td>
</tr>
<tr>
<td></td>
<td>T value 0.33</td>
<td>4</td>
<td>4.63</td>
<td>0.31</td>
<td>0.35</td>
<td>2.27</td>
<td></td>
</tr>
<tr>
<td>oil bearing crop</td>
<td>Param 0.17</td>
<td>0.95</td>
<td>-0.05</td>
<td>-0.02</td>
<td>0.01</td>
<td>0.06</td>
<td>0.90</td>
</tr>
<tr>
<td></td>
<td>T value 0.99</td>
<td>15.2</td>
<td>-0.84</td>
<td>-0.11</td>
<td>0.08</td>
<td>0.41</td>
<td></td>
</tr>
<tr>
<td>fruit</td>
<td>Param 0.01</td>
<td>-0.2</td>
<td>0.28</td>
<td>0.26</td>
<td>0.61</td>
<td>0.31</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td>T value 0.23</td>
<td>1</td>
<td>4.67</td>
<td>1.90</td>
<td>9.71</td>
<td>3.69</td>
<td></td>
</tr>
<tr>
<td>vegetable</td>
<td>Param 0.12</td>
<td>0.02</td>
<td>0.01</td>
<td>-0.04</td>
<td>0.89</td>
<td>-0.07</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td>T value 2.17</td>
<td>0.34</td>
<td>0.05</td>
<td>-0.22</td>
<td>16.13</td>
<td>-0.47</td>
<td></td>
</tr>
<tr>
<td>Trad</td>
<td>Param 0.04</td>
<td>0.11</td>
<td>0.91</td>
<td>-0.02</td>
<td>0.02</td>
<td>-0.05</td>
<td>0.99</td>
</tr>
</tbody>
</table>

358
### 2.3. Analysis of the role of affecting factors

Judging from the general analysis, the explanatory ability of the model is relatively weak with wheat, because the production of wheat is mainly influenced by policies. But other than that, the determination coefficient with other crops all exceeded 90%, indicating relatively strong goodness of fittest. In other words, these affecting factors can explain output levels.

Traditional Chinese medical herb is mostly affected by the factor of area of arable land, followed by wheat, bean, corn and fruit. Therefore, planting area of these products should be expanded so as to make full use of the limited land and water resources in the province to raise output and output value per unit by a large margin.

The output of potato and vegetable is closely related with production prices, but the parameter value is less than 1, reflecting lack of elasticity. However, as the production price goes up, farmers will increase their input in the two crops, and ultimately increase the output despite the lack of elasticity.

Labor is highly relevant with the output of oil-bearing crops and traditional Chinese medical herb, both labor-intensive products. Yet, due to severe labor surplus in Gansu, the influence of labor input in wheat, corn, potato, bean and vegetable is insignificant, and the elasticity of labor input to fruit output is even negative. Factors that would help increase fruit output would be size of planting area, machinery capacity and fertilizer.

The elasticity of agricultural input to wheat output is 3.13, while that of area of arable land 0.74, suggesting that the two factors are relevant with wheat output, and that wheat output is mostly influenced by policies. The influence of agricultural input to other crops, however, is insignificant, indicating low service efficiency. It also means
that the guiding role of agricultural policies should be strengthened for agricultural development.

The elasticity of machinery capacity to wheat production is negative, because the relatively drastic increase of agricultural machines in recent years have increased production cost and thus caused loss in profits. Meanwhile, greater machinery capacity would be helpful in increasing the output and profits of fruit and vegetable. Fertilizer is significant with corn, bean and fruit, but not other crops.

3. Analysis on factors affecting competitive livestock products in Gansu

a. Affecting factors

The subjects to be analyzed here are pig, cow, sheep and milk. Apart from price, labor and agricultural input, corn and bean are the major factors with pork output. As the data of forage grass is unavailable, we assume fodder grass to be the major factor with output of cow, sheep and milk.

3.2 Model-building

Like the production model with crop farming industry, the production model with livestock industry also takes modified CD function:

\[ \ln Y_j = a_j + b_j \ln P_j + c_j \ln L + d_j \ln S + e_j \ln G + f_j \ln B + g_j \ln F + \mu_j \]

Y- yielding, P- production price, L- labor, S- agricultural input, G- corn output, B- bean output, F- fodder grass area

Taking data from 1978 to 2005, and taking pork, beef, mutton and milk as the explained variables, production price, labor, agricultural input, corn output, bean output and fodder grass area as the explaining variables, the results are:

<table>
<thead>
<tr>
<th></th>
<th>5.71</th>
<th>-0.84</th>
<th>4.92</th>
<th>2.59</th>
</tr>
</thead>
</table>

Table 2-17 parameter estimation on production function of major livestock products in Gansu from 1978 to 2005

<table>
<thead>
<tr>
<th>explainin</th>
<th>producti</th>
<th>labo</th>
<th>agricultural</th>
<th>corn</th>
<th>bean</th>
<th>fodder</th>
<th>Deter</th>
</tr>
</thead>
<tbody>
<tr>
<td>g</td>
<td>on price</td>
<td>r</td>
<td>investment</td>
<td>output</td>
<td>output</td>
<td>grass</td>
<td>minati</td>
</tr>
</tbody>
</table>

360
### 3.3 Analysis on the role of affecting factors

As can be seen in the results, the explanatory ability of the model is relatively strong with all the four livestock products.

Price is a big factor in the output of beef, mutton and milk, but with low elasticity. The specialized production of cows and sheep makes fixed assets input a relatively big part in the production cost mix, leading to less sensitivity of output to price.

Due to large amount of surplus labor, small changes in labor can't have any significant impact on the output. Agricultural financial input is highly relevant with production of

<table>
<thead>
<tr>
<th>variables</th>
<th>area</th>
<th>on coeffic</th>
<th>ent</th>
</tr>
</thead>
<tbody>
<tr>
<td>po</td>
<td>0.17</td>
<td>-0.1</td>
<td>0.97</td>
</tr>
<tr>
<td>rk</td>
<td>6</td>
<td>-1.0</td>
<td>17.21</td>
</tr>
<tr>
<td>met</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>be</td>
<td>0.99</td>
<td>0.03</td>
<td>0.19</td>
</tr>
<tr>
<td>ef</td>
<td>28.85</td>
<td>0.26</td>
<td>1.62</td>
</tr>
<tr>
<td>er</td>
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<td></td>
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<tr>
<td>valu</td>
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<tr>
<td>re</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mu</td>
<td>0.52</td>
<td>0.06</td>
<td>0.48</td>
</tr>
<tr>
<td>to</td>
<td>5.35</td>
<td>0.60</td>
<td>5.00</td>
</tr>
<tr>
<td>n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>er</td>
<td></td>
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</tr>
<tr>
<td>valu</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>re</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mi</td>
<td>0.54</td>
<td>-0.0</td>
<td>0.56</td>
</tr>
<tr>
<td>lk</td>
<td>7</td>
<td></td>
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</tr>
<tr>
<td>met</td>
<td>5.71</td>
<td>-0.8</td>
<td>4.92</td>
</tr>
<tr>
<td>er</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>valu</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>re</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>value</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
pigs, sheep and milk, but with different utilization ratio. The utilization ratio of financial input in pork production is relatively high, with 1% increase of input generating almost 1% increase of output. The utilization ratio with mutton and milk is lower. And the financial input barely has any influence on beef production.

Due to the extensive production of pigs and market-based production and sales of fodder, processed fodder with corn and bean as the ingredient has no significant influence on pork production. The area of fodder grass land doesn't have much impact on beef or mutton production; it has some influence on milk production, but with low elasticity. This means that beef and mutton production mainly relies on grass, and with low utilization ratio.

4. Suggestions on how to optimize agricultural product mix in Gansu

Agricultural restructuring is driven by market demand and technological innovation, and fundamentally motivated by the pursuit of higher productivity and greater economic return. Higher productivity and greater economic return means higher output per unit for crop farming, and it means higher utilization ratio of financial input for livestock industry.

a. Development concept of livestock products

As people is having more money in their pockets, the potential market demand for livestock products will be gradually set free, and people will begin to spend more money on meat, eggs and milk, of which the income-consumption elasticity is relatively high. Researches size the income-consumption elasticity of various agricultural products as: milk>eggs>poultry>beef and mutton>pork>refined grain>coarse grain. Therefore, the agricultural restructuring is expected to proceed in corresponding sequence. The per capita consumption of milk in Gansu is only half of the national average, so there's great potential market to be tapped. More over, milk has a big elasticity, and a small increase in income will bring about a relatively big increase in milk consumption. So it's necessary to increase milk output by expanding area of fodder grass and forage grass. The per capita consumption of meat in Gansu is less than two thirds of the national average, while demand for beef and mutton is relatively high in the northwest area, so the output of beef and mutton should be raised by taking full advantage of the large area of natural and man-made grass land.
in Gansu, increasing input in livestock industry, improving management of the grassland and making more efficient use of straws, as well as fiscal input and credit to enhance productivity, bring more benefits to farmers and help livestock industry go on the track of sound progress.

b. Development concept of grain crops

Among the price-and-income-to-demand elasticity of various agricultural products, that of grain is the lowest, while that of cash crops and livestock is relatively high. The traditional crop farming sector, therefore, is expected to shrink. Against the background of a country with big population and relatively small land, Gansu suffers from small per capita arable land, severe shortage of water resources and much smaller per capital consumption of grain than the national average. Therefore, the key of optimizing agriculture and enhancing the comparable benefits of agriculture should be increasing grain output per unit so that the grain security will be ensured. It can be said that how much the grain output per unit can be raised will decide how fast agricultural restructuring can be completed, because the level of grain output per unit reflects the result of interaction among various factors of materials, technology and governmental policies, including financial input to improve land productivity, labor, fertilizer, pesticide, irrigation, etc..

As for the demand for wheat, on the one hand, urban citizens, as they are getting richer, will have less demand for wheat; and on the other hand, peasants will consume more grain as the rural population expands. Moreover, while the urban per capita consumption of grain will decrease, the consumption of grain as fodder and grain for industrial use will increase, so the demand pressure for wheat is still there. As for the wheat production, the planting scale of the grain will be downsized due to agricultural restructuring measure of reducing the production of grain while expanding the production of cash crops, converting farmland for forestry and pasture as well as water shortage. Therefore, in the future, the focus should be protecting and enhancing grain production capacity, increasing input into seed and fertilizer and increasing the share and planting unit of quality wheat for special use and quality corn. The machinery capacity of wheat production is redundant, and should be streamlined.

Bean is one of the major import products with inadequate domestic output and relatively high price. Therefore its output should be enhanced by expanding planting area and increasing input of fertilizer. The potato industry in Gansu is basically
mature, and is likely to grow steadily thanks to market price.

4.3 Development concept for cash crops

Due to its relatively high output value per unit, the traditional Chinese medical herb should be further developed by expanding its planting scale. The oil-bearing crop is one of the four major agricultural products with relatively low per capita consumption in Gansu and relatively high output value per unit. Its output could be raised by increasing labor input. When it comes to vegetable, it is expected to have higher quality while taking less land. Its economic performance could be improved by introducing more facilities such as shed for producing vegetable. And it's value could be enhanced by increasing input in storing and processing. The output per unit and quality of fruit could be improved by increasing input in introducing fine seeds and preventing pest-caused diseases. Meanwhile the obvious redundant labor in the fruit industry should be transferred to other sectors.
Appendix 3

Analysis on the Economic Performance of Agricultural Investment in Gansu Province
Gansu Academy of Social Sciences, Luo Zhe

In recent years, thanks to the efforts of governments at all levels the fundamental status of agriculture has been greatly consolidated and agricultural input has been increased year after year. This has undoubtedly provided essential financial guarantee for improving agricultural infrastructure, enhancing the overall production capacity of agriculture and promoting the development of agricultural and rural economy. The Gansu Provincial Government focused on issues relating to agriculture, rural areas and farmers, and provided strong financial support to the sound and stable development of agricultural and rural economy in the province by increasing fiscal input, particularly input in commercialization of agriculture and scientific and technological advancement, and strengthening skill training to transfer redundant rural labors. However, we are dismayed to find out that despite increased input in some programs, the output grows rather slowly, or even negatively. Therefore, it would be of great significant to measure out the contribution rate of input in various programs to their output. Now this paper is going to have an empirical analysis on the contribution rate of input to output in grain, crop farming and animal husbandry according to statistics dating from 1978 to 2005.

4. General analysis on investment efficiency of agriculture

When it comes to agriculture, the fundamental production factors are land, labor and capital. Input of land, labor and capital is the key to agricultural modernization, as it plays very important role in improving production conditions, enhancing production level and promoting sound and stable development of rural economy.

1.1 Analysis on the production function model

Firstly, model-building

The following production function model is built to analyze the investment efficiency
of agriculture in Gansu. In this model, there are five independent variables: seeding area (S) stands for input of land, labor (L) for input of labor, machinery capacity (k1) for input of fixed capital, fertilizer(k2) and cash input(k3) for input of variable capital. Meanwhile, the dependent variable is the yielding value (Y), which stands for output.

\[ Y = A e^{\mu T} S^\alpha L^\beta K_1^\delta K_2^\gamma K_3^\phi \]  

(1)

In the above function, A stands for basic scientific and technological level, T for variable of time, for growth rate of scientific and technological advancement, and \( \alpha, \beta, \delta, \gamma, \phi \) for input-to-output elasticity of various factors.

When the two sides take their logarithms simultaneously, the function turns into:

\[ \ln(Y) = \ln(A) + \mu T + \alpha \ln(S) + \beta \ln(L) + \delta \ln(K_1) + \gamma \ln(K_2) + \phi \ln(K_3) \]  

(2)

As there could be collinearity among k1, k2 and k3, we further qualify the function as:

\[ Y = A e^{\mu T} S^\alpha L^\beta (K_1 K_2 K_3)^\phi \]  

(3)

Take logarithms both sides, and get:

\[ \ln(Y) = \ln(A) + \mu T + \alpha \ln(S) + \beta \ln(L) + \varphi (\ln(K_1) + \ln(K_2) + \ln(K_3)) \]  

(4)

1.2 Model estimation

We collected statistics of yielding value (Y), seeding area (S), labor (L), machinery capacity (K1), fertilizer utilization (K2) and cash input of agriculture in Gansu Province from 1978 to 2005. Please refer to Table 1.

<table>
<thead>
<tr>
<th>time</th>
<th>Yielding (100m RMB)</th>
<th>Arable land (1000 hm2)</th>
<th>Labor (10,000)</th>
<th>Machinery capacity (10,000 kw)</th>
<th>Net fertilizer (10,000 ton)</th>
<th>Investment (100m RMB)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>480.78</td>
<td>316.1</td>
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</tr>
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<td>......</td>
<td></td>
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<tr>
<td>1990</td>
<td>103.05</td>
<td>3611.3</td>
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<td>25.56</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>323.03</td>
<td>3740.2</td>
<td>697.53</td>
<td>1056.9</td>
<td>64.54</td>
<td>107.67</td>
</tr>
</tbody>
</table>
Now let’s estimate function (2) first. The result of estimation is listed in Table 2. The adjusted R-squared is 0.9918; residues passed testing, meaning relatively strong explanation capacity of the model. The regression coefficient of T (variable of time) is 0.2418, and passed T testing at the level of 1%, meaning that technological advancement effectively promoted the yielding value during the period from 1978 to 2005. The regression coefficient of LOG (S) is 6.8233, and passed T testing at the level of 1%, meaning that growth of seeding area has marked positive effect on the growth of yielding value. The regression coefficient of LOG (L) is -0.7060, with a T-statistic of -1.2493 and probe of 0.2253, meaning that increase of labor input during the period had a negative impact on the growth of yielding value, though the T testing shows that the negative impact is not serious. Therefore, the redundant rural labors should be transferred in order to enhance agricultural productivity. The regression coefficient of LOG (k2) is positive, but did not pass the T testing, meaning that input of fertilizer did contribute to the growth of yielding value, but not significantly. Regression coefficients of LOG (k1) and LOG (k3) are both negative, meaning that increased input in machinery capacity and cash did not contribute to the growth of yielding value much. Generally speaking, agriculture investment in Gansu is not very effective. Given that there may be collinearity among K1, K2 and K3, we did some regression analysis on function (4), the result of which is displayed in Table 3. Now the adjusted R-squared is 0.9900, and residues passed testing, and there isn’t much difference compared with function (2) regarding variable of time (T), LOG(S) and LOG(L). We are mainly interested in the coefficient of LOG (K1) +LOG (K2) +LOG (k3) because it represents elasticity of capital input. Its regression coefficient is -0.15668, and passed T testing at the level of 10%, meaning that agricultural investment in Gansu in general is not very efficient. The combination of function (2) and function (4) tells us that the growth of agricultural output in Gansu is mainly contributed by technological advancement and growth of seeding area. In terms of capital input, input of fertilizer also contributed to agricultural output to some extent, and this may be because of the non-agricultural use of agricultural cash input and positive externality of agricultural investment.

Table 2-19 Estimation on production function model of agriculture in Gansu

<table>
<thead>
<tr>
<th>Year</th>
<th>Value 1</th>
<th>Value 2</th>
<th>Value 3</th>
<th>Value 4</th>
<th>Value 5</th>
<th>Value 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>521.50</td>
<td>3726.0</td>
<td>761.40</td>
<td>1406.9</td>
<td>75.90</td>
<td>218.45</td>
</tr>
</tbody>
</table>
### Table 2-20 estimation on production function model of agriculture in Gansu II

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-344.483</td>
<td>50.32086</td>
<td>-6.84573</td>
<td>0.0000</td>
</tr>
<tr>
<td>T</td>
<td>0.135718</td>
<td>0.024789</td>
<td>5.474875</td>
<td>0.0001</td>
</tr>
<tr>
<td>LOG(S)</td>
<td>9.828365</td>
<td>1.212348</td>
<td>8.106887</td>
<td>0.0004</td>
</tr>
<tr>
<td>LOG(L)</td>
<td>-0.087314</td>
<td>0.438193</td>
<td>0.19926</td>
<td>0.8438</td>
</tr>
<tr>
<td>LOG(K1)+LOG(K2)+LOG(K3)</td>
<td>-0.15668</td>
<td>0.085477</td>
<td>-1.83298</td>
<td>0.0798</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.991454</td>
<td>Mean dependent vary</td>
<td>4.778458</td>
<td></td>
</tr>
</tbody>
</table>
2. Analysis on the grey correlation between agricultural input and output.

Due to information inadequacy, the agriculture production system is a typical grey system. In order to test the correlation between input of various factors and their respective output, and make the testing results more reliable, we did some grey correlation analysis on the investment efficiency of agriculture.

2.1 calculation method of correlation degree

Among many calculation methods of correlation degree, we here choose the popular method of absolute correlation degree. Assume that there are m observed values for the temporal series of one output index and n input indexes, output index series is $x_0(k)$, input index is $x_i(k)$, k=1, 2, ...m; i=1, 2, ...n, then the correlation coefficient between $X_0$ and $X_i$ at point k is:

$$
\varepsilon_{i(k)} = \frac{\min_{i} \min_{k} |x_0(k) - x_i(k)| + p \max_{i} \max_{k} |x_0(k) - x_i(k)|}{|x_0(k) - x_i(k)| + p \max_{i} \max_{k} |x_0(k) - x_i(k)|}
$$

(5)

$\varepsilon_{i(k)}$ is the correlation coefficient between $X_0$ and $X_i$ at point k, $|x_0(k) - x_i(k)|$ is the absolute value of series $X_i$ and series $X_0$ at k point, $\min_{i} \min_{k} |x_0(k) - x_i(k)|$ is two-stage minimum probability, $\max_{i} \max_{k} |x_0(k) - x_i(k)|$ is two-stage maximum probability, they are the minimum value and maximum value in the number set respectively, the resolution ratio p ranges from 0 to 1, and usually takes 0.5. The general correlation coefficient between $X_0$ and $X_i$ is:

$$
\rho_i = \frac{1}{m} \sum_{k=1}^{m} \varepsilon_{i(k)}
$$

(6)
2.2 analyses on the correlation between agricultural input and output in Gansu

We take the yielding value as variable of output, agricultural investment, seeding area and labor as three variables of input with a time span from 1978 to 2005. Refer to Table 1 for relevant statistics. Due to the differences among various indexes in dimension, non-dimensional analysis would be necessary to measure the correlation degree. To make a non-dimensional analysis, we convert absolute values of each year into their respective sequential growth rate, which is listed in Table 4. Then we can calculate the correlation degree between input and output of each year, which is listed in Table 5. And finally we can figure out the general correlation coefficient between growth of each input and growth of yielding value according to function (6). As the result indicates, labor is mostly correlated with yielding value, with a correlation degree of 0.84. It is followed by seeding area, with a correlation degree of 0.82. The least correlated factor is agricultural investment, with a correlation degree of 0.79. Since the correlation coefficients of the three input factors are all around 0.8, all the three factors are highly relevant with agricultural output. That means that the agricultural industry in Gansu is still input-based, and increase of input would be of great significance to agricultural growth in the near future. The dynamic correlation degree between each factor and the yielding value varies in different period. During 1979 to 1982, labor was mostly correlated, indicating a labor-driven period; in 1983 to 1987, agricultural investment was mostly correlated, suggesting a capital-driven period; in 1988 to 2002, again, labor was mostly correlated, maybe because of labor migration; in 2003 to 2005, agricultural investment overshadowed other factors in terms of correlation degree. Therefore, it would be very helpful to increase agricultural investment. However, the growth rate of agricultural investment has been declining ever since 1997 (refer to Graph 1), and the yielding value began to descend after reaching its peak in 1995. Thus, it would be of significance for agricultural industry in Gansu to adjust investment policies and deepen investment reform.

<table>
<thead>
<tr>
<th>time (year)</th>
<th>yielding X0</th>
<th>Seeding area X1</th>
<th>labor X2</th>
<th>Agricultural investment X3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>3.70</td>
<td>-0.98</td>
<td>2.08</td>
<td>11.31</td>
</tr>
<tr>
<td>1980</td>
<td>17.65</td>
<td>0.22</td>
<td>4.10</td>
<td>2.08</td>
</tr>
<tr>
<td>1985</td>
<td>20.85</td>
<td>0.68</td>
<td>-2.31</td>
<td>17.16</td>
</tr>
<tr>
<td>1990</td>
<td>15.63</td>
<td>0.95</td>
<td>3.34</td>
<td>36.10</td>
</tr>
</tbody>
</table>

Table 2-21 aggregate yielding and sequential growth rate of various input factors of agriculture in Gansu from 1979 to 2005  %
<table>
<thead>
<tr>
<th>Time</th>
<th>Seeding Area and Yielding</th>
<th>Labor and Yielding</th>
<th>Investment and Yielding</th>
<th>Ranking of Correlation between Seeding Area and Yielding</th>
<th>Ranking of Correlation between Labor and Yielding</th>
<th>Ranking of Correlation between Investment and Yielding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>0.92</td>
<td>0.97</td>
<td>0.87</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1980</td>
<td>0.74</td>
<td>0.79</td>
<td>0.76</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1981</td>
<td>0.92</td>
<td>1.00</td>
<td>0.91</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1982</td>
<td>0.86</td>
<td>1.00</td>
<td>0.99</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1983</td>
<td>0.63</td>
<td>0.63</td>
<td>0.66</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>1984</td>
<td>0.97</td>
<td>0.98</td>
<td>0.63</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1985</td>
<td>0.71</td>
<td>0.68</td>
<td>0.94</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>1986</td>
<td>0.76</td>
<td>0.78</td>
<td>0.93</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>1987</td>
<td>0.78</td>
<td>0.84</td>
<td>0.87</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>1988</td>
<td>0.62</td>
<td>0.63</td>
<td>0.54</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1989</td>
<td>0.91</td>
<td>0.99</td>
<td>0.92</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1990</td>
<td>0.77</td>
<td>0.80</td>
<td>0.71</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1991</td>
<td>0.90</td>
<td>0.93</td>
<td>0.85</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1992</td>
<td>0.97</td>
<td>0.95</td>
<td>0.73</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>1993</td>
<td>0.66</td>
<td>0.64</td>
<td>0.98</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>1994</td>
<td>0.45</td>
<td>0.44</td>
<td>0.34</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>1995</td>
<td>0.65</td>
<td>0.63</td>
<td>0.79</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>1996</td>
<td>0.78</td>
<td>0.80</td>
<td>0.73</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1997</td>
<td>0.99</td>
<td>0.96</td>
<td>0.68</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>1998</td>
<td>0.95</td>
<td>0.95</td>
<td>0.68</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1999</td>
<td>0.90</td>
<td>0.91</td>
<td>0.75</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2000</td>
<td>0.96</td>
<td>1.00</td>
<td>0.76</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2001</td>
<td>0.86</td>
<td>0.88</td>
<td>0.77</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>
Figure 2-5 Analysis on changes in total factor productivity (TFP) of agriculture in Gansu

1.3.1 Malmquist Index

To have a better understanding of agricultural productivity in Gansu, we now analyze on the changes in agricultural TFP with Malmquist Index. Malmquist Index, a method based on Data envelopment analysis (DEA), was originally put forward by Malmquist (1953), and used for the first time as productivity index by Caves et al in 1982. Usually, the Malmquist Index is used to analyze on samples of multiple countries or regions, but it's also able to test the TFP changes of one country, based on temporal series data. Here, we will focus on some major conclusions and description of Malmquist Index and DEA, you can look for specifics in other books.

From period $t$ to period $t+1$, the Malmquist Index of TFP growth rate can be expressed as the following:

$$M_{i,t+1}(x^*_i, y^*_i, x^{t+1}_i, y^{t+1}_i) = \left[ \frac{D_i'(x^*_i, y^*_i)}{D_i'(x_i, y_i)} \frac{D_i^{t+1}(x_i^{t+1}, y_i^{t+1})}{D_i^{t+1}(x^*_i, y^*_i)} \right]^{1/2}$$

(7)
During time period \( t \) in region \( i \). Yielding value \( Y \) is expressed as \( y'_i = (Y'_i) \), while \( D'_t(x'_i, y'_i) \) and \( D'_t(x'^{+1}_i, y'^{+1}_i) \) stand for distance functions during time period \( t \) and time period \( t+1 \) respectively, based on technology \( T_t \) of time period \( t \). The Malmquist Index based on technology \( T_t \) from period \( t \) to period \( t+1 \) is defined as:

\[
M'_t(x'_i, y'_i) = \frac{D'_t(x'_i, y'_i)}{D'_t(x'_i, y'_i)}
\]

Likewise, the Malmquist Index based on technology \( T^{t+1} \) of period \( t+1 \) from period \( t \) to period \( t+1 \) is defined as:

\[
M^{t+1}(x'_i, y'_i, x'^{t+1}_i, y'^{t+1}_i) = \frac{D^{t+1}(x'_i, y'_i)}{D^{t+1}(x'_i, y'_i)}
\]

\[
M_{i,t+1}(x'_i, y'_i, x'^{t+1}_i, y'^{t+1}_i) = \frac{D^{t+1}(x'_i, y'_i)}{D^{t+1}(x'_i, y'_i)} \left[ D_t(x'_i, y'_i) \right]^{1/2}
\]

After the pattern of Fisher's ideal index, Caves, Christensen and Diewert (1982) took the geometric average of the above two functions, i.e. function \( (7) \) as the Malmquist Index indicating productivity changes from period \( t \) to period \( t+1 \). When the index is larger than 1, it means that there is TFP growth from \( t \) to \( t+1 \).

Function \( (1) \) can be broken down as the product of two parts, as shown in the following:

\[
M_{i,t+1}(x'_i, y'_i, x'^{t+1}_i, y'^{t+1}_i) = \frac{D^{t+1}(x'_i, y'_i)}{D^{t+1}(x'_i, y'_i)} \left[ D_t(x'_i, y'_i) \right]^{1/2}
\]

The first part \( EF \) stands for productivity changes from \( t \) to \( t+1 \), and the second part \( TC \) stands for technological changes from \( t \) to \( t+1 \) (refer to Fare et al. 1994 for specifics).

To apply this theoretical tool to practice, we need to calculate various distance functions of input and output, which entails DEA of region \( i \):

\[
\sum_{j=1}^{n} \lambda_j K_{jp} \leq K_{jq}
\]

In the above function, \( K_{jp} \) and \( q \) represent time periods, then,

\[
D^p_{t}(x^p_i, y^p_i) = (\alpha_i(p,q))^{\lambda^p_{t}}_{L_j, \lambda^p_{t+1}, \lambda^p_{t+2}, \ldots, \lambda^p_{t+n} = 0}
\]
1.3.2 Analysis on the changes in TFP of agriculture in Gansu

Now we are going to measure the changes in TFP of Gansu agriculture from 1978 to 2005 with Malmquist Index by taking yielding value as factor of output, and seeding area, labor and agricultural investment as three factors of input. Since there are no other areas to compare, the technological efficiency index, net technological efficiency index and scale efficiency index are all equal to one, and need no more analysis. So we will only focus on the last column on Table 6, i.e. the changes of TFP. Generally speaking, the TFP in Gansu is not very high; actually it is on the decline with an average Malmquist Index of 0.9160. But in terms of trend, TFP accelerated from 1979 to 1984, maybe because of efficient utilization of various factors thanks to the reform in rural economy. The TFP grew steadily from 1984 to 1992, before it began to descend. It declined to the lowest point in 1995, and then began to climb up. It then kept growing steadily from 1998 to 2002 before it declines again in 2002.

Table 2-22 Malmquist Index analysis on agricultural production in Gansu from 1979 to 2005

<table>
<thead>
<tr>
<th>year</th>
<th>technological efficiency index</th>
<th>technological change index</th>
<th>net technological efficiency index</th>
<th>scale efficiency index</th>
<th>TFP index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>1</td>
<td>0.711</td>
<td>1</td>
<td>1</td>
<td>0.711</td>
</tr>
<tr>
<td>1980</td>
<td>1</td>
<td>0.816</td>
<td>1</td>
<td>1</td>
<td>0.816</td>
</tr>
<tr>
<td>1981</td>
<td>1</td>
<td>0.875</td>
<td>1</td>
<td>1</td>
<td>0.875</td>
</tr>
<tr>
<td>1982</td>
<td>1</td>
<td>0.894</td>
<td>1</td>
<td>1</td>
<td>0.894</td>
</tr>
<tr>
<td>1983</td>
<td>1</td>
<td>0.864</td>
<td>1</td>
<td>1</td>
<td>0.864</td>
</tr>
<tr>
<td>1984</td>
<td>1</td>
<td>0.928</td>
<td>1</td>
<td>1</td>
<td>0.928</td>
</tr>
<tr>
<td>1985</td>
<td>1</td>
<td>0.907</td>
<td>1</td>
<td>1</td>
<td>0.907</td>
</tr>
<tr>
<td>1986</td>
<td>1</td>
<td>0.928</td>
<td>1</td>
<td>1</td>
<td>0.928</td>
</tr>
<tr>
<td>1987</td>
<td>1</td>
<td>0.918</td>
<td>1</td>
<td>1</td>
<td>0.918</td>
</tr>
<tr>
<td>1988</td>
<td>1</td>
<td>0.881</td>
<td>1</td>
<td>1</td>
<td>0.881</td>
</tr>
</tbody>
</table>
2. Analysis on investment efficiency of grain

As a kind of important strategic material to the agriculture-based national economy, grain plays an important role in supporting national development, invigorating economy and stabilizing society. Therefore, it's of realistic significance in raising the amount of output. In today's society when the market-oriented and strategic restructuring of agriculture is being carried out, agriculture still shoulders the historical responsibility of enhancing comprehensive production capacity of grain and safeguarding food security of the nation. The key of increasing the grain output lies in raising grain output per unit. There are many factors that could affect grain output per unit, but the most fundamental ones are land, labor and cash investment, which have a direct impact on grain output. This section will have a quantitative analysis on the investment efficiency of grain with statistics and relevant metering methods.
### Table 2-23  agricultural input and grain output in Gansu

<table>
<thead>
<tr>
<th>Year</th>
<th>input (100m RMB)</th>
<th>output (10,000 ton)</th>
<th>area (1000 hm²)</th>
<th>output per unit (kg/hm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>3.89</td>
<td>510.55</td>
<td>2995.95</td>
<td>1704.13</td>
</tr>
<tr>
<td>......</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>25.56</td>
<td>686.59</td>
<td>2875.16</td>
<td>2387.97</td>
</tr>
<tr>
<td>......</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>107.67</td>
<td>713.48</td>
<td>2798.21</td>
<td>2549.77</td>
</tr>
<tr>
<td>......</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>218.45</td>
<td>836.89</td>
<td>2587.19</td>
<td>3234.75</td>
</tr>
</tbody>
</table>

From: Gansu Statistic Yearbook (1979-2005), by China Statistic Publishing House

The following production function model is built to analyze on the investment efficiency of grain in Gansu. In this function, yielding refers to grain output, agricultural investment stands for cash input, area of growing area stands for input of land, and input of labor is represented by grain output per unit, which is closed related to the former.

\[
y = e^{\alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3}
\]

(10)

In function (10), \(y\) stands for grain output (10,000 tons), \(x_1\) for agricultural investment (100 million yuan), \(x_2\) for grain growing area (1000 hm²), \(x_3\) for grain output per unit (kg/ hm²). \(\alpha_i (i = 1, 2, 3)\) represent output elasticity of the input factors.

The following result is based on statistics from 1978 to 2005 and Eview5.0.

\[
y = e^{-9.2137 x_1 -0.0001 x_2 1.0017 x_3 0.9988}
\]

(11)

\[
R^2 = 0.9999 , \quad F = 105478.4 , \quad P=0.0000
\]

The F value of the significance test of function (11) is 105478.4, much larger than F0.01 (3, 24), which means distinct regression effect of the function. The multiple correlation co-efficiency is 0.9999. Function (11) shows that increase of growing area and output per unit are obviously conducive to grain output. Under certain conditions,
every one unit increase of growing area will bring about 1.0017 unit increase of grain output, and every one unit increase of output per unit will bring about 0.9988 unit increase of total output. However, increase of agricultural investment has a negative impact on grain output. Under certain conditions, every one unit increase of agricultural investment will cause 0.0001 unit loss in output. According to the above analysis, the grain production in Gansu is still at the stage of explosive growth. The increase of output mainly depends on growing area and labor, while agricultural investment is insignificant or even negative in contributing to total output. There are many reasons for this, such as too little investment in developing and popularizing agricultural technologies, and poor utilization of assistant capital in grain production and agricultural production.

3. Analysis on investment efficiency of crop farming

As one of the major traditional crops in Gansu, crop farming takes quite a large part in crop output. So the investment efficiency of crop farming is closely related to the social economic development and people's income in Gansu. Since the fundamental status of grain crops is once again attached great importance to, Gansu has gradually increased input in crop farming in recent years (see Table 8). Meanwhile, in order to bring more income to farmers, the government carried out some restructuring within the crop farming sector by enlarging the share of some cash crops. Now let's have a quantitative analysis on the crop farming industry.

<table>
<thead>
<tr>
<th>Year</th>
<th>Crop Farming Area</th>
<th>Wheat Area (10,000 mu)</th>
<th>Wheat Output (10,000 ton)</th>
<th>Corn Area (10,000 mu)</th>
<th>Corn Output (10,000 ton)</th>
<th>Potato Area (10,000 mu)</th>
<th>Potato Output (10,000 ton)</th>
<th>Fruit Area (10,000 mu)</th>
<th>Fruit Output (10,000 ton)</th>
<th>Vegetables Area (10,000 mu)</th>
<th>Vegetables Output (10,000 ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>18.05</td>
<td>2140.50</td>
<td>236.03</td>
<td>449.66</td>
<td>101.64</td>
<td>418.59</td>
<td>47.05</td>
<td>52.61</td>
<td>11.69</td>
<td>67.74</td>
<td>57.58</td>
</tr>
<tr>
<td>1980</td>
<td>22.00</td>
<td>2075.40</td>
<td>240.05</td>
<td>477.27</td>
<td>89.13</td>
<td>439.77</td>
<td>44.13</td>
<td>51.34</td>
<td>12.75</td>
<td>67.03</td>
<td>57.57</td>
</tr>
<tr>
<td>……</td>
<td>67.03</td>
<td>57.57</td>
<td>24.45</td>
<td>2.52</td>
<td>……</td>
<td>……</td>
<td>……</td>
<td>……</td>
<td>……</td>
<td>……</td>
<td>……</td>
</tr>
<tr>
<td>1990</td>
<td>73.24</td>
<td>2187.37</td>
<td>365.31</td>
<td>450.59</td>
<td>137.56</td>
<td>440.57</td>
<td>61.08</td>
<td>246.86</td>
<td>38.49</td>
<td>95.43</td>
<td>204.58</td>
</tr>
<tr>
<td>……</td>
<td>204.58</td>
<td>25.20</td>
<td>2.64</td>
<td>……</td>
<td>……</td>
<td>……</td>
<td>……</td>
<td>……</td>
<td>……</td>
<td>……</td>
<td>……</td>
</tr>
</tbody>
</table>

377
In the following function, the yielding value of crop farming represents output as a
dependent variable, while the independent variables are the planting area and output
of the major crops in Gansu including wheat, corn, potato, fruit, vegetable and
traditional Chinese medical herb.

\[ y = e^{\alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \alpha_4 x_4 + \alpha_5 x_5 + \alpha_6 x_6} \]  

(12)

In function (12), \( y \) stands for yielding value of crop farming (100 million yuan), \( x_1 \)
for planting area of wheat (10,000 mu), \( x_2 \) for planting area of corn (10,000 mu),
\( x_3 \) for planting area of potatoes (10,000 mu), \( x_4 \) for planting area of fruit (10,000
mu), \( x_5 \) for planting area of vegetable (10,000 mu), \( x_6 \) for planting area of
traditional Chinese medical herb, and \( \alpha_i (i=1,2,3,4,5,6) \) for output elasticity of
these crops respectively.

The following result is based on statistics in Table 7 and Eview 5.0.

\[ y = e^{\alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \alpha_4 x_4 + \alpha_5 x_5 + \alpha_6 x_6} \]  

(12)

The \( F \) value of the significance test of function (12) is 214.2991, much larger than
\( F_{0.01} (6, 21) \), which means distinct regression effect of the function. The multiple
correlation coefficient is 0.9839.

Function (13) shows that increase of growing area of whatsoever crops among wheat,
corn, fruit, vegetable and traditional Chinese medical herb is conducive to grain
output. Under certain conditions, every one unit increase of growing area of the above
crops will bring about 1.1143, 0.0754, 0.4657, 1.2753 and 0.08770 unit increase of
grain output respectively. Potato is the only one crop with a negative elasticity
coefficient of -0.5308, which means increase of growing area of potato does no good
to the output. Among the five positive elasticity coefficients, the impact of fruit,
vegetable and traditional Chinese medical herb on the total yielding of crop farming is significant, while the impact of wheat and corn is not. The author believes that the major reasons behind this are: firstly, as traditional crops, wheat and corn have relatively low prices and added value, thus have low contribution rate to the industry, while fruit and herb, kind of cash crops, enjoy relatively high prices. Herb, in particular, has an even higher price, and plays positive role in raising total yielding value and bring more income to farmers. Large area of vegetable planting enables farmers to sell surplus products to neighboring towns or provinces, thus contributing to the yielding value and farmers' income. Secondly, in order to respond to the Central Government's policy to increase farmers' income, local governments would favor the development of cash crops including fruit and herb, and provide adequate market information, while traditional crops do not have such preference.

4. Analysis on investment efficiency of animal husbandry

As one of the most important part of agricultural industry in Gansu, the husbandry industry has been growing for 20 years (see Table 9), playing an important role in promoting the development of rural economy and increasing farmers' income. With the leap frog development of large-scale of live farming in Gansu in the past one decade, the husbandry industry has gradually become a emerging and pillar industry with the fastest growing speed and greatest contribution to farmers' income. The following function is built to have a better understanding of the contribution to total yielding value by different products.

\[ y = e^{e^{\alpha_0 x_1^{\alpha_1} x_2^{\alpha_2} x_3^{\alpha_3} x_4^{\alpha_4}}} \]  

(14)

In function (14), \( y \) stands for yielding value of husbandry industry (100 million yuan), \( x_1 \) for pork output (10,000 tons), \( x_2 \) for beef output (10,000 tons), \( x_3 \) for milk output (10,000 tons), \( x_4 \) for mutton output (10,000 tons), and \( \alpha_i (i = 1, 2, 3, 4) \) for output elasticity of the above products.

The following result is based on statistics in Table 3 and Eviws 5.0.

\[ y = e^{1.6453 x_1^{0.0670} x_2^{0.6263} x_3^{0.0755} x_4^{0.4297}} \]  

(15)
\[ R^2 = 0.9824, \quad F = 306.8254, \quad P = 0.0000 \]

### Table 2-25 analysis on investment efficiency of husbandry in Gansu

<table>
<thead>
<tr>
<th>year</th>
<th>husbandry value (100 m rmb)</th>
<th>pig (10,000 ton)</th>
<th>cow (10,000 ton)</th>
<th>milk (10,000 ton)</th>
<th>sheep (10,000 ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>3.78</td>
<td></td>
<td></td>
<td></td>
<td>2.02</td>
</tr>
<tr>
<td>......</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>4.74</td>
<td>12.26</td>
<td>0.47</td>
<td>2.47</td>
<td>1.22</td>
</tr>
<tr>
<td>......</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>25.77</td>
<td>25.00</td>
<td>3.02</td>
<td>7.86</td>
<td>3.83</td>
</tr>
<tr>
<td>......</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>71.72</td>
<td>40.97</td>
<td>7.85</td>
<td>13.31</td>
<td>7.54</td>
</tr>
<tr>
<td>......</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>129.11</td>
<td>53.79</td>
<td>12.64</td>
<td>31.19</td>
<td>13.10</td>
</tr>
</tbody>
</table>

From: China Statistic Yearbook (1979-2005), by China Statistic Publishing House

The F value of the significance test of function (15) is 306.8254, much larger than F0.01 (4, 23), which means distinct regression effect of the function. The multiple correlation coefficient is 0.9824.

Function (15) shows that increase of output of whatsoever products among pork, beef, milk and mutton is conducive to total yielding. Among the four products, the impact of beef is the most remarkable. Under certain conditions, every one unit increase of beef output will bring about 0.6263 unit increase of total yielding value. And every one unit increase of output of pork, milk and mutton will bring about 0.0670, 0.0755 and 0.4297 unit increase of total yielding value. It is clear that the investment efficiency of the husbandry industry in Gansu is relatively high, and this is indispensable with Gansu's industrial policy of "accentuating local characteristics through optimizing industrial structure". As one of the top five pasturing area in China, Gansu boasts a vast area of natural grassland that accounts for 39.4% of the total land area of the province, providing sufficient resources for the development of husbandry industry. Gansu has successfully added the yielding value of husbandry by making full use of the endowed natural resources, focusing on raising pigs, cows,
sheep, developing milk industry, and creating its own brand.

5. Summary

Based on the above empirical analysis on the investment efficiency of grain, crop farming and husbandry, we find out that in Gansu Province, increase of grain output mainly depends on expansion of grain planting area, while agricultural investment has little impact on grain output. In crop farming industry, cash crops have great impact on value-adding, while the impact of traditional crops is tiny. In husbandry, investment in all kinds of products helps to increase the output value.

Now the paper will be concluded with some suggestions on how to enhance agricultural investment efficiency in Gansu. Firstly, investment in agriculture should be increased to study and popularize technologies and provide skill training to farmers. With the implementation of “converting farmland for forestry and pasture” policy, arable land area is bound to shrink, and it would be impossible to increase grain output by expanding grain growing area. Therefore the growth pattern of grain must be converted from the extensive one to an intensive one, and to that end, intensified study and popularization of agricultural science and technology would be the best option. Secondly, the inner structure of crop farming should be optimized by enlarging the share of cash crops which have high added value according to the principle of being market-oriented and focusing on economic performance. In other words, to raise the output value of crop farming, while maintaining the traditional crops, Gansu should put more efforts in developing cash crops to satisfy the market demand and increase farmers’ income as well. Thirdly, the endowed natural resources should be further exploited to develop the profit-making husbandry industry, and build up Gansu’s own brands. The development of husbandry industry could be accelerated by optimizing product structure, enhancing quality, efficiency, improving labors’ skills, and establishing four major science and technology service system of fine seeding, fodder, kale yard and disease prevention. Research could be carried out on breed, grassland and fodder resources, and multi-dimensional technical trainings in various forms could be organized to improve the skill of farmers. There should be an intermediary organization between peasant households and market to nurture the market demand and enable husbandry industry to move towards regionalization and industrialization. Other than that, there should be full-fledged infrastructure and a full
package of technological services so that the agricultural industry in Gansu will enjoy adequate information, huge market demand and unblocked development path.

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Appendix 4

Review and Comment on Agricultural Development Policies in Gansu and their performance

Gansu Academy of Social Sciences, Wang Junfeng

Traditional classical economic theory believes that agricultural output depends on the amount of land, labor and capital, while the agricultural development theory under the New Institutional Economics believes that agricultural development is mainly determined by the policy arrangement to enhance land and labor productivity. Policy guarantee is indispensable for agricultural success in any countries in the world. A more familiar fact is that the policies carried out by China in the past half a century has had a far-reaching impact on China's agricultural development. The differences in agricultural performance brought about by the rural reform are so remarkable that any person who is interested in agriculture does not need abstruse theories to feel the great influence of policies. The same is true with Gansu's agricultural development.

1. Gansu's agricultural development policies and their performance prior to the reform and opening up

From 1949 to 1978, agricultural development in Gansu, like in other parts of China, experienced the period of national economic recovery and rapid development during the first Five-Year Plan, period of "Great Leap Forward" Movement and adjustment in the 1960s, and period of tortuous development in the Cultural Revolution. Gansu's agricultural development policies during these periods are no different from those in other parts in China from the macro perspective, but Gansu still had its own characteristics from micro perspective.

4. Agricultural development policy and its performance during the period of national economic recovery and rapid development during the first Five-Year Plan

In the early 1950s, Gansu adopted an economic development policy that focused on
recovering and developing crop farming and animal husbandry and brought about rapid agricultural development (see Table 1). The main measures are as following:

The first one is a prudent and differentiated land reform policy. Land reform was carried out step by step in old districts, pilot areas and crop farming areas before it was taken in new districts, non-pilot areas and pastures. This policy was in line with Gansu's local conditions and generated fruitful results. In particular, Gansu handled and settled ethical and religious problems with precaution, and accumulated experience in conducting socialist transformation of flock-masters through redemption, reflecting the spirit of scientific and harmonious development.

The second one is water and soil conservation policy that aimed at preventing soil erosion. Farmland water-conservation constructions were carried out to expand irrigating areas by give people work in place of relief subsidies. By the end of the first Five-Year Plan period, the whole province built over 20 large-scale water-conservation projects including trunk canals and reservoirs, and effective irrigation area was expanded from 4.7115 million mu in 1949 to 6.4459 million mu. Apart from that, governments below the provincial level set up a batch of demonstration areas of water and soil conservation to popularize conservation measures including terrace, drainage system, ridging check and afforestation.

<table>
<thead>
<tr>
<th>Table 2-26 agricultural performance in Gansu during the economic recovery and the First Five-Year Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>year</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>1952</td>
</tr>
<tr>
<td>1957</td>
</tr>
<tr>
<td>increase by (%)</td>
</tr>
</tbody>
</table>

From: statistics from Forty Years in Gansu, by Gansu Statistical Bureau

---

1.2. Agricultural development policy and its performance during the period of
"Great Leap Forward" Movement and adjustment in the 1960s.

From 1958 to 1962, like other parts in China, Gansu implemented the Central
Government's instructions on "Great Leap Forward" and the people's communes,
which caused severe disturbance and destruction to agriculture. Gansu witnessed a
disaster and a painful lesson in its history of agricultural development. The disaster
refers to the big famine caused by state requisition purchases and equal payment
regardless of work performance. In 1959, the entire province purchased 1.27 billion
kilograms of grain, accounting for 37.5% of the aggregate annual output. The per
capita consumption of grain was only 0.38 kilogram at that time, and peasants could
barely make their ends meet. The communal pot policy of distributing equal share of
food to people regardless of their work performance led to serious food shortage in 26
counties among the total 45 counties, with 1.54 million people severely afflicted and
2200 people died of food shortage and dropsy.26 The lesson refers to the "Tao River
Water Diversion Project". This so-called "communist project" kicked off on June 17,
1958. It involved over 100,000 people, cost the Central Government 140 million yuan,
and caused severe grain and material shortage in Qingyang, Tianshui and Pingliang. It
was forced to hall after 28 months of hard work. Compared with 1957, Gansu's grain
output decreased by 105,000 tons, oil-bearing crops by 50,900 tons and cotton by
5,100 tons in 1962. Also, the number of big animals was down by 1.31 million.27

Gansu's agricultural development policies were adjusted after the "Xilan Conference"
was held in early December, 1960 and the policy of "adjusting, consolidating,
fulfilling and improving" was adopted by the Central Government.

Firstly, the policy of agricultural production relations was adjusted. In this regard,
three major policies were taken. One is to turn the basic rural unit from brigade to
production team, set a definite quantity for requisition task, and provide assistance to
peasants in need in terms of food, clothes, shelter, medical service and burial. The
households in need were granted with special treatment, while the rest got paid
according to their work performance. The second one is to grasp the two ends to bring

26 Li Qingling, Economic History of Gansu. Lanzhou University Press, 1996, P277
along the middle, in other words, to sustain the advanced and help the backward so as
to encourage the vast majority to move along. A "small freedom" policy was also
adopted to increase the share of commune members’ private plot in arable land from
5% to 7%, separate 3-5% of arable land for commune members to use as fodder land,
allow production teams to sell big livestock to individual commune members or
households, and to open village fair trade in order to have diversified channels and
balance supply and demand. The third one is to popularize the agricultural production
responsibility system. In 1962, Linxia, Wudu and Qingyang witnessed the appearance
of contracting production quotas to individual households. In particular, the number
of production teams which “contract work and production to individual households”
and adopt an “all-round responsibility system” in Linxia accounted for 72% of the
total. The Gansu provincial party committee initially approved this, but then had to
“correct mistakes” when the Central Government re-emphasized on class struggle.

Secondly, the policy of compressing urban population and alleviating the burden of
agriculture was adopted. In July, 1961, the Gansu provincial party committee issued
an instruction to reduce urban population, strengthen agriculture and reduce grain
sales to urban areas. Urban population was reduced twice by 480,000 in the same year.
In 1962, another 400,000 urban population was reduced, and in 1963, 127,000.28 As a
result, the pressure on the grain supply was eased, but rural population increased,
which lowered agricultural productivity.

Thirdly, an initial agriculture protection policy was adopted. Major measures include
raising purchasing prices of agricultural products, increasing bank loans to rural
economy and agriculture, reducing grain requisition, stopping unpaid transfer of
communes’ and individuals’ property and labor, making compensations and
organizing the secondary industry and other industries and sectors to support
agriculture.

Table 2-27 agricultural performance in Gansu during the “Great Leap Forward” and the
1960s

<table>
<thead>
<tr>
<th>year</th>
<th>Value (10,000 yuan)</th>
<th>Aggregate output of major products</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grain (10000 tons)</td>
<td>Cotton (tons)</td>
</tr>
</tbody>
</table>

1.3 Agricultural development policy and its performance during the period of the "Culture Revolution"

The “Culture Revolution” severely disturbed the normal agricultural production, nullified effective agricultural development policies and impaired agricultural development by overemphasizing on the development of grain. Guided by the spirit of “Beinong Conference” and the policy of comprehensive rectification, Gansu accentuated and carried out agricultural development policies of constructing water conservancy projects and large-scale agricultural infrastructure, which quickly improved production conditions and enhanced the aggregate output value.

Firstly, a batch of large-and-medium water conservancy projects were built, which greatly improved agricultural production conditions in Gansu. During the “Cultural Revolution”, Gansu’s water conservancy projects focusing on water conservancy and land preparation scored great achievements in retrospect. According to statistics, during this period of time, Gansu completed 23 large-and-medium water conservancy projects. Hexi had 13 of them, creating sound conditions for Hexi to become a major production base of commodity grain in Gansu.

Secondly, remarkable achievements were achieved in minor watershed management and large-scale infrastructure construction. By 1974, 51 items of plan on minor watershed management were put forward, and in July and August of the same year, a spot meeting on minor watershed management was convened in Qingyang and Longxi, a document on minor watershed management was drafted, and minor watershed in Shanhegou Hill was better managed. Since the Beinong Conference, every winter and spring in Gansu had witnessed over one million people (in one year, as many as 2.6 million) engaged in infrastructure-building, which focused on
soil-improving and water-conserving. By 1975, more than 20,000 water conservancy projects were completed, irrigation area was expanded by 1.16 million mu, 1.42 million mu of level terrace was built and 1.75 million strip checks was created.29

Thirdly, the policy of industry-supporting-agriculture achieved initial results. After the Beinong Conference, Gansu motivated and organized almost 200 large enterprises in manufacturing machinery and electric equipment, producing 18400 km of circuit devices, which brought electricity to 65% of communes in Gansu. 70% of chain-type tractors were equipped with push plates and over 60 power plants, fertilizer plants and agricultural machinery repair shops were built, which enhanced the level of agricultural equipment in Gansu.

<table>
<thead>
<tr>
<th>year</th>
<th>Value (10,000 yuan)</th>
<th>Aggregate output of major products</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Grain (10000 tons)</td>
</tr>
<tr>
<td>1970</td>
<td>164281</td>
<td>412.10</td>
</tr>
<tr>
<td>1975</td>
<td>226100</td>
<td>551.70</td>
</tr>
<tr>
<td></td>
<td>increased by (%)</td>
<td>37.63</td>
</tr>
</tbody>
</table>

2. Agricultural development policies in Gansu and their performance since reform and opening up

Since reform and opening up, Gansu’s agricultural development policy experienced several important stages.

2.1 The period of continuing with reform and opening up, and steadily implementing the agricultural development policies by the Central Government

From 1978 to the end of 1980s, on the basis of reforming the agricultural management system, deepening and improving the household responsibility contract system, Gansu developed a policy of “developing diversified agricultural products, while guaranteeing the production of grain”. The major measures include the following:

One, Gansu took the construction of Dingxi and Hexi as an opportunity, and focused on development of commodity production bases of grain and cash crops. By 1989, the Central Government had earmarked 1.16 billion yuan in the construction of Dingxi and Hexi. The aggregate agricultural output value in Dingxi and Hexi reached 2.901 billion yuan, increasing by 79.4% compared with 1982. 30 The commodity grain production bases in Hexi thus became relatively large, and grain supply and demand in mid-Gansu was basically in balance.

Two, Gansu adjusted the agricultural structure, and made a strategic transfer of “getting rid of poverty and getting rich through afforestation, development of husbandry and environmental improvement”, which turned the single development of crop farming to comprehensive development of crop farming, forestry, husbandry, sideline industry and fishery. The share of forestry, husbandry, sideline industry and fishery as a whole in aggregate agricultural output value increased from 29.6% in 1978 to 33.9% in 1986. 31

Three, Gansu achieved marked technical and economical returns by contracting technologies and popularizing agriculture technologies. For example, from 1985 to 1987, Dingxi contracted the technologies to cultivate high-yielding crops that covered one million mu of terrace, generating a net increase of 84.17 million jin (one jin = half a kilogram) of grain in three years, and a net increase of 40.28 million yuan of income. The ratio of input to output is 5.74: 1, and the ratio of popularizing cost to earning is 1: 115. 32

32 Gansu Agricultural Technology Policy Study Group. Study Report on Gansu’s Agricultural Technological Policies, P284
2.2 the period of market-oriented reform and agricultural commercialization

In the early 1990s, especially after Mr. Deng Xiaoping delivered a series of important speeches in Southern coastal cities, the conflict between small-scale peasant household operation and the market economy became increasingly intense along with the evolution of market-oriented reform and changes of market demand for agricultural products. Some provinces accumulated experiences in solving this conflict through agricultural commercialization. Their success encouraged Gansu to enter into the period of promoting agricultural commercialization. In 1995, Gansu party committee and Gansu provincial government made a decision to speed up the development of pillar industries and integrated operation, and gave strategic importance to the development of pillar industries dominated by forest fruit, livestock, vegetable and agricultural product processing so as to develop rural economy and increase peasants’ income.

Firstly, development bases were built up, and pillar industries were developed. The construction of Dingxi and Hexi and the strategy of “creating a new Hexi” starting in 1997 developed six pillar industries of grain, cotton, alcohol, melon and fruit, vegetable and seed production in Hexi, pillar industries of potato, medical herb, vegetable and meat in mid-Gansu, pillar industries of fruit, vegetable, tobacco and meat in Longdong, and characterized commodity base for agricultural products as well as pillar industry of dry and fresh fruit in Longnan.

Secondly, a batch of farm and sideline product processing enterprises was started. By 1998, a total of 1833 key agricultural product processing enterprises were started, including 219 starch processing enterprises, 176 fodder processing enterprises, 68 vegetable processing enterprises, 15 beer barley processing enterprises, 355 livestock and poultry butcher enterprises and 102 transport and distribution enterprises.33

Thirdly, specialized markets for farm and sideline products were developed, so were rural trading markets. By 1997, more than 2000 specialized markets for various farm and sideline products were developed, and various intermediary agencies and marketing forces also developed along.34 But there are still some problems, such as slow development of cooperative economic organizations of peasants, lack of convenient channel of product-marketing, insignificant influence of brand-building on

the market.

2.3 period of the Development of the West and the Tenth Five-Year Plan

Since the year of 2000, Gansu has taken advantage of the historic opportunities of the Development of the West and China’s accession to the WTO, and adopted agricultural development policies aiming at increasing peasants’ income by focusing on development of agriculture with local characteristics.

Firstly, regional competitive industries continue to appear, and the development pattern of characterized agriculture has initially come into being. Gansu gives priority to the development of characterized agriculture by making it the centre of agricultural development policies and measures, and directing projects and capitals to move towards it. In 2000, Gansu identified 22 key agricultural industries of the province during the Tenth Five-Year Plan, and explicitly pointed out the development path of characterized agriculture. In 2001, the provincial government established a special fund of 50 million yuan to offer special support to characterized agricultural sectors. In 2002, the provincial party committee and the provincial government concentrated the key agricultural sectors according to the concept of obtaining a large market share by developing leading companies, large-scale production bases and major sectors. Priority was given to ten competitive industrial bases, including seed production, vegetable, potato, traditional Chinese medical herb, brewing materials, fine pasture, dairy processing, beef cattle, bacon hog and quality fruit. As a result, a batch of regional competitive sectors gained a relatively large scale; potato, medical herb, clover, corn seed production, melon seed production and barley for making beer have maintained or become top one in China, and Gansu has become the largest medical herb production base in China, and also a major vegetable supply center for the Eastern China in winters and springs.

However, due to the relative backwardness in agricultural processing sector and short industry chain, the quantity advantage of characterized agriculture has not turned into economic advantage.

Secondly, the implementation of a series of preferential policies for peasants has greatly improved the policy environment for increasing peasants’ income. During the Tenth Five-Year Plan, particularly since 2003, Gansu began to carry out projects to bring more income to peasants mainly by implementing the Central Government’s
preferential policies for farmers, developing county economy and labor economy. In 2000, the per capita net income of peasants in Gansu was 1428.70 yuan, and it became 1980.0 yuan in 2005. That’s 551.3 yuan increase within five years, or an annual average of 110.26 yuan. But the growth rate of income has declined. Compared with the Eighth and Ninth Five-Year Plan, the growth rate of peasants’ income is not high in the Tenth Five-Year Plan. In the Tenth Five-Year Plan, the growth rate was only 6.74%, less than half of the 15.36% of the Eighth Five-Year Plan, and 3.43 percentage points less than the 10.17% of the Ninth Five-Year Plan. At present, the per capita net income of peasants in Gansu ranked the last but to one in the country, and is 1275 yuan less than the national average. It’s easy to see that low income of peasants will continue to be a major restriction factor for Gansu’s agricultural development. Therefore, the growth rate of peasants’ income will naturally become a major indicator for the performance of agricultural development policies in Gansu.
Sub-report 3

Technology Innovation and Hi-tech Industry

LI Xinnan
Abstract

Under the background of economic globalization and technological revolution, Gansu needs to achieve strategic transformation in its development mode. However, technological innovation and development of hi-tech industries in Gansu means more science and technology advancement, its foundation lying in the appropriate development model and approaches. As Gansu is less developed compared with those provinces in east China, efforts should be made in line with the strategy of opening up and giving full play to its advantages in an unconventional way, to adopt ten measures in four aspects so as to deepen its reform and create a favorable environment for innovation. These measures which shape “attractive pools in pillar industries and potential industries” can be boosters for innovation and economic development.

On the one hand, we should encourage high-tech industrial development in non-ferrous metals, equipment manufacturing and biotechnology industries, which are highly developed in Gansu; on the other hand, we intend to shape a lenient market environment for hi-tech development by pinpointing no specific key areas for hi-tech growth and supporting hi-tech application in all kinds of small and medium-sized enterprises.

Besides, the ‘dual structure’ of science and technology resources distribution of Gansu can be addressed by forging a technological innovation alliance that focuses on meeting innovative needs of regional pillar industries through a new mode with industry-education-research synergy.

In addition, while fulfilling the responsibilities of corpus function areas, Gansu may strive for more favorable tax policies from the central government to encourage more regional input to innovative undertakings. For example, in order to establish a mechanism that supports technology innovation, it is viable that the amount of national tax on Gansu be proportionately offset according to its yearly increased input in science and technology.
Since reform and opening up, though enjoying a rapid growth, the economic development in Gansu is still constrained by various factors, such as inadequate investment, lack of human resources and high technologies, undesirable environment, limited resources and disadvantageous geographical location. Thus compared to the development of the whole country, Gansu is weaker in economic strength. Facing the development of science and economy both at home and abroad, as a less developed province in China, Gansu needs to consider, in the course of making development strategy, on how to bring about sustainable socio-economic development through technology innovation and development of hi-tech industry.

To Gansu, technology innovation and development of hi-tech industry is not a pure issue regarding science and technology development. Fundamentally, it is actually an economic issue closely related to the mode of economic development. Therefore, it is necessary to relate technology innovation and hi-tech development to Gansu’ integral socio-economic development and economic restructuring, and integrate such issue into the overall strategic planning of Gansu’s development.

Based on our understanding of the international and domestic trend of socio-economic and scientific development, this section focuses on the opportunities and potential Gansu has in the future, analyzes possibility of promoting socio-economic development through technology innovation and development of hi-tech industry and put forward suggestions on how to realize an innovation-driven economy in Gansu. This section elaborates the above-mentioned points from 4 aspects as follows:

----Environment and background for Gansu’s technology innovation and development of hi-tech industry;
----Status-quo and problems of Gansu’ technology innovation and hi-tech development;
----Gansu’s potential and resources for technology innovation and hi-tech development;
----Strategic tactics and measures on how to realize technology innovation and develop hi-tech industry in Gansu.
Section 1 Environment and Background for Gansu’s Technology

Innovation and Hi-tech Industry Development

1.1. New opportunities and challenges coming along with changing international and domestic situations

1.1.1. Economic globalization and technology revolution present grave challenges as well as new opportunities to the less developed regions.

Globalization, which has been advancing ever rapidly since the new century, has swept from the economic arena to the areas of politics, science and technology, culture and even security. It has profoundly altered the economic and political status-quo of the world. At the same time, a new round of science and technology revolution is also sizzlingly undergoing, which may lead to new and remarkable breakthroughs that will change the society and economy in a more significant way. Breakthroughs in science and technology present a new vista and more room for technology innovation and economic development, shaping a fundamental environment that Gansu as well as all other regions will face for their development.

Developed countries, with previous adaptation to globalization in the last century, now pace up technology innovation and further fuel its innovative drive to more swiftly grip the high-end of the industrial line. In the world market, they more and more enjoy the competitive advantage in IPR. Meanwhile, developing countries also focus more on technology innovation and accelerate the development of their own hi-tech industry while playing the cards of low labor/ resources costs. In such a context, the restructuring of the world industrial structure is also bringing about similar reform in China.

As to China, guided by the goal of establishing an innovation-driven economy, the nation has expedited the transformation of its economic development mode. Different regions are also making the efforts based on local realities, starting to power their economic growth with technology innovation and hi-tech development, so as to build up a more favorable development environment. It can be seen in China now that though imbalance of regional development still exists, the eastern, central and western part of China are all forging forward pillar industries with their own competitive advantages.

Besides the transformation in economic growth mode, the new trend of international scientific and economic development also witnessed the escalated application of technological and research results, faster circulation of various productive factors, and increasingly rapid combination of innovation factors of different walks of life in different regions. Such a momentum helps...
industrial development transcend regional boundary of resources, offering the less developed regions opportunities to realize leaping development by offsetting its regional shortage of natural resources. Therefore, to Gansu, industrial changes and development will present a chance for it to make best use of its advantages, while also bring about competition to Gansu’s industrial restructuring. If Gansu fails to grasp the opportunities, its economy will soon fall backward for no advance.

1.1.2. National policies of building an innovation-oriented country and implementing the Western Development Program unfold unprecedented possibilities to Gansu.

The Chinese government has formulated a series of national policies conducive to technology innovation and to creating a propitious environment for the development of hi-tech industries. One of them is to set a goal of building China into an innovative country. Led by such a goal, China upholds the strategy of indigenous innovation, aiming to sharpen its innovative edge. Besides, the optimization and upgrade of industrial structure through technology innovation urgently demands China to transfer its economic growth mode and improve the quality of economic progress. Such a move requires enterprises to be the major players in technology innovation. That is to say they should be the cradle that cultivates innovation and have the major play in upgrading industrial structure of China for stronger international competitiveness. These policies are favorable for Gansu to track on innovation–driven development through technology innovation and hi-tech development. Closely following the guidance of such desirable policies, Gansu should seek out the best of them for its own development.

Another strong policy support to Gansu is the implementation of the Western Development Program initiated by the central government, to balance the eastern and western development of China for building a harmonious society. Backed up by stronger economic strength, it is now an important responsibility of the central government to promote balanced regional development and social harmony. According to the Program released in 2006, in order to propel sustainable socio-economic development, during the 11th Five-Year Plan period (FYP), the step to develop the western region will be paced up with the focus on accelerating the infrastructure building and bolstering local industries of sharp competitive edge. These two are important and leading content of the Program, the implementation of which is of far-reaching significance to the long-term development of northwestern region even central China at large. Gansu, as a province located in western China, will immensely benefit from the implementation of the Program, which especially expands the room for Gansu’s technology innovation and hi-tech development.
1.2. Strategic choices of Gansu for its development mode under new circumstances

Faced with opportunities and challenges, Gansu as well as other less developed regions all turn to formulate new development strategies. Specifically constrained by unfavorable environment and lack of natural resources, talents, investment and high technologies, Gansu needs the strategic transform from a resources-dependent economy to an innovation-driven one in terms of its socio-economic development mode. Such transformation will help Gansu fundamentally get rid of poverty and backwardness, be part of globalization and new technology revolution, and involved in China’s drive to be an innovative country and the Western Development Program as well. Such transformation is the intrinsic needs of Gansu’ development as well as an integral part of the overall socio-economic development strategies of China.

In order to realize such strategic transformation, Gansu has to well handle the following basic relations in its development: ① the latest economic growth indicators V.S. the strategic goal of development; ② annual increase of local fiscal revenues V.S. nurturing strength of enterprises; ③ giving a full play of competitive advantages of existing industries V.S. developing new growth pole of industries; ④ national restrictive stipulations on some development V.S. the special favorable policies for Gansu’ development. If these four basic relations were ill handled, the competitive advantages and development opportunities would eclipse in no minute. And Gansu will have little chance in the future to realize its strategic transformation.

Therefore, strategically speaking, it is suggested accordingly that the strategic goal of long-term development not compromise to the latest economic growth indicators; prioritize the nurturing of enterprises to the increase of local fiscal revenue, especially when Gansu’s enterprises are generally weak in economic strength and original accumulation; while giving full play of competitive advantages of existing industries, special attention be attached to developing new economic growth poles either in original industries through application of new technologies or in relevant potential industries through making best of use of some preferential policies and original technological advantages; proactively seek special regional policies while making full use of national policies on corpus function areas according to overall development plan of China.
Section 2 Status-quo of and Problems in Gansu’s Technology Innovation and Development of Hi-tech Industry

2.1. Technology Innovation Network

First, Gansu’s industrial pattern and technological capabilities were developed under the planned economy, which at that time properly met the production and technological needs out of Gansu and fitted in the overall economic system of the country. However, with the advance of reform and opening up and marketization, Gansu now has to restructure its industry since not only its supply line but also the corresponding channels of introducing technologies and innovative factors have been severed in the new environment.

Set under the planned economy, products of most enterprises in Gansu were not produced to meet the market needs and failed to develop their competitive advantages through technology innovation. Therefore, many enterprises lack in the drive to innovate technology and engage in R&D. Though some enterprises under the central government in Gansu are strong enough to have some R&D capabilities, their contribution to local economy is not so evident to develop a virtuous interaction between them. Overall, the technology innovation system has not yet been well fledged in Gansu’s enterprises.

Second, the basic and applied research in Gansu, though somehow established, is mainly practiced in state universities and research institutes, falling short of directly satisfying the needs of local market. Besides, the ‘dual structure’ is phenomenal in the allocation of Gansu’s science and technology resources, which was in shape under the planned economy. Therefore, the allocation science and technology resources and scientific competence developed in Gansu are not consistent with current pattern of local economic development. For example, the scientific achievements of some state key research institutes, such as that of Lanzhou University or Lanzhou branch of the Chinese Academy of Sciences, fail to be adequately translated to local economy, or back up the technology innovation in enterprises of Gansu. Cooperation among enterprises, universities and research institutes is in need of a favorable policy environment and security mechanism as well as incentives to transfer research results to productivity. In a word, Gansu’s relatively weak capability in both scientific research and technology innovation, and inadequate technological support to industrial upgrading is far from satisfying its local economic development.
Third, because of slow development, Gansu’s private S&T enterprises and intermediaries have not played a due role in the network of technology innovation. Compared with development of private enterprises as a whole, private S&T enterprises and intermediaries even suffer slower progress. Statistics show that by December 2004, the number of private S&T enterprises throughout China reached 141,353 with total assets value of RMB5.3 trillion, an increase of 13.14% and 18.61% respectively compared to 2003. The number of employees in private S&T enterprises amounted to 11.3 million, producing total revenue of RMB4.8083 trillion35. By contrast, the same picture in Gansu however is not so rosy even though the local government has adopted a series measures to encourage private economy, especially the development of private S&T enterprises, such as the release of Decisions on Greatly Promoting Development of Private S&T Enterprises in 2000, and the Provisions on Developing Private S&T Enterprises of Gansu in 2001. According to statistics, by the end of 2004, the number of private S&T enterprises in Gansu only totaled around 409, with 20,000 employees and combined assets value of RMB 5.6 billion. And the numbers for annual revenue and patents are RMB12.2 billion and 131 respectively. These figures tell the great gap

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between the development of private S&T enterprises in Gansu and that in the whole country. Obviously, Gansu’ private S&T enterprises have limited impact on clustering innovative factors and leading the innovation of a new area.

In short, the building of Gansu’ technology innovation network suffers in various ways, for example, severed scientific and technological resources and the ‘dual structure’ of its allocation, weak S&T strength and innovative capability, inadequate and scattered innovative factors that fail to interflow with that out of Gansu for combined network effects.

2.2. Government expenditure on Science and Technology

Since Gansu is weak in economy, its government expenditure was much less than the aggregate public expenditure of China. Thus, it is not difficult to tell its expenditure on science and technology is even worse. Between 1994-2005, the annual government expenditure of Gansu increased by six times from RMB7.238 billion to 42.935 billion; however, during the same period, the expenditure on science and technology only rose by 2.7 times, from RMB77 million to 199 million. It is also incompatible to the increase of national government S&T expenditure growth rate from 0.53% to 1.4%. Besides, though the speed of annual expenditure increase on science and technology reaches 10.12%, it is the lowest compared with increase of expenditure on other undertakings. Therefore, considering its slow increase speed, expenditure on science and technology has actually taken less and less share in Gansu’s total government expenditure, the figure of which slides down from 1.06% in 1994 to 0.46% in 2005.(See table 3.1 for details). Many reasons have attributed to such a decline. One is in terms of government resources distribution, the mechanism to intensify government input on technology innovation has not yet in place, which to some extent curbs the technology innovation and development of hi-tech industry.

Table 3-1 Government expenditure Structure of Gansu: 1994-2005

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Government Expenditure</th>
<th>Expenditure on Infrastructure</th>
<th>Expenditure on Agriculture</th>
<th>Expenditure on Education</th>
<th>Expenditure on Health and hygiene</th>
<th>Expenditure on S&amp;T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>723817</td>
<td>43163</td>
<td>70350</td>
<td>118861</td>
<td>0</td>
<td>7728</td>
</tr>
<tr>
<td>2000</td>
<td>1882322</td>
<td>204571</td>
<td>170585</td>
<td>275477</td>
<td>80568</td>
<td>12703</td>
</tr>
<tr>
<td>2005</td>
<td>4293479</td>
<td>452723</td>
<td>424551</td>
<td>674831</td>
<td>178431</td>
<td>19916</td>
</tr>
</tbody>
</table>

Average Annual Growth Rate(1994-2005) 21.32 77.12 18.93 13.84 10.12
2.3. Innovation capability and vitality of Gansu’s Enterprises

Since the overall innovative capability of Gansu is comparatively weak, lagged far behind that in developed regions of China, the innovation capacity of Gansu’s enterprises is predictable to be even weaker, especially comparing with that of their eastern counterparts. The study on the reality of Gansu enterprises indicates following problems: ① insufficient input on innovation because of weak economic strength and poor investment capability of most Gansu enterprises; ②the lack of innovation acumen caused by no intrinsic needs and incentives in enterprises for innovation; ③ due to the first two problems, Gansu enterprises are generally incapable of developing and innovating technologies, suffering from innovation incompetence and lacking innovative activities an mechanism in them. These problems evidently shackle the upgrading of local economic structure and competitiveness. For example, there are only 5 state-level enterprise technology centers in Gansu among the 400 in China, as well as few national engineering research centers. Most Gansu enterprises fail to be the major players in technology R&D, technology producers, users and beneficiaries.

Compared with other 4 provinces in west China in terms of the dynamics of their innovative activities in enterprises, Gansu holds a medium ranking. Among 228 large and medium-sized enterprises of Gansu, only 55 have S&T development sectors, and 89 are engaged in S&T activities, the ratio of which is not high against the total enterprise number. The large and medium-sized enterprises do a better job. Among 199 medium enterprises, 64 are somehow related to S&T activities; 39 are engaged in R&D activities; and 45 develop new products and 33 have their own R&D sections. (See table 3-2, 3-3 and 3-4 for details on innovation activities of Gansu enterprises and the comparison with other 4 western provinces).

<table>
<thead>
<tr>
<th></th>
<th>Gansu</th>
<th>Shaanxi</th>
<th>Ningxia</th>
<th>Xinjiang</th>
<th>Qinghai</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Large and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium-sized enterprises</td>
<td>228</td>
<td>473</td>
<td>121</td>
<td>208</td>
<td>56</td>
</tr>
<tr>
<td>Number of Enterprise with S&amp;T sectors</td>
<td>55</td>
<td>152</td>
<td>24</td>
<td>39</td>
<td>20</td>
</tr>
<tr>
<td>Number of Enterprises engaged in S&amp;T Activities</td>
<td>89</td>
<td>218</td>
<td>42</td>
<td>53</td>
<td>25</td>
</tr>
</tbody>
</table>

Sources: National Bureau of Statistics of China, Ministry of Science and Technology, 2006 China
S&T Statistics Yearbook.

Table 3-3 2005 S&T Activities in Large and Medium-sized Enterprises of Gansu

<table>
<thead>
<tr>
<th></th>
<th>Number of Enterprises</th>
<th>Number of Enterprises with S&amp;T Activities</th>
<th>Number of Enterprises with R&amp;D Activities</th>
<th>Number of Enterprises engaging in New Products Development</th>
<th>Number of Enterprises with R&amp;D Sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Enterprise</td>
<td>29</td>
<td>25</td>
<td>22</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>Medium Enterprise</td>
<td>199</td>
<td>64</td>
<td>39</td>
<td>45</td>
<td>33</td>
</tr>
</tbody>
</table>


Table 3-4 Statistics on S&T Activities in Large and Medium-sized Enterprises of Five Western Provinces of China

<table>
<thead>
<tr>
<th></th>
<th>Nation-wide</th>
<th>Gansu</th>
<th>Shaanxi</th>
<th>Ningxia</th>
<th>Xinjiang</th>
<th>Qinghai</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of Enterprises with S&amp;T</td>
<td>23.7</td>
<td>24.1</td>
<td>32.1</td>
<td>19.8</td>
<td>18.8</td>
<td>35.7</td>
</tr>
<tr>
<td>Percentage of Enterprises engaging in S&amp;T Activities</td>
<td>38.7</td>
<td>31.7</td>
<td>46.1</td>
<td>34.7</td>
<td>25.5</td>
<td>44.6</td>
</tr>
<tr>
<td>Percentage of R&amp;D input against Sales Revenue</td>
<td>0.8</td>
<td>0.5</td>
<td>0.8</td>
<td>0.5</td>
<td>0.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Percentage of Input on S&amp;T activities against Sales Revenue</td>
<td>1.5</td>
<td>1.0</td>
<td>1.6</td>
<td>1.4</td>
<td>0.5</td>
<td>1.4</td>
</tr>
</tbody>
</table>


2.4. Innovation friendly mechanism and policies

State-owned economy dominates the pillar industries of Gansu. By contrast, the contribution of hi-tech industry only accounts for few percentage points of Gansu’s GDP, featuring weak foundation, underdeveloped capital market and shortage in financial capital for its development. Besides, since Gansu is presently still overshadowed by planned economy, the full play of local innovative factors is hindered by inadequate institutional innovation, poor environment for innovation and entrepreneurship as well as the lack of a social mechanism to channel external innovative factors into Gansu.

Judged by economic pattern, Gansu features resources-dependent and state-owned economy. On
the one hand, taken shape over years, current structure of heavy industry is highly dependent on energy and raw materials, so its development imposes great pressure upon the cause of energy and resources conservation; on the other hand, Gansu’s economic development is heavily relied on state-owned enterprises and state-owned economy, traditional industry still make up a lion share in its economic development. In other words, stagnant development of non-state-owned economy and SMEs as well as the unfavorable social environment for innovation and entrepreneurship has severely undermined the development of hi-tech industry.

Institutional reform to Gansu’s state-owned enterprises has not yet been completed. Therefore, many enterprises are still constrained by inflexible operation systems and incomplete incentive mechanisms to boost innovative activities in enterprises. Such situation undermines the implementation of innovative activities and the dynamics of Gansu’s economy. From the institutional point of view, a market-based resources allocation mechanism has not yet in place in Gansu; and Gansu also needs to promote technology innovation as the driving force for the development of both the industry and enterprises. In short, reform towards local economic regime is required to be furthered on.

Regarding the policy environment in Gansu for innovation, the local government has already taken measures to energize the development of hi-tech industries. For example, the building of Lanzhou Hi-tech Zone is to create a pleasant environment for the development of hi-tech industry. Currently, the hi-tech industries in Gansu mainly focus on the fields of information, biology, medicines and new materials, with small scale and little impact. For example, in the area of biology, some state-level research centers in Gansu, like Lanzhou Institute of Biological Products, and Lanzhou Veterinary Research Institute, have certain production value created, but their scale and influence are not big enough to significantly push forward local economy. Vitality and dynamics of hi-tech industry in Gansu is below the average national level. In 2004, the R&D intensity of hi-tech industries in Gansu was only 3.1%, while the same figures for the whole country, eastern, central and western part of China were 6%, 6.4%, 4.2% and 6% respectively.

As mentioned above, many factors interplay to affect Gansu’s technology innovation and development of hi-tech industry, including international and domestic situations, Gansu’s own geological location and environment, its historic and economic accumulation as well as local human resources. Among these factors, the development strategy set by and policy environment of Gansu are more closely related to technology innovation and hi-tech development. In reality, Gansu is still lacking favorable conditions to attract investments and adequate capital to encourage the development of hit-tech industry, which features high risks and high input. So are the innovation culture and corresponding soft environment that are conducive to technology innovation and hi-tech development. Weakness in these aspects has hindered the transfer of R&D results to productivity, debilitated innovative activities in large and medium-sized enterprises and stumbling innovative development of small hi-tech enterprises.
Referring to the questionnaire we designed on the major reasons preventing the development of technology innovation and development of hi-tech industry in Gansu, most of the experts share the opinion that the lack of environment for entrepreneurship is the major bottleneck for the transfer of high technologies. 37

The questionnaire were taken by 60 persons, among which there are researchers of key research bodies (key universities, research institutes of Chinese Academy of Sciences, local research institutions), managers and chief technologists of key enterprises in pillar industries and hi-tech enterprises, and civil servants.

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37 The questionnaire were taken by 60 persons, among which there are researchers of key research bodies (key universities, research institutes of Chinese Academy of Sciences, local research institutions), managers and chief technologists of key enterprises in pillar industries and hi-tech enterprises, and civil servants.
Section 3 Gansu’s Potential and Resources for Technology Innovation and Development of Hi-tech Industry

Currently, Gansu is undergoing a transition from preliminary to the middle stage of industrialization, which is still featuring low industrialized level, backward economy and shortage of original capital and possibilities to attract investment. In 2005, the utilization of foreign investment per capita was even less than one US dollar, which indicated that it was almost impossible for Gansu to materialize economic development through capital expansion. In the meantime, since many resources are at the verge of extinction and exhaustion, Gansu is faced with increasing pressure of ecological and environment protection. Besides, restrictive by relevant policies on exploitation of some resources, Gansu can not go prosperous through consuming energy while polluting the environment. Therefore, it is an intrinsic requirement of Gansu’s socio-economic development to search for a new path for sustainable growth.

Technology innovation is the engine and source for industrial upgrade. It makes lucrative output with much less input possible when the enterprises exchange with outside world for the development factors, including materials, energy and information. Through technology innovation at different levels in different directions, optimizing resource-oriented enterprises and expediting industrial upgrade is probable.

According to the 11th FYP for Gansu, by 2010, the ratio of primary, secondary and the tertiary industry will be 12.5:46:41.5, and the added value created by the secondary industry will increase to over 40% of GDP, while the input to research and experiments will amount to 1.5% of GDP to improve innovative capability; the urbanization level will be above 35%. In order to make such a strategic goal true, Gansu’s overall economic growth and development of hi-tech industry should count on the technology innovation and the introduction of innovative factors. And opportunities for technology innovation and hi-tech development are provided as Gansu upgrades its industry and strategically rearranges its economic structure.

3.1. Industries of Comparative Advantages and Technology Concentration

Some industries have laid a solid foundation in Gansu and developed their own competitive edge and technological strength, such as petrochemical industry, metallurgy industry, material industry and equipment manufacturing industry, etc. as early as in the 1st FYP, among the 156 national key industrial projects, 16 found their home in Gansu. For example, Lanzhou Refinery and Lanzhou Petroleum, the predecessors of Lanzhou Petrochemical Cooperation were two of 156 national key projects established in Gansu, which have been regarded as the cradle of China’s petrochemical industry. Currently, Lanzhou Petrochemical Cooperation is a petrochemical giant in western China that combines oil refinery, chemical industry and production of chemical fertilizer. The
value of its total assets amounts to RMB23 billion with an annual sales revenue reaching RMB40 billion. Lanzhou Lanshi Ltd. is another similar case. Its predecessor is Lanzhou Petro-chemical Machinery founded in 1953, which was by then the largest manufacturing base for equipments of oil drilling and refinery. Nowadays, while integrating R&D, industrial production and trade, Lanzhou Lanshi Ltd is a large enterprise group that specializes in manufacturing oil drilling and refinery equipments as well as general machinery.

Over dozens of years of development, enterprises like what we mentioned above have established a good financial basis and developed quite impressive technological strength. For example, Lanzhou Aluminum Co., Ltd possesses quite a few top-notch equipments for aluminum electrolysis and fabrication. It has developed quite a lot of quality and new products for key engineering projects of military and defensive use. The technology they developed independently or jointly with other parties can directly make aluminum foil directly out of cast-rolled electrolysis aluminum liquid and was the first of its kind in China. Besides, technologies applied in electromagnetic casting, pipes used for special nuclear industry also lead the international level. Furthermore, technologies for indirect extrusion press of aluminum and aluminum alloy, high precision tube drawing process, technologies of producing materials for missile orbit, technologies for producing small and medium sized pipes and rods, and super-thin pipes have met the technological needs of this area in China, while technologies of manufacturing equipment sets exclusively for indirect extrusion press and producing aquisity aluminum paste has leveled China with other countries in this area.

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**Column 4  Introduction of Chemical Research Center of Lanzhou**

Between 2001 and 2006, Chemical Research Center of Lanzhou (CRCL) has contracted 245 projects worth RMB 1600 million in terms of project funds. 96 of them are either invested by the state or the share-holding companies, and 2 of which are 863 projects and 1 in the 973 program. Independently they developed more than 50 new technologies, 40 of which have been applied, and created more than hundred millions of profit. Plus, the technology transfer also brought in more than RMB400 million to CRCL. Five province-level technological infrastructures have been put in place as follows: ①a platform providing information on Petro-chemical Patents; ②National Quality Testing Center of Petro-chemical Products; ③ Technology Center for Clean Production of Chemical and Sales Branches of PetroChina; ④ Two Key Labs of Catalysis of Refinery and Chemical Branches of PetroChina; ⑤ Research Center of Gansu for Catalysis Engineering. Besides, the results of catalysis research have been successfully applied to 45 industrial equipments. Totally 90,000 tons of catalysis products have been sold, taking more than 50% market share with RMB1.8 billion sales revenues and more than RMB600 million economic benefits. And the research project named *LIP: New Catalysis for Improving Oil Quality* completed by CRCL was selected as one of 10 major S&T progressive achievements for 2006. Actually it is the third time for CRCL to be awarded with such an honor.

Over the past five years, CRCL has applied for 113 patents, 81 of which have been granted, holding 30% of patent numbers applied by refinery enterprises in China, 40% of the granted total.
Representatives of Gansu’s enterprises which have already won competitive edge and significant technology strength in their field also include Jinchuan Group Ltd. and Jiuquan Iron and Steel Group. Take Jinchuan for example. Currently it is the biggest producer of nickel, platinum and cobalt in China. Its production of nickel and cobalt accounts for more than 90% of China’s total production and is one of five giants in the world in terms of its platinum production. Besides, it currently also is the biggest cooper producer in the northern China. It now has 310,000 employees with total assets value of RMB17.37 billion. For a consecutive of 6 years, it leads peers in metallurgy industry around China in terms of economic profits. In 2006, its sales revenue was up to RMB35.4 billion and the increase was more than 10% of the sales revenue of the whole province. Jinchuan sharpens its competitiveness and gains a top ranking in the industry through constantly adopting advanced technologies of smelting metals. Moreover, it is also in possession of the majority resource of associated mineral of nickel, platinum and non-ferrous metal, providing a valuable field to study mining, selecting and smelting of mineral resources as well as technologies of utilizing resource-oriented products. Such rich resources also present many problems in theory and practice to researchers. Thus through the combination of academia, education and industry, Jinchuan assimilates a variety of innovative factors to create favorable conditions for the building of its own technology innovation system.

3.2. Major local innovative factors being activated

Stimulated by the policy of reform and opening up, major local innovative factors have been activated to encourage innovative activities and development of hi-tech industry. Gansu’s innovative mechanism has gradually taken shape with more and more innovative activities and important scientific results coming along the way. The overall level of science and technology has been increasingly improved. Its contribution rate to local economic growth has significantly rose which plays a more important role in strengthening the comprehensive economic strength of Gansu. A batch of important S&T results, especially technologies and knowledge innovation in the industries of petrochemicals, metallurgic materials, application of nuclear technologies, potato industry, grass industry, desertification treatment, dry farming, heavy ion physics, glaciology and geocryology, plateau climate have gradually taken a leading position in China. In 2006, seven major S&T programs have been launched, with one national key lab, 2 enterprises technological centers, one university S&T parks and 10 ministerial and provincial level engineering centers being approved to be established.

Besides, Lanzhou University and branches of Chinese Academy of Sciences located in Gansu as well as some other key S&T institutions enjoy comparative richer S&T human resources. With the deepening of the reform on research and educational system, such S&T institutions are going to have more and more play in developing advanced technologies and expediting technological transfer.
In addition to S&T institutions, preferential policies also encourage the boom of S&T enterprises, and strong force that fuels development of hi-tech industry. A batch of innovation-driven enterprises and entrepreneurs have mushroomed in the process of reform and opening up. For example, through independent innovation, Lanzhou Energy-saving and Environment Protection Engineering, Ltd. has been rapidly growing and Tianshui Spark Machine Tool picked up from bankruptcy; and new products bring about 80% profits of Lanzhou Institute of Biological Products, while the CNC RD-QC11K-14mm×12m cutting centre developed by Tianshui Metal forming Machine Tool Co., Ltd. for manufacturing automobiles has led the international standard.

### 3.3 Comparative price advantage of productive factors and strong potential of hi-tech industry

Since Gansu now is transiting from the preliminary to the middle stage of industrialization, its economic development and social consumption level comparatively low. Therefore, it enjoys advantage in terms of the price of productive factors, such as land and labor.

In addition to the price advantage, its simple economic structure also presents more possibilities for industrial restructuring in the future. Even though the state-owned economy tunes its economical development currently, the private S&T enterprise and hi-tech industry will still enjoy more room for development if proper policies will be in place because the state-owned economy
just dominates few industries.

It is an obvious weakness that the hi-tech industry only takes a small account of Gansu’s economy. With no areas of Gansu’ hi-tech industry being outstanding enough in provincial economy, it fails to significantly push economic development. However, such weakness also presents Gansu with more choices and development opportunities ahead. Gansu can learn the experiences of others in developing their hi-tech industries, avoiding the detours while enjoying subsequent advantages for leaping development. With the policy support, it is possible for Gansu to track on development with more opportunities through innovation, capital concentration and sustained growth.

3.4. National Innovation Strategy and Gansu’s development opportunities

The National Outline of Medium and Long –term Science and Technology Development Program (the Outline) has made strategic arrangements for China’s science and technology development and the innovation course. Regarding S&T development, it identifies 11 key areas, 68 priorities, 16 major programs of strategic significance and 8 key technologic areas to support economic boom and lead S&T development into future. The key S&T development areas identified in the Outline are somehow consistent with some of Gansu’s advantageous industries, which make it possible for Gansu to get most out of national S&T resources distribution. Gansu will become prosperous if its development goal can well fit into national programs.

For example, regarding the key areas and priorities\(^{38}\) identified by the Outline, Gansu enjoys ample development potential in the following areas: ①the massive and low-cost exploration and utilization of renewable energy resources, priority 4 identified in the energy area, the first key area in the Outline. This priority emphasizes the development of large wind power generators, construction technologies and equipment for coastal and inland wind fields as well as wind energy intensive areas in west China, technologies for solar-based power generation and building-integrated solar energy; ②functional restoration and reconstruction of ecosystem in ecologically vulnerable areas, a priority identified in environment, the third key areas in the outline. This priority emphasizes on developing dynamic monitoring technologies for typical vulnerable ecological areas, including, among others, the middle and upper reaches of the Yangtze River and Yellow River, Loess Plateau, deserts and desertification lands, farming-grazing areas, and mining areas; on developing technologies for pasture degradation and rodents control, and technologies for restoring degraded ecosystems; on developing ecological protection and restoration technologies for major engineering works such as the Qinghai-Tibet Railway, and

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\(^{38}\) The key areas in the Outline are areas attached with special importance and focus for their development in national economy and social progress, as well as industries in urgent need of S&T support. Priorities means technology cluster in key areas that is with clear development goals, solid foundation, foreseeable breakthroughs in recent future but in great need of further development.
complex mining areas; on establishing technical support models for restoring the functions of
diverse ecosystems and maintaining its continuous improvement; ③ germplasm development,
preservation, and innovation in and targeted cultivation of new varieties as well as healthy
breeding practices in domestic animals, poultry, and aquatic products, and associated epidemic
disease prevention and control, respectively priority 17 and 18 in key area of agriculture, the
fourth key area in the Outline; ④ basic and generic parts and components, priority 26 in the key
area of manufacturing industry, the fifth key areas in the Outline.

Gansu is also of great potential to excel in frontier technologies. Priorities identified for future
development are: ① developing scale screening technology for functional strains, directional
biocatalyst upgrading technology, biocatalysts technology system for scale industrial production
in the area of next-generation industrial biotechnology (frontier technologies No.5); ② solar cell
related materials and associated key technologies, efficient rechargeable cell materials and
associated key technologies, key super capacitor materials and associated manufacturing
technology, and efficient energy conversion and storage material systems in the areas of efficient
energy and material technology (frontier technologies No.11).

Furthermore, Gansu may also fit in the national development strategy in the area of energy, water
and mineral resources, environment, manufacturing, new material, biotechnology, etc, since it
enjoys a foundation for development in these areas. Specifically speaking, it can make strides in
preventing the pasture degradation in the upper reaches of the Yellow River and restoration of
ecosystem of water source area, wind power generation and associated equipment, new material
technologies, equipment manufacturing, informationalization of manufacturing industry, new
semi-conduct parts and associated products, metallurgy, targeted breeding and innovation of
animal and plant varieties, fine processing of agricultural products and developing new drugs and
TCM innovation.

Section 4 Strategic Choices and Countermeasures on Realizing
Technology Innovation and Developing Hi-tech Industry of Gansu

4.1 Strategic Choices

When it comes to formulate the development strategy on Gansu’s technology innovation and

39 Frontier technologies refer to major visionary, pioneering, and exploratory technologies in the realm of high
technology. Frontier technologies constitute an important basis on which future high technologies stem out and
emerging industries grow. They represent a nation’s comprehensive high-tech innovation capability.
hi-tech industry, taking into consideration of domestic and international S&T and economic development trend, it is necessary for the policy makers to, on the one hand, attend the acceleration of China’s transformation from planned economy to market economy, and on the other hand, notice the central government’s restrictive exploitation upon some resources in Gansu. Based on the understandings of the impacts of the above-mentioned two facts, Gansu may get down to pondering its development strategy. Besides, such strategy needs to be systematically designed to position technology innovation and development of hi-tech industry as economic activities other than pure S&T activities.

Recalling previous experiences of emerging regional economies in China, it is obvious that their success in developing regional economy is closely related to the free low of innovative factors. In order to rejuvenate the economy of less developed region, it is a key to make it an “attractive pool” that offers desirable conditions for the inflow of technology innovation factors as well as provides a favorable environment that constantly stimulates their dynamics. Therefore, looking at the gap between the less developed western China and the developed eastern coastal regions of China, we notice that, besides economic backwardness, the western part of China is in an unfavorable environment with backward institution and system, lack of attractive policies and social environment which enable the free follow of innovative factors and inflow of external technology innovation factors for cluster effect.

Gansu suffers from a disadvantageous geological location and poor natural resources storage, which are all detrimental by nature in attracting external innovative factors. Even so, Gansu can learn from emerging areas, such as Shenzhen and Pudong, to play the “preferential policy card” and effect as an “attractive pool”. It needs to develop an atmosphere for the free flow of technology innovation factors first, and then encourages the inflow of such factors for the cluster effect. In order to make this true, Gansu shall deepen the institutional reform and change the government function as well as gear up to establish such an “attractive pool”. In a word, Gansu needs to track on a development road of its own uniqueness through innovation.

Specifically speaking, based on the local reality, the Gansu government needs to implement the strategy of a flexible and open attitude to a leaping development that makes best use of its strengths while avoiding weakness. It should aim at creating a market for the free flow of productive factors, a policy environment that rewards and stimulates innovation and entrepreneurship and a platform that encourages the innovative activities. By so doing, Gansu will ultimately be an “attractive pool” that gathers various technology innovation factors for their full and efficient performance.

That being with an open attitude means Gansu should draw upon the successful experiences of the well-developed regions of China, be more open to the outside world, and free its mind to deepen the reform as well. In other words, abiding by the national laws and policies, the government needs to be hands off with the areas that are out of the government responsibilities and beyond its
capabilities by giving up the conventional rules, easing excessive administrative control and compromising some vested interests. By so doing, it encourages and creates a lenient environment for the free flow of various productive factors, especially to attract in innovative factors to further dynamics of existing productive elements; and the function and structure of the government will be reconsidered and changed to focus on the administration in the needed areas upon the requirements of the market. That being with a flexible attitude is to give the market mechanism a full play wherever it exits. The government functions to guide and shape an agreeable environment that motivates various players of innovation activities, especially SME’s innovative activities through the innovation on institutions, systems and culture.

To avoid the weakness means to evade the disadvantages of Gansu in capital, industries, natural and human resources, environment and geological location; instead and address these problems by adopting effective measures. For example, innovation on the organization mode of industry, research and education may rectify the “dual structure” in Gansu’s S&T resources distribution and improve the innovative capability of Gansu. On the other hand, to make best use of its strength means to evaluate Gansu’s potentials and comparative advantages objectively, and learn to fully tap on one’s own comparative strength. To Gansu, its comparative advantages lie in the metallurgic material, equipment manufacturing and petrochemical industry, and the richer storage of some mineral resources as well as competitive edge in some S&T research areas. In order to play up these strengths, Gansu is required to reform the pattern of resources distribution, gather resources and attention to develop the industries of comparative advantages through technology innovation. Meanwhile, it is also encouraged to promote hi-tech industrial development in traditional industries for innovation-driven accumulation. By strengthening the function of the government, Gansu also needs to set up a platform to serve innovative activities and build an innovation network to bolster the innovative activities of the society, especially that of SMEs.

Leaping and unconventional development means that while drawing upon the successful experiences of other well-developed regions, Gansu’s development should not be confined by the stereotypes and previous developmental paths. When it comes to the upgrade of industrial structure, the attention should be given to both the upgrading of the products and the technologies instead of ignoring the improvement of the industrial technologies. The advance of the technologies may update the products so that hi-tech industries may derive from the traditional ones. Besides, in order to realize leaping development, Gansu needs to seize the opportunities offered by the positioning of its function in China’s development and becomes an “attractive pool” through combining various policy tools and advantages in some areas, also by assimilating a varieties of innovative factors. Such an “attractive pool” will bring out the dynamics of innovative factors; optimize its distribution pattern for strengthening the regional innovative capability. The technology innovation will further Gansu’ advantageous industries, and fuel the development of its emerging industries so that Gansu may possibly accomplish intensive economic growth.
4.2. Tactics and Measures

4.2.1. Tactic 1: to upgrade the local industry through technology innovation and rallying associated resources and assimilating innovation factors in and out of Gansu for the regional pillar industries.

Gansu should categorize its pillar industries as leading and non-leading ones and adopt different development tactics for them accordingly.

Measure 1: Under the micromanagement of the government, rallying resources and attracting technology innovative factors in /out of Gansu to address technological bottlenecks in Gansu’s leading pillar industries of comparative advantages; and cultivating hi-tech industry, restructuring and expanding industries through effective combination of education, research and industry and the upgrading of the industrial technologies.

Gansu’s leading pillar industries include the nonferrous metal industry (the metallurgy of nonferrous metal, ferrous metal and production of metal products) and new materials and equipment manufacturing industries (a whole set of petrochemical equipment, oil-drilling equipment, CNC shearing machines, electric motors/appliances, electronic particles, vacuum equipment, equipment sets for forging and press, pneumatic tools, material testing machine, agro-machinery), etc. They are the focuses for future industrial development with competitive edges. The government may gather its limited financial and policy resources to engage innovative factors for addressing the technological bottlenecks in these leading industries through local S&T development plan, innovative capability building, alliance established among universities, research institutes and enterprises, human resources development, technology transformation, restructuring educational structure, government procurement and subsidies, etc. By so doing, the technological level and innovative capability will be raised for new products and sharper competitiveness in the market; in the meantime, hi-tech industry will also derive and grows

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**Column 6  Finland’s leaping development: appropriate policies mix and innovation-driven industrial restructuring**

Finland used to be a country of vulnerable industrial and S&T foundation. In 1970s, its forestry-dependent economy was cornered for further development. Facing difficulties, it timely rode on the development trend of micro electronics, through which it accomplished the leaping development. Since then, it has rapidly transformed from a country relied on forestry resources to an industrial one that thrives on information technologies and advanced knowledge. Its national competitiveness has ever once ranked No.1 in the world. Guided by the information-oriented policy set in 1980s, the Finnish government has been committed to improving the market environment and tightening its support to education, research and technology innovation. Nokia was then growing big. Since 1990, it has started to pursue knowledge-intensive growth and improve national and industrial innovation system by centering the resources to information industry for social transformation and leaping development.
stronger out of these original leading industries.

For example, as one of the leading industry in Gansu, equipment manufacturing is a key industry that the government needs to support and center the resource on, especially during such a middle stage of industrialization. The value added of Gansu’s equipment manufacturing industry in 2004 reached RMB 42.538 billion, 27.27% of provincial GDP (RMB 155.893 billion) and 84.2% of the total value added of the second industry (RMB 50.512 billion). The value added of the manufacturing industry in Gansu ranked around 25th nationwide. According to the production scale and contribution rate, equipment manufacturing industry and material industry accounts for 11.73% and 32.13% of the entire manufacturing industry respectively. Such figures prove that Gansu is of a comparatively complete manufacturing system and capability for producing large-scale equipment, especially enjoying advantages in producing petrochemical equipment, oil drilling equipment, CNC shearing machines, electric motors/appliance, electronic particles, vacuum equipment, smelting equipment, pneumatic tools, etc.

To focus on developing equipment manufacturing industry also fits in national strategy. Opinions on Rejuvenating Equipment Manufacturing Industry published in 2006 by the State Council stated that by 2010 a batch of large equipment manufacturing groups with strengthened capabilities featuring proprietary IPRs in manufacturing key equipments would be developed to meet the demands in area of defense, energy, transportation and crude materials; besides, some equipment manufacturing hubs of uniqueness that gather famous brands of this fields would be established by making best use of regional advantages and the effect of industry clusters; moreover, a group of state-level engineering centers of internationally leading strength in manufacturing equipments for key technologies would be built with a preliminary technology innovation system coming along the way as well; and finally a coordinated pattern of equipment manufacturing industry will take shape with specialized divisions surfaced out in manufacturing key technological equipment, hi-tech equipment, generic equipment, etc. During the same period, with more policy support and stronger guidance, some key technological equipments and products that is of great significance to the national economic security and defense as well as to the sustainability of national economy by upgrading the industries with their foreseeable greater market share, would be identified as areas of focus for technological breakthroughs. Furthermore, on the one hand, the large equipment manufacturing groups are encouraged to make breakthroughs in key technologies and integrate the manufacturing system; on the other hand, they are also expected to fuel development of SMEs specializing in production of associated parts and other supporting facilities. By so doing, an industrial chain will be formed featuring specialized competence.

Guided by above-mentioned policies and government plans, Gansu may integrate S&T resources and strengths to expedite the upgrading of equipment manufacturing industry with focus on fueling advancement of CNC shearing machines and oil-drilling equipments in machinery industry. Focusing on smoothing the technology innovation chain, more financial input and policy
support will be channeled to key enterprises that have stronger innovative capability and fit into national development needs. Starting with these key enterprises, Gansu may form an alliance of education, research, industry for the innovation in some regional pillar enterprises. Such alliance gives a full play of combined advantages of these three social working forces, assimilating various innovative factors to achieve breakthrough in technology bottlenecks of the industrial development. Besides, it also will help improve the manufacturing capability and techniques practiced in the whole industry so that a solid ground will take shape for stronger industrial development as well as the expansion of industrial chain with emerging growth points.

Thus, it is suggested that the government starts with enterprises like Tianshui Spark Machine Tools, which is of fair foundation for technology innovation and more potential to extend the value chain of the industry as well as leading the industrial development, to establish technology innovation alliance of western machine tool industry. It would be a great move made by Gansu government to rejuvenate its equipment manufacturing industry. Aiming at expanding their production scale through sharpening their core competitiveness, the government may integrate the resources for innovation in and out of Gansu to develop a new technology innovation chain for this industry by supporting them to play the market rules. As a leading enterprise in Gansu’s machine tool industry, Spark accumulates experiences in technology innovation. Therefore, centering the Spark, it is possible to develop an industrial cluster, with the effect of which on the one hand expansion of Spark is possibly materialized, on the other the prosperity of the supporting SMEs to Spark, as well as regional economic growth can be foreseeable. The continued development of Spark currently has already needed supporting facilities provided by around 20 SMEs near Tianshui, and 40 in Lanzhou and Xian. Its technologies have been passed around and

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**Column 7 Technology Innovation Alliance of Gansu Machine Tool Industry**

Six ministries of the State Council have worked out the approaches to promote the joint efforts of industry, education and research for the coming period, which includes: to explore the modes and mechanisms that will effectively combine the strengths of industry, education and research in line with the S&T development plan for the 11th FYP; to establish technology innovation alliance in some identified industries; to establish regional technology innovation alliance of some industries.

Responding to such guidance of the central government, Gansu may try these approaches with machinery industry, a pillar industry in Gansu that ever topped its peers in China. In 2004, the total output of machinery industry amounts to RMB13.88 billion, 8.56% of that of manufacturing industry that year, which was RMB 162.2 billion. Gansu’s machinery industry rallies some quality enterprises of great potential after the reform to their management, such as Tianshui Spark Machine Tool Co., Ltd. and Tianshui Metalforming Machine Tool Co., Ltd. However, their further development is restrained by inadequate investment, technological support and qualified HR. Therefore, a technology innovation alliance for Gansu machine tool industry may assimilate the innovative factors and channel various supports to this industry. Such establishment will be a possible solution to the problems previously mentioned in this industry.

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down so that the technological level of this industry in this region has been increasing. In a word, the establishment of such an alliance in machine tool industry may fuel the technological upgrading and development of a great number of SMEs and effectively rally the innovative factors, significantly expand Gansu’s manufacturing industry and upgrade its technological level.

Moreover, Gansu may also make great strides in industries of new materials and nonferrous metallurgy, since some large scale nonferrous metallurgy / iron and steel enterprises of comparatively stronger comprehensive strength and a nationwide renowned “nickel” city reside in Gansu. So for Gansu, while the local research strengths being given the full play in developing the nonferrous new material based in Lanzhou, Baiyin and Jinchang under the guidance of the National Medium and Long-term S&T Development Plan, it is also suggested that Gansu integrate the stronger research capability of Lanzhou University and Lanzhou branch of Chinese Academy of Sciences with the research strength of local universities and key enterprises through results sharing and joint research efforts, so as to expedite the development of new materials with focuses on nonferrous materials, fine chemicals, new battery materials and nanomaterials, rare earth material, inorganic material and nanomaterial. Such a joint endeavor among local and central research strengths will help Gansu hold a niche in this industry in China and greatly upgrade the technological value and techniques of some products. Besides, Gansu is also encouraged to establish a technology innovation alliance in nonferrous metal material industry. For example, it may start with key enterprises, such as Jinchuan in this area to expand the relevant businesses for a virtuous industrial cycle. Jinchuan, a key enterprise of this industry, is of great potential and in a good shape to attract innovative factors out of Gansu, and assimilate external innovative factors inspired by collaboration among industry, education and research. The technology innovation inside Jinchuan may bring out the development of a hi-tech industry to meet its further expansion and gather innovative factors over China into Gansu. It will also facilitate the value chain of nonferrous metal industry for crafts and technique improvement and the development of new products.

In the meantime, Gansu needs to attach importance to the application of hi-tech and advanced applicable technologies in basic material industry, including nonferrous metal, iron and steel, building materials and chemical industry, so as to optimize its structure. Baiyin Non-ferrous Metal Groups, Co., Ltd. and Jiuquan Steel Group can be identified as key enterprises for Gansu to propel the building of technology innovation system and strategic cooperative mechanism for technology innovation.

In a word, though constrained by the limited resources, Gansu may go prosperous through the following approaches: rallying resources to support the development of relevant industries classified into different categories in distinct ways; starting from the key enterprises with strong potential to further the industrial chain and establish regional technology innovation alliances of industries through joint efforts of industry, education and research in a bid to absorb various
innovative factors, including research strengths administrated by the central government; upgrading technology and materializing the enterprises expansion through technology innovation and intensive development, which is an important strategy for Gansu’ future development.

**Measure 2: As to the industries administered by the central government but located in Gansu with its local uniqueness, we should develop relevant hi-tech enterprises providing supportive services and speed up the upstream and downstream industrial clusters for a complete industrial chain to push forward local economy.**

For the development of such industries, like petroleum, heavy chemicals and aluminum, though Gansu local government can not arrange their development according to its own needs, the relevant industries and Gansu’s R&D agencies can keep a close eye upon the development of the products and new technologies in these industries so as to build matching enterprises with high technologies. It can help the technology transfer and spill-over from these industries to upgrade the local technological level and fuel its economy. These supporting enterprises are encouraged to develop the downstream products, such as raw material processing to form relevant industrial clusters.

A typical case that endorses such a doing is Lanzhou Aluminum Co., Ltd which joined the Aluminum Corporation of China Limited in 2005. Lanzhou Aluminum’s products are classified into 14 categories of 90 kinds of alloys around 10 thousand specifications, featuring aluminum and aluminum alloy pipes, tubes, rods, sections, boards, and belts and foil as well as magnesium powders, aluminum powders, magnesium-aluminum alloy powders, aquosity aluminum paste, cast aluminum material, and other deep processing products. Lanzhou Aluminum aims at developing a comparatively complete industrial chain from electrolysis, smelting, to fabricating by building National Aluminum Testing Base, Lanzhou Aluminum’s own power plant, and aluminum fabrication base during the 11th Five Year period. Though the development of Lanzhou Aluminum is not fully under Gansu government’s guidance, the expansion of Lanzhou Aluminum will bring about many opportunities to the local economy. The local government can support the building of technology innovation system in Lanzhou Aluminum, and the implementation of some new projects, and help it solve the problems concerning the use of lands, electricity, as well as give a helping hand to high value-added hi-tech enterprises which are in the downstream in aluminum fabrication.

At the same time, Gansu needs to provide good conditions and policy support for important technological transformation in pillar industries administrated by the central government, such as the 115,000-ton ester acrylate project carried out by Lanzhou Petrochemicals, and the move and rectification of Qingyang petrochemicals.

**Measure 3 Focusing resources on the industries of great development potentials to shape hit-tech clusters.**
Gansu boasts some industries with certain potentials, such as the bio-medicine industry, which may be nurtured into industrial clusters in the future. Bio-industry is viewed as one of strategic industries in 21st industry and was identified in national 11th FYP as a key industry for development. The growth of bio-industry in Gansu is not only driven by the demand of domestic and foreign market, but also the development of the province itself to address such issues as raising farmers' income and protect the environment. Compiled by National Development and Reform Commission and issued by the General Office of State Council, the 11th Five Year Plan on the Development of Bio-industry listed the development goal of this industry for the coming 5 years, which is to develop some bio-clusters and shape regional bio-edge and strengths in China. Specifically speaking, this goal indicates the following achievements to make: first, the innovative capability will be significantly strengthened in the bio-industry with remarkable increase of R&D input against value rise of the whole industry and with newly developed bio-products of proprietary IPRs creating annual sales value of RMB1 billion; second, we need to upgrade the bio-industry structure by breeding a batch of innovative SMES and 10 large bio-enterprises, each with sales revenues over RMB10 billion, and efforts are also needed to build around 8 comprehensive bio-bases and specialized bio-bases with production value over RMB50 billion in the area of Beijing-Tianjin-Hebei, Yangtze River Delta and Perl River Delta; third, the rapid expansion of the bio-industry is expected and the value added of this industry will be above RMB500 billion by 2010, with substantial increase in its export value. The Plan also specifies some areas for accelerated development which cover biomedicine, bio-agriculture, bio-energy, bio-manufacturing and bio-environmental protection, and identifies 9 research directions include vaccine and diagnostic agents, innovative medicine, modern TCM, biomedical engineering, bio-breeding, green bio-products in agriculture, bio-energy, biomass material, and microbiological manufacturing. Gansu was once listed as a production base for bio-industry of China in the 11th FYP of the Western Development Program.

Gansu enjoys some comparative advantages in bio-resources and a foundation for the development of bio-industry. The research institutes of toxicology, virology and genetic medicine that meet requirements of Good Laboratory Practice (GLP), as well as State Bases for Clinical Research of Pharmaceutics of GCP standards, are residing in Lanzhou University, Northwest Normal University, Lanzhou University of Technology, Gansu Agricultural University, Institute of Biology of Gansu Academy of Sciences, Lanzhou Institute of Biological Products of China National Biotech Cooperation, and Lanzhou Veterinary Research Institute. These research bodies have achieved a large number of S&T results in vaccines and genetic engineering.
In order to expedite the growth of bio-industry in Gansu, the key is to realize industrialization and concentrated development of the industry based on local advantages and features. Therefore, we should transform the local and central research strengths and achievements into innovation factors in Gansu while attracting the factors from outside by adjusting the structure of research, industry and human resources. A technology innovation path featuring introduction, assimilation and absorption, improvement, innovation based on imported technologies and finally indigenous innovation should be followed. Currently, there are 1500 S&T professionals engaged in bio-industry R&D in Gansu’s, most of whom are researchers of central S&T research institutes in Gansu. The government shall create a market for fair competition to encourage researchers to start up and develop various bio-businesses, thus establishing a bio-cluster in Gansu through policy support and expanded funds channels, including venture capital, incubators as well as other financing approaches. Besides, resources can be rallied to cultivate pharmaceutical industry and bio-technologies applied in agriculture and industry.

**Tactic 2: creating a more lenient market environment to motivate various innovative factors for the development of hi-tech industries.**

**Measure 4: Encouraging the development of all kinds of hi-tech industries in a more free and lenient policy environment without identifying key areas.**

To identify the key areas with government support for the hi-tech industry requires various preconditions: first, the hi-tech area identified for key development should be the one that holds a certain share in the hi-tech industry and the overall industrial structure of Gansu, and its value added should reach at least 8% of that of the hi-tech industry as a whole; second, funds and financing channels are required for the identified area; third, relevant human resources, including innovative entrepreneurs, management talents and technical professionals; fourth, supporting and matching facilities, including strong processing capacity, techniques and distribution network. Currently, Gansu lacks both the above preconditions and certain hi-tech industries with strong advantages and potentials, so to identify a key area now is too early to attract and integrate...
innovative factors, which may exert negative impact over the overall development of hi-tech industry. Instead, we should encourage the ample development of hi-tech industry of all kinds through competition and pinpoint the key areas when Gansu is ready to satisfy all the abovementioned requirements.

Once some industry with the above-mentioned qualifications comes up in Gansu, the local government can then identify it for key development with preferential policies and more resources. Besides, it can also encourage the development of a batch of hi-tech and private S&T enterprises as well as intensify the introduction, assimilation and promotion of imported advanced technologies for the development of identified areas.

**Measure 5 Bringing into full play the role of market in allocation of important factors for a more accessible market environment while strengthening the services provided by the government**

Gansu should accelerate the reform on local economic institution to fuel marketization, with price being the deciding force upon the allocation of key production factors. The government needs to expedite the functional transformation to serve the enterprises with quality and human–oriented performance. Therefore, first, the government needs to get down to improving the investment environment of Gansu, attracting investment with a modern and eco-friendly environment built on a high starting pointing. Second, the government may intensify the policy support to leading industries and streamline the administrative procedures for good projects with influence upon the whole industrial chain. Third, it is the responsibility of the government to create a fair and ordered market environment under the rule of law to regulate the behavior of enterprises and protecting IPRs. Fourth, the government needs to enhance credit building in the society so as to reduce the exchange cost of technology innovation and cooperation among enterprises, universities and research institutes. Finally, the government should promote an innovation culture in the society to create sound atmosphere that cares for innovation, encourages innovation and tolerate failures.

**Measure 6 Addressing the “dual structure” in Gansu’s S&T resources allocation to improve the innovation network by innovating the combination mode of industry, education and research.**
The clear identification of positions and responsibilities of industry, education, research and intermediaries in the innovation network can smooth the cooperation and interaction among the innovation players and factors. With the innovative mode for the cooperation among industry, education and research, the dual structure in urban and rural S&T resource allocation of Gansu will gradually be rectified with S&T resources allocation being freer of geological constrains. The technology innovation network will hence be improved and such networks in western China as well as in larger regions be integrated. The government should lead S&T innovation and help with the building of a technology innovation system combining the strengths of industry, education and research under the guidance of the market. In such a system, the enterprises are major players in technology innovation while the university and research institutes play a major role in the knowledge innovation system.

In line with the thinking of “integration, sharing, service and upgrading”, the government should also set up a “Technology Innovation Platform for SMEs” in Gansu as well as in western China, so as to promote the integration, accessibility and sharing of S&T resources to back up the innovation in SMEs. By deepening the reform on S&T institution, the government will lead the building of such a platform with the participation of multi-players, especially the participation of service centers for start-ups, incubators of S&T enterprises, research institutes operated as enterprises as well as key labs and engineering centers of research institutes, universities and enterprises. Tapping the rich innovative human resources as well as other advantages in Gansu, the platform, industry-education-research synergy and the military-civil combination will assimilate more advanced domestic and international technologies to ensure the development of new products.

**Tactic 3 : Integrating the development of various industrial parks for a better microenvironment to attract innovation factors and fuel the development of hi-tech industry.**

In line with the national and local guidance on Gansu’s industrial adjustment, the government may create a sound environment in small industrial-concentrated areas for the growth of those hi-tech clusters with comparative advantages.

**Measure 7 Creating a favorable regional environment that assimilates innovative factors of all kinds for developing various S&T parks featuring different industrial clusters and technology innovation**

The government may develop S&T parks or zones of different industries for the cities or city belts that originally accommodate a certain industry. Such S&T parks and zones are open to innovative factors of all kinds to have their play in it. Universities located in Gansu under the administration of the central government, research institutes and key enterprises are welcome to find their places in the parks. The government shall energize the development of industrial clusters of great potential by creating a favorable environment for innovation and entrepreneurship, setting in place
a free market featuring fair competition, protecting IPRs, offering incentives on innovation and bringing innovations into full play. For example, it is feasible to cultivate such parks and zones featuring material industry in Lanzhou, Baiyin and Jinchun, etc. Taking advantages of resources, industrial bases and policies of Baiyin, the baiyin hi-tech zone may selectively develop some key hi-tech clusters relevant to the development of Baiyin city. It is encouraged to build new S&T parks and zones to strengthen R&D of common technologies in areas that are with certain advantages in wind power generation, new materials, information technology, and bio-pharmacy, new breeds of animals and plants and environment protection technologies.

Measure 8 Developing hi-tech zones of different uniqueness in an environment with favorable policies for business, limited government role, full utilization of market and policies serving enterprises and tax sources.

Since every hi-tech zone should be branded with its own uniqueness, it is better for Gansu to reposition its hi-tech zones according to the local reality, bearing in mind that the government is working to serve the enterprises and market, so as to nurture the source of tax revenue. A hi-tech zone is distinct from others by the leading industry integrating the local technological strengths with local resources. For example, Wuhan’s Optical Valley and Shanghai’s Medical Valley are two representative knowledge–intensive hi-tech clusters built upon their competitive strengths in R&D. Gansu can also shape the uniqueness of the Lanzhou hi-tech zones based upon its own competitive R&D edge in non-ferrous new metal materials, bio-engineering and technologies for environmental protection.

For Gansu, if it intends to develop a hi-tech zone of sharp competitiveness, besides intensifying the policy support to hi-tech zones, it should not blindly follow the current trend of having telecommunication, IT or other presently hot industrial spot as leading industries in Lanzhou.

Column 9

**Experiences and Lessons of Silicon Valley, Route 128 and Tsukuba Scientific Town**

It is necessary for Gansu to reflect upon the development of Silicon Valley, Route 128 and Tsukuba Scientific Town when planning its specialized S&T parks and zones. Though both are hi-tech development zones rich in S&T resources in the US, the Silicon Valley and Route 128 track on different development paths. With the government support, a free market of fair and adequate competition is available to Silicon Valley, in which innovative entities enjoy smooth cooperation and exchange that fuel the long-term development and strong competitiveness. By contrast, Route 128 is comparatively more dependent upon the helping hand of the government and fails to appropriately position the involvement and role of the government in its building. Besides, the lack of independent development in an environment of hierarchy also leads to the difficulties that constrain its development under new circumstances. For Tsukuba Scientific Town, it was built according to the government plan to assemble S&T resources for great S&T strides. The excessive government interference has resulted in difficulties when the town grows up.
hi-tech zones while giving up its comparative advantages in areas mentioned above. The Xi’an hi-tech zone is best and fast growing one of the 13 hi-tech zones in Western China, and also ranks ahead among the 53 hi-tech zones in China, with telecommunication as one of its leading industries. Therefore, Lanzhou hi-tech zone should avoid vicious competition with Xi’an hi-tech zone in this area; instead, it may rally the limited resource to play large the research strength of Lanzhou university and Lanzhou branch of Chinese Academy of Sciences, especially making best use of the resources, technologies of Science Park of Lanzhou university to underpin its development. Besides, Gansu also needs to transform its traditional industry by upgrading them with technological breakthroughs so as to forge the industrial chain.

Tactic 4 Creating an environment for innovation-driven development for more policy support from central government in line with the national plan on development of function areas.

Measure 9 Striving for more support from the central government to strengthen the Gansu’s independent “blood-making” capability

In line with the realities in Gansu and requirements of national function areas, Gansu needs to accelerate the transformation of its government function, becoming more open to the outside world with less unnecessary administrative control inside. It should coordinate and communicate with the central government for more preferential policies on its development and support the national strategy of environment protect, energy conservation and emissions reduction. In order to be identified as a pilot province in west China, Gansu now is working hard to develop a lenient environment and making Gansu a comfortable and appealing region for innovation and entrepreneurs by encouraging the development of all kinds of hi-tech industries.

The central government adjusted its fiscal and tax policies to Gansu according to its plan of function areas and Gansu local government should pay close attention to the policy changes. It should strive for a fiscal and tax policy featuring “less tax, more flexibility” from central government. In reality, the central government also moves towards this direction to materialize equal public service it advocates. As a result, the central government will appropriate fiscal funds to less developed regions for balanced regional development and encourage independent and sustainable local development especially through technology innovation and S&T progress. Therefore, Gansu can work hard for having tax policies granted by central government to encourage increase of Gansu’s S&T input while fulfilling its functions through protecting ecological environment when it grows economically. For example, Gansu may ask for a tax reduction for the annual increase of Gansu government’s S&T input (if accepted, this policy will be readjusted after a 5 years’ pilot implementation); and the support from competent ministries to Gansu’s projects will be correlated with the increase of local input to innovation projects so that a mechanism will gradually be in place featuring steady increase of public input on technology innovation and development of hi-tech industry. With such policies, Gansu will soon track on the
development through technology innovation.

In addition, Gansu should also take the *National Medium and Long-term S&T Development Plan (2006-2020)* as the guide to strive for the initiation of the two projects of protecting the Water Resources in the Upper Reaches of Yellow River and the Hexi Corridor Experimental Zone for Coordinated Development between Man and Nature. Moreover, centering on the key areas and priorities identified in the *Plan*, Gansu needs to pace up the functional restoration and reconstruction of ecosystem in ecologically vulnerable areas and developing monitoring technologies upon activities of ecosystem. Besides, it may propel the implementation of the major S&T project on restoration and comprehensive treatment to eco-system along the Shiyang River, as well as the project on preventing pasture degradation and restoring eco-system of water sources in the upper reaches of Yellow River.

Furthermore, Gansu needs to make best out of different state policies. Since the release of supporting policies to the *Plan*, 54 implementing regulations have been issued by different competent ministries by August 2007, and many of them can be utilized by Gansu to build a more open and more favorable policy environment conducive to technology innovation. Though these implementing regulations are at large to develop a desirable condition for innovation, Gansu still needs to utilize them differentially according to Gansu’s reality. For example, according to the *Announcement on Income Tax Reduction for Enterprises of Technology innovation* jointly released by the Ministry of Finance and State Administration of Taxation in 2006, the enterprises can be exempt of income tax that amounts to 150% of its R&D expenditure of that year. This policy has been soon practiced by many provinces that are eager to gather innovative factors and encourage technology innovation in enterprises. For example, Sichuan was the first to practice this policy for the innovation–driven enterprises in its province and Anhui province took the lead in carrying out the policy in innovation pilot cities, which was soon followed by Jiangsu and Zhejiang according to their own realities. The municipal government of Beijing also released some regulations that promote the government procurement on independently developed innovative products. Similar regulations also include *Announcement on Taxation Policies to Encourage Start-ups and Investment, Announcement on Taxation Policies for Incubators of S&T Enterprises, Opinions on Reinforcing the Warrantee System of SMEs’ Credibility and Opinions on Income Distribution Incentives for Innovation in Enterprises*.

**Measure 10 Developing innovative talents and attracting factors of all kinds for technology innovation** by making best use of Gansu’s geological strength, natural resources and national policies as well as mobilizing all resources within Gansu’s reach.

Gansu should attract various innovative factors by making best use of its geological strengths and following national guidelines for development and creating a lenient policy environment and innovation friendly market. For example, the guideline of developing strategic alliances for the innovation of industrial technology, especially in the regional pillar industries, provides Gansu...
with the opportunity to be favored by the central government by innovation the combination mode of industry, education and research for assimilating innovative factors to Gansu’s pillar industries. Chinese Academy of Sciences also put forward the policies that encourage the flow of talented human resource to Western China, including the grants on kicking off a project for newly arrived doctors, human resources needed by research institutes in Western China and the mechanism that promotes the visits of scholars to the West and introduction of scholars from eastern China.

Among all innovative factors Gansu is in need of, the innovative personnel is the key factor. Various measures should be taken to borrow, introduce and cherish the “brains” and gather them to industries of Gansu, which are of advantages, features and potential. In order to attract talents, efforts should be made in the following aspects: creating an environment that features fair competition, handsome payment and inspires utmost performance of the professionals; carrying out equal treatment to local and introduced talents with ample room left for their performance; the innovative talents attracted under the market mechanism by enterprises may be subsidized somehow by the government and helped with relocation.

Besides, Gansu needs to attach importance to the role of educational resources in developing talents that meet the demands of technology innovation and development of its hi-tech industry. For example, Gansu may readjust the disciplinary structure according the demands of key industries, guide the selection of majors with economic tools, such as subsidies and loans for some majors, and make best use of educational institutes outside Gansu to cultivate talents for it through entrusted education and contracted employment compensation.
Development Strategy of Tourism in Gansu Province

DONG Suocheng, LI Yu, LI Bin, XUE Mei and LI Zehong
Abstract

Gansu Province boasts a unique strategic position in the development of tourism in west China with its diversified natural environments and culture. The *Study on the Development Strategy of Tourism in Gansu Province* bases itself on the a comparison between Gansu and neighboring provinces and autonomous regions, identifies the underlying obstacles, problems and difficulties in the way of tourism development, and has made an comprehensive assessment of the province’s potential and comparative advantages. The report defines the strategic position of tourism from the perspective of economy, society and ecology, demonstrating that the industry is one of the important pillars underpinning Gansu’s pursuit of a diversified development strategy, and the pivotal role played by tourism in promoting new economic growth, prosperity, and employment as well as in improving the ecology and environment. It outlines the strategy and objective of the tourism industry in Gansu; the blueprint that highlights the development of quality tours, interaction between central and peripheral areas, and the tourism industry related to farmers, agriculture and the countryside; policies and measures for the implementation as well. Priorities have been selected and ranked in order. The report could provide grounds for formulating policies that aim at developing the tourism industry in Gansu.
As a rising industry in the global arena, tourism could promote the sustainable and balanced socio-economic development in Gansu Province, and benefit the people in poverty-stricken areas in a substantial way. The study on the development strategy of Gansu’s tourism industry aims at identifying the obstacles, problems and difficulties, analyzing in a comprehensive manner the potential and comparative edges of tourism resources in Gansu, and seeking a development strategy that conforms to local conditions. The tourism strategy serves as a pillar that underpins the overall development strategy of Gansu.

As an inevitable course connecting ancient China with central Asia and Europe by land, Gansu Province has long been home to the glorious Silk Road culture. In terms of natural geography, it is situated in the east monsoon areas of China and the connection between the arid region in northwest and the high cold zones of Tibet. That makes Gansu a mixture of various climates where a wide array of natural sceneries could be found, plateaus, mountainous regions, the Gobi desert, and deserts, to name but a few. In terms of history, the province had witnessed close contacts and exchanges between the Han nationality in central China and other ethnic groups. That being true, it follows that Gansu boasts a unique position with regard to natural structure, geo-politics, history, culture and other aspects, evident in its diversified natural sceneries, cultures and customs, and historic interests. The tourism resources here are abundant and can not be found elsewhere in the western region or even in other parts of China.

Tourism used to be developed as a pillar industry that promised new economic growth in the development strategy of Gansu. However, due to a number of reasons, efforts did not pay off as expected. That contributed to the fact that Gansu’s tourism resources and tremendous potential for growth had been overlooked by decision makers for a certain period of time. Consequently, the tourism industry was reduced to an undefined position in the overall development strategy, with inadequate policy support, underdeveloped systems and institutions, and a weak brand. Coupled with constraints on transportation, services and other infrastructure, the province has not yet been able to fully demonstrate its strength, namely its rich resources of tourism with distinct features.

This report is based on a comprehensive evaluation of Gansu’s tourism resources and a sound analysis on the distinctions that differentiate Gansu from others. It demonstrates the important role of the tourism industry in Gansu’s future economic growth and diversity of industrial structures, and comes to the recognition that to develop tourism should be identified as a priority that optimizes industrial structures, promotes diversified developments and facilitates the change of economic growth patterns. The tourism industry should and could become a pillar that fosters economic growth and brings prosperity to the people. The report also puts forward corresponding policies and measures.
Section 1 Comprehensive Assessment of Gansu’s Conditions for Developing Tourism in Gansu

I. Strengths

1.1 Gansu enjoys immense potential for developing resources of tourism and clear comparative edges.

Generally speaking, the resources of tourism in Gansu are abundant, with fine quality and in good combination. Basic resources exceed 80% and abound in supply. Quality resources account for 25.66% of the total in the survey. The province presents a wide variety of regional resources combinations with sound structures and tourist destinations of well-defined images. Those resources represent the change of Gansu’s natural environments and the vicissitudes of human history. Besides, natural resources and culture elements are well distributed across the region, reinforcing and complementing each other.

Such status quo provides favorable conditions for the design of tourist products, image plan, itinerary arrangement, and marketing. The following regional combinations have great potentials to tap: the Qilian mountain region and oasis on the west of the Yellow River, and the natural resources of deserts combined with the culture of the Silk Road; in east Gansu, the natural scenery of the Loess Plateau combined with the pre-history culture and local customs; the natural resources of the Yellow River in Lanzhou City in good combination with urban culture; the Tibetan culture in south Gansu combined with the eco-tour on the Tibetan Plateau—the Shambala Tour in the mysterious Tibetan region; and the eco-tour of myriad canyons and waterfalls in Longnan.

Gansu is endowed with remarkable cultural resources that boost the development of tourism. The province has quite a few quality tourist destinations that are well known at home and abroad. In a long course of 8,000 years’ development, Gansu has become home to the Silk Road culture, the ancestor culture, the Great Wall culture, the culture of ethnic groups, the Red Culture, and the culture of modern science and technology. In addition, the province is where the culture of the Yellow River, of the Three Kingdoms and of the Jiandu (bamboo and wooden slips) grows. For instance, over 20,000 bamboo slips in the Han Dynasty have been unearthed in the ancient towers at
the sites of Dawancheng, Diwancheng and Jianshui-Jin Pass of Jinta County, making the locality an “archive of the Han Dynasty”. There are 83 fundamental types of cultural tourism resources, accounting for some 69% of the total. According to a survey, 1,570 objects of cultural tourism resources take up 73.7% of all objects of tourism resources in the province. More than half of the resources for cultural tourism are ranked as quality resources.

With a vast expanse of territory, Gansu spans over the Loess Plateau, the Qinghai-Tibet Plateau and the Inner Mongolia Plateau. It is also a border area between the mountainous region of the west Qinling Mountains and the Sichuan basin. Such geographic complexity fosters bio-diversity and a good variety of natural sceneries, such as loess, deserts, the Gobi desert, oases, the Yardan landform, the Danxia landform, snow mountains, glaciers, canyons, karrens, lakes, grasslands and forests. The colorful natural resources and distinct mountains and rivers of Gansu represent the unique strength of the province to develop eco-tours and tap the tremendous potential for eco-tourism development.

Compared with neighboring provinces and regions, Gansu has big competitive edges in terms of natural and cultural tourist destinations, for example national natural reserves, 4A national tourist destinations, national geographic parks, major national scenic spots and places of interests, and national tourist cities of historic interests.

<table>
<thead>
<tr>
<th>Province</th>
<th>National natural reserves number</th>
<th>National natural reserves percentage</th>
<th>4A national tourist destinations number</th>
<th>4A national tourist destinations percentage</th>
<th>National geographic parks number</th>
<th>National geographic parks Percentage</th>
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</tbody>
</table>

Note: 1. Data related to national natural reserves and national geographic parks are recorded by the end of 2005, and that of 4A national tourist destinations is based on the record in August, 2006.
### Table 4.2 National tourist destinations in Gansu VS those in neighboring regions

<table>
<thead>
<tr>
<th>Province</th>
<th>Major national sightseeing destinations and places of interests</th>
<th>National tourist cities of historic interests</th>
<th>Top Tourist Cities of China</th>
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<tr>
<td>China</td>
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</tbody>
</table>

Note: Data on major national sightseeing destinations and places of interests was collected by the end of 2006, and that of national tourist cities of historic interests and fine tourist cities of China refer to the record by the end of 2005.

1.2 Geographically Gansu is granted with favorable conditions to joint hands with other regions for inter-provincial tours.

The geographic location of Gansu as a border area has laid a foundation for the complexity in natural environments and culture, and the diversity of tourism resources and products. Historically, Gansu used to be a must-go place through which ancient China reached out to central Asia and Europe by land, which made Gansu a cradle of the glorious Silk Road culture. In the same time, the province witnessed close contacts between the Han nationality and other ethnic groups, which enabled the place to nurture multi-ethnic culture. Geographically, Gansu has different climates and features plateaus, mountainous regions, the Gobi desert, and deserts among other fascinating natural sceneries due to the influence of three plateaus, namely the Loess Plateau, the Qinghai-Tibet Plateau, and the Inner Mongolia Plateau. Accordingly, the area is a combination of China’s east monsoon climate area, northwest arid zone and Qinghai-Tibet high cold zone. The province also serves as a connection between the northwest and the southwest, bordering Shaanxi, Ningxia, Inner Mongolia, Qinghai, Xinjiang and Sichuan. It constitutes a bridge over three major tourist destinations, namely the Qinghai-Tibet area, the southwest and northwest of China. Moreover, this is where the six punch products of traveling in west China are presented: the Silk Road, the charming Yellow River, the Ancient Tang-Tubo Passageway, the red
journey, the eco-tour in the west and specialized routes. All these prove Gansu’s strategic position in terms of geography and its irreplaceable role in developing tourism in the northwest and even in west China. One of its strength lies in a location that connects other localities and makes for inter-provincial travels, a market of trans-provincial tours and potential for further development in tourism. That also prepares Gansu for regional cooperation in tourism development.

1.3 The advantage of backwardness in economic growth could stimulate fast development of the tourism industry.

Thanks to the policy of vigorously developing the west, Gansu, as an underdeveloped province, began to register rapid economic growth. In particular, its economic growth has outpaced the average level of the country in recent years—Gansu is catching up. As a result, its tourism industry has started to make impressive progress in the 10th Five Year period, exhibiting immense potential and great prospects. In 2006, the GDP of Gansu hit RMB227.5 billion, up 11.4% compared with 2005. Referring to international experience, the period when per capita income ranges from USD 800 to 3000 is a time for the tourism industry to make big strides. The per capita GDP of Gansu in 2006 reached RMB 8,749, topping USD 1,000, which signifies that the local tourism industry is in for fast advancement.

Gansu increased the input to tourism infrastructure and promotion in 2006, which proved to be rewarding. The overall income of the tourism industry hit RMB8.02 billion, up 28.2% compared with the year before. The number of tourists from Gansu traveling in other parts of the country amounted to 15,741 million, presenting a 27.2% growth on a year-on-year basis. The tourism industry began to develop in an all-round way and the system of mainstream products started to take shape. Also in 2006, tourist destinations equipped with basic capacity of tourist reception exceeded 200. An additional 26 national A-grade scenic spots were listed, making Gansu a host of 83 such sites. Among those 83, there are 19 4A attractions, 16 3A sites, 46 2A sites and 2 1A sites. The province is also home to 8 fine tourist cities of China and had 10 industrial and agricultural demonstration zones in 2005.

Major routes with the theme of history and culture have been developed, highlighting the Silk Road, extending to the central, western and eastern tourism regions of the province and based on cities like Lanzhou, Dunhuang and Tianshui. In the south and
the north, tours aimed at introducing religious beliefs, ethnic culture and ecological conservation have been gaining momentum, covering Linxia, Gannan, Baiyin, Pingliang, etc. Aside from improving traditional routes, efforts have also been made to build up new punch products such as the travel to the west the Yellow River to see the fascinating desert, the tour to the east for places of interests of the Silk Road, the tour for seeking roots and worship, the travel to the south to taste the culture and customs of the Hui and Tibetan nationalities, and the sightseeing of the grassland.

Meanwhile, the related service industry is making rapid progress. By 2005, a total of 228 star hotels could be found in Gansu, among which 1 was five-star, 15 were four-star, 60 were three-star, 138 were two-star and 14 were one-star. The industry has been growing in scale and upgrading its management. 294 tourist agencies were in business, of which 32 were international and 262 were domestic. Companies and institutions engaging in tourism amounted to 1,745. The tourism industry directly employed 75,800 people, and indirectly found jobs for 287,000 people. Of those employed, 3,922 tour guides worked with IC cards.

Speaking of industrial tours, Gansu is also ready to go through its paces given the existence of quite a few world-renowned industrial bases that demonstrate the triumphs of the Chinese nation. For example, the list includes the Jiuquan Satellite Launch Center—the town of China’s manned space flight, the town of oil in Yuman which is crowed as the cradle of China’s petroleum industry and the hometown of the “man of iron”, Jinchang termed as the capital of nickel, Baiyin termed as the capital of cooper, Liujiangxia which hosts a large hydropower station, and the Jiayu Pass dubbed the capital of steel. Those are eligible to become destinations for tourists interested in modern industry and the space science and technology.

Gansu’s strength of developing countryside sightseeing tours is also self-evident. As a traditional agricultural province, Gansu boasts rich varieties of produce with fine qualities, bountiful wildlife, an impressive number of distinct ethnic groups, fascinating folk residences of the Han nationality and other ethnicities, ancient architecture, pastoral landscape, and charming pastures with ethnic herdsmen. Those are great tourist attractions that pave the way for agricultural and countryside tours. They are the resorts that draw city dwellers during holidays and assets of Gansu to braze a new trail in its tourism industry. Furthermore, Gansu can turn to green tours given its oasis agriculture peculiar to the arid regions in the hinterland of the Hexi Corridor. Green produce comprising crops, cotton, oil, fruit, vegetables and animal products simply flourish. Tasty food that recognized by ministries and the province
for fine qualities are very popular with tourists, to name just a few, the Jinfeng pears, the Zaosu pears, the Mingshan jujubes, and the Liguang apricot. It is also plausible for Gansu to take advantage of the Loess Plateau for its long history of farming, the cave dwelling, special diets, and the folklore that could not be found elsewhere. The agriculture and husbandry industry in Gannan and the Linxia plateau, coupled with the inviting customs and culture of the Hui and Tibetan nationalities only add to Gansu’s appeal to tourists. What’s more, the region is rich in traditional Chinese medicine (TCM) represented by Angelica sinensis, Codonopsis pilosula (dangshen), Astragalus, liquorice, Chinese ephedra (mahuang), Cistanche salsa, and cynomorium songaricum. When it comes to wildlife, the giant panda, black-necked cranes, the wild horse, the wild donkey, the wild camel, the white goat, the swan, the Tibetan snow cock, the black bear, the goiter gazelle and the steppe eagle are all rare animals of wide appeal to tourists.

1.4 New opportunities rise for Gansu’s tourism industry.

Along with the buildup of China’s comprehensive national strength, the tourism industry is currently in buoyant growth after the entry into the age of mass tourism. The year 2006 witnesses vibrancy in China’s inbound and outbound tours, and domestic tours. When rejuvenating Gansu’s tourism, such great prospects present golden opportunities to the industry.

New national strategies, such as, that vigorous development of the west has provided substantial backing to Gansu’s tourism industry. Measures will be taken to expedite the advancement of the tourism industry so as to make it another contributor to regional economic growth. Such measures include speeding up infrastructure construction, building related facilities and improving the ecology and the environment.

The multifold demand of tourists constitutes a strong driving force for Gansu’s tourism industry. Aside from traditional products, consumers ask for more that are original and dynamic. Industrial tours, eco-tours, sports tours, adventures, festival tours and red tours have won more fans. Given the province’s relevant comparative edges, such developments have really presented Gansu with new opportunities.

Also, regional cooperation in tourism is in full swing, giving Gansu another chance to
expand its market. Based on joint efforts among Gansu, Shaanxi, Ningxia, Xinjiang, and Qinghai over the years, those five provinces came to agreements with Tibet and Sichuan during 2004 and 2005 on inter-provincial tours. It was believed that tourism should know no regional boundaries, cooperation should be strengthened in developing green passages of regional tours, brands should be built and the market of tourism in west China should be expanded. It is important that under such circumstances Gansu grip the opportunity to grow its tourism market.

In the same time, a series of measures have been introduced by Gansu for the purpose of accelerating the development of the tourism industry. That has prepared cities and regions in Gansu to move the industry forward.

2 Problems, obstacles and difficulties that stand in the way of tourism development in Gansu

2.1 An ill-defined position coupled with insufficient policy support

The tourism industry had been neglected when Gansu grew its economy. The lack of understanding of the industry leads to confusion as to what kind of role tourism should be playing in the economy and how this role should be played. Policies are yet to be fully in place to energize tourism as a pillar industry.

As of the year 2000, Gansu began to stimulate the tourism industry and took it as a pillar that underpinned economic growth. The grand goal of “building Gansu into a province of tourism” has its focus on the Silk Road. Nevertheless, due to various reasons, efforts did not pay off as expected. Thus decision makers could not reckon the industry as a source of power, a pilot, and a generator of benefits in a wide spectrum of fields. For some time they failed to recognize the immense potential of Gansu’s tourism resources and the great prospects of the industry. What followed was that the industry remained underestimated in the development strategy of Gansu, receiving little policy support and input and lagging behind their counterparts in the neighboring regions.

Given such policies and input, the weak economic performance of Gansu as a whole and the limited budgets at various levels only added to hindering the development of tourism. The industry is poorly funded in terms of infrastructure for inter-provincial travels, major tourist destinations and promotion. Neither did such input match the
rich resources endowment, nor the fine quality of the resources. Consequently, the province failed to fully tap its tourism resources and turn its strength into a tourism economy. It hardly did enough to develop the tourism industry, not to mention inter-regional tourism and cooperation. The tourism industry in Gansu has been lagging behind. Those are the fundamental reasons why Gansu, though endowed with abundant tourism resources, has not yet witnessed strong growth of its tourism economy.

Currently, Gansu’s neighbors are expediting their tourism developments. Take Xinjiang for example, annually the fund allocated for publicity and promotion tops RMB 10 million Yuan. The figure for Ningxia and Qinghai also exceeds RMB 8 million Yuan respectively. In the east coastal developed areas, every year the Commission of Tourism in Hangzhou City is in command of RMB 70 million Yuan for tourism development and promotion. Provinces in west China have identified tourism as a pillar industry. Therefore, this industry is rapidly gaining ground and competition is being intensified with each passing day, confronting Gansu with a new challenge. (Table 5-3 and 5-4)

### Table 4-3 Financial Input of Some Provinces in 2002 and Related Economic Indicators

<table>
<thead>
<tr>
<th>Province</th>
<th>Provincial Input (RMB10,000 Yuan)</th>
<th>Total Income of Tourism (RMB100 million Yuan)</th>
<th>Percentage of GDP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shandong</td>
<td>10700</td>
<td>610.75</td>
<td>5.79</td>
</tr>
<tr>
<td>Yunnan</td>
<td>3000-4000</td>
<td>289.90</td>
<td>12.80</td>
</tr>
<tr>
<td>Shaanxi</td>
<td>4000</td>
<td>187.00</td>
<td>8.00</td>
</tr>
<tr>
<td>Tianjin</td>
<td>3000</td>
<td>418.00</td>
<td>20.70</td>
</tr>
<tr>
<td>Guangxi</td>
<td>2280</td>
<td>230.47</td>
<td>9.50</td>
</tr>
</tbody>
</table>

### Table 4-4 Position of the Tourism in Gansu and its Neighbors and a Comprehensive Analysis of Corresponding Policies and Measures
<table>
<thead>
<tr>
<th>Province</th>
<th>Position of Tourism in the 10th Five Years</th>
<th>Position of Tourism in the 11th Five Years</th>
<th>Quality Tourism Routes</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gansu</td>
<td>Tourism as a new engine for economic growth</td>
<td>An industry with strength and distinct features.</td>
<td>1. The Silk Road through Tianshui—Lanzhou—Dunhuang, history and culture, and the charming desert; 2. The fascinating Yellow River through Gannan—Linxia—Lanzhou—Baiyin, the grassland, and ethnic culture; 3. Places of interests of the Red Army: Lanzhou—Huining—Pingliang—Qingyang, and folk customs and culture.</td>
<td>1. A coordination mechanism for developing tourism with departments directly affiliated to the provincial government as members has been set up and a website for traveling in Gansu is running. 2. Participation in the 2007 Fair of Domestic Tourism 3. A promotion tour in the Pearl River Delta was initiated in 2007 with Xiamen as the first leg. 4. The promotion budget increased from RMB 4 million Yuan to RMB 10 million Yuan.</td>
</tr>
<tr>
<td>Sichuan</td>
<td>Sichuan is committed to build itself into a major destination of ecological and cultural tours. It aims to take a big step forward from an owner of rich tourism resources to a leader of tourism economy.</td>
<td>The aim is to make Sichuan a major destination of ecological and cultural tours and take a big step forward from an owner of rich tourism resources to a leader of tourism economy.</td>
<td>1. Jiuzhai-Huanglong 2. Giant Buddha of Leshan Mountain-Ermei Mountain 3. Dujiangyan Irrigation System-Qingcheng Mountain 4. Wolong Reserve of Giant Pandas 5. Sanxingdui Culture Tour</td>
<td>1. The government gave directions and enterprises played the major role. The Governor headed the leading group on tourism development which was formed in 2004. 2. Since 2003, the Conference on Tourism Development in Sichuan has been held regularly every year. The provincial working meeting on tourism is also convened on an annual basis since then. 3. Promotion campaigns achieved successes at home and abroad. 4. Input has been increased. The investment between 2003 and 2005 is RMB 30 billion Yuan. Of which 1/3 came from the government. There are three ways of financing, namely interest discount offered by the government in support of major projects’ borrowing of bank loans; proactive policy financing availing of the drive to vigorously develop west China; pledge loans of tourist site tickets.</td>
</tr>
<tr>
<td>Shaanxi</td>
<td>Further efforts should be devoted to making the tourism industry stronger and larger so as to become a pillar for economic growth.</td>
<td>The tour of culture of the Zhou, Qin, Han and Tang dynasties; the inter-provincial red tourist sites in Shaanxi, Gansu and Ningxia, the resort of the Huashan Mountain, and the 1. The partnership between the Xianyang International Airport of Xi’an and Airport Frankfurt (Frankfurt am Main) injected RMB 2 billion Yuan to the building of a key airport in central and west China. 2. Efforts were made to develop tourism brands highlighted by the Silk Road. 3. Shaanxi participated in the International Fair on Tourism held in Berlin, Germany. 4. The promotion in Singapore titled the Spring in the City was initiated. 5. Unfailing efforts were made to develop tourism in the countryside with a theme of the Harmonious Urban and Rural Areas.</td>
<td>1. The partnership between the Xianyang International Airport of Xi’an and Airport Frankfurt (Frankfurt am Main) injected RMB 2 billion Yuan to the building of a key airport in central and west China. 2. Efforts were made to develop tourism brands highlighted by the Silk Road. 3. Shaanxi participated in the International Fair on Tourism held in Berlin, Germany. 4. The promotion in Singapore titled the Spring in the City was initiated. 5. Unfailing efforts were made to develop tourism in the countryside with a theme of the Harmonious Urban and Rural Areas.</td>
<td></td>
</tr>
</tbody>
</table>
2.2 The tourism industry as a whole is not strong.

The industry is at its initial development stage, small in economic scale with a short industrial chain and little capacity to energize related industries. In 2002 and 2003, Gansu only ranked 28th in terms of earning foreign exchange via tourism in China. The short industrial chain of tourism makes it difficult to forge synergies with other industries. This is evident in that tourism is more relevant to products, labor and employment than to socio-economic values. Also, the industry has many individual links instead of multiple connections, one-way relations rather than two-way partnerships, and direct linkages but much less indirect contacts. In 2005, the industry made up no more than 3.54% of Gansu’s GDP, falling far behind its peers in neighboring provinces. The total income from tourism in China contributed to 5.01% of the GDP. Beijing and Shanghai witnessed tourism account for 26.7% and 19.8% of their GDP respectively, which indicated the leading position of tourism in the region. In Yunnan, the total income from tourism was 12.5% of its GDP.

2.3 Tourism brands have yet to be established to fully avail of Gansu’s strength.

The major reason why Gansu, though rich in tourism resources, has yet to enjoy robust growth of its tourism economy is that the province has not done enough to build up tourism brands. For a long time the core brands have been nothing more than the Silk Road and the Mogao Cave in Dunhuang, hardly giving play to other strengths of Gansu such as being the cradle of ancient Chinese culture, and home to spectacular natural sceneries and various ethnic cultures. The integral strength of tourism resources remains to be tapped so as to serve tourism economic performance. (Table 5-5)

<table>
<thead>
<tr>
<th>Province Region</th>
<th>Brand Highlights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gansu</td>
<td>“A Gansu of Culture, of landscapes, of ethnic groups and modernity”</td>
</tr>
<tr>
<td>Sichuan</td>
<td>The eco-tour brand features the giant panda with the catch-phrase of “wonderful Sichuan, pandas’ hometown”; the cultural tour brand is represented by the sun bird, and the countryside tour brand features happiness at rural households.</td>
</tr>
<tr>
<td>Shaanxi</td>
<td>Brands built on cultural tours at heritage sites, the red tours and eco-tours.</td>
</tr>
<tr>
<td>Inner Mongolia</td>
<td>Sightseeing on grasslands, ethnic customs, history and culture.</td>
</tr>
</tbody>
</table>
Xinjiang  The fascinating Gobi desert, ethnic customs, and the Silk Road Culture.
Qinghai  Sightseeing on snow-capped plateaus, the Buddhist culture, and ethnic customs.
Ningxia  “South China in the west, wonderland in Ningxia”. As the South China (south of the Yangtze River) in the west, Ningxia presents culture of Tibet, Ningxia and muslins.
Yunnan  “Colorful Yunnan, tourists’ paradise”. Brands include eco-tours, ethnic culture and the catch-phrase of “Colorful Yunnan, tourists’ paradise”.

2.4 The central tourism cities have yet to become the engine for province-wide development.

Though as a hub of tourism over the past few years, Lanzhou, the capital city of Gansu, has made slow progress in its tourism development, evident in that the industry tends to be marginalized in the city’s socio-economic advancement. Consequently, Lanzhou plays no more than a minor role in energizing the tourism industry in other parts of Gansu and so do other regional tourism hubs. (Table 5-6)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Tourists (10,000 people)</th>
<th>Total income from tourism (RMB 100 million Yuan)</th>
<th>tourism income /GDP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>197</td>
<td>13.97</td>
<td>4.08</td>
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<tr>
<td>2002</td>
<td>226</td>
<td>15.98</td>
<td>4.18</td>
</tr>
<tr>
<td>2003</td>
<td>151</td>
<td>10.58</td>
<td>2.43</td>
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<tr>
<td>2004</td>
<td>259</td>
<td>18.45</td>
<td>3.68</td>
</tr>
<tr>
<td>2005</td>
<td>293</td>
<td>20.84</td>
<td>3.67</td>
</tr>
<tr>
<td>2006</td>
<td>354</td>
<td>21.84</td>
<td>3.42</td>
</tr>
</tbody>
</table>

2.5 Underdeveloped infrastructure like transport and tourist services constrains tourism development.

Situated in China’s hinterland, Gansu is a faraway destination for the mainstream
tourist market in the coastal developed areas. The province is a long and narrow stretch dotted with decentralized sightseeing spots, which undermines its connection with the outside world. It will cost quite a fortune to perfect the infrastructure while transport routes cover long distances in the absence of connections between major highways, national highways and the 250 plus tourist destinations. The absence of a highway network hinders the flow of tourists and makes it impossible for various resorts to complement each other. (Table 5-7, and Table 5-8)

Table 4-7 From Lanzhou and other western cities to Beijing and Shanghai

<table>
<thead>
<tr>
<th>Region</th>
<th>Long-dist</th>
<th>Civil</th>
<th>Railway</th>
<th>Ship</th>
<th>Accomod</th>
<th>Catering</th>
<th>Sightseeing</th>
<th>Shops</th>
<th>Commodity</th>
<th>Entertainment</th>
<th>Communication</th>
<th>Urban Transport</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beijing—Lanzhou</td>
<td>Railway 1876km; Train 18 hours; Plane 2h 5min</td>
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<tr>
<td>Beijing—Dunhuang</td>
<td>Railway 3009km; Train 34 hours; Plane 3h 10min</td>
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<tr>
<td>Beijing—Urumqi</td>
<td>Railway 3768km; Train 40 hours; Plane 3h 55min</td>
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<tr>
<td>Beijing—Xining</td>
<td>Railway 2092km; Train 21 hours; Plane 2h 30min</td>
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<tr>
<td>Beijing—Lhasa</td>
<td>Railway 4064km; Train 47 hours; Plane 3h 50min</td>
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<tr>
<td>Beijing—Kunming</td>
<td>Railway 3174km; Train 38 hours; Plane 3h 10min</td>
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<tr>
<td>Shanghai—Lanzhou</td>
<td>Railway 2185km; Train 20 hours; Plane 2h 40min</td>
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<tr>
<td>Shanghai—Dunhuang</td>
<td>Railway 3318km; Train 43 hours; Plane 3h 10min</td>
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<tr>
<td>Shanghai—Urumqi</td>
<td>Railway 4077km; Train 42 hours; Plane 5h 5min</td>
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<tr>
<td>Shanghai—Xining</td>
<td>Railway 2401km; Train 24 hours; Plane 4h 30min</td>
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<tr>
<td>Shanghai—Lhasa</td>
<td>Railway 4373km; Train 49 hours; Plane 6h 50min</td>
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<tr>
<td>Shanghai—Kunming</td>
<td>Railway 2660km; Train 37 hours; Plane 2h 50min</td>
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</tbody>
</table>

Table 4-8 Composition of foreign exchange income from tourism in Gansu and China (Cost of Travel) (2002)
The above two tables demonstrate though it doesn’t cost much to travel from Beijing or Shanghai to Gansu compared with other western cities, Gansu’s narrow and long landscape coupled with decentralized resorts has raised the cost of transport. That’s why some tourists complain that the Silk Road tours have been overcharged. Such a scenario has hindered the development of the tourist market.

2.6 Blurred ownerships, ill-defined rights, and irrational systems and institutions stand in the way.

For some tourist resources and destinations, the blurred ownership, ill-defined rights to operation, to revenue and to management, coupled with irrational administrative systems, give rise to vicious competitions where multiple parties claim to be in charge against each other. That has hurt the interests of tourists and seriously hampered the healthy development of tourism. Thus tourist companies have failed to develop the modern corporate system that operates in line with the market economy.

The mechanism for regional cooperation in tourism is ineffective. There is an absence of effective mechanisms for cooperation with neighbors in terms of routes design, tourist product development and resources sharing. This indicates that synergies have not been forged among the region. Worse still, competitions for tourists and capital arise.

In the meanwhile, international tourism companies will play an increasing bigger part in the market of domestic tours, competing in product quality, promotion, pricing, and management and operation systems. Far from being competitive, Gansu hasn’t fully prepared itself for the race.
2.7 Gansu suffers from the shortage of high-level professionals who are good at running, managing, promoting and marketing tourist projects.

A considerable number of professionals are needed to fill a big gap in Gansu’s tourism drive. In particular, Gansu suffers from the severe shortage of senior tour guides and high-level professionals who are good at running, managing, promoting and marketing tourist projects. That has been one major obstacle that Gansu has to overcome. Moreover, the backward planning in various localities has led to duplicate and blind developments of tourist destinations. Efforts have not been adequately made to boost publicity while tourist companies should have been doing a better job on marketing.

2.8 Threats confront Gansu’s ecology and environment.

Situated in the hinterland, the eco-system of Gansu as a whole is fragile and sensitive. The province has fallen victim to drought, sand storms, sever desertification in particular, erosion and other environmental disasters. Despite the fact that efforts to build up the eco-system did improve the internal environment of oases, the eco-system continues to deteriorate in some places. Besides, environmental pollution remains alarming in cities that specialize in developing and processing mining resources. Those problems, together with water resource scarcity, have by and large affected the development of tourism. The Shiyang River valley is confronted with the risk of vanished oasis when mankind gives way to the desert. The Qilian Mountain is witnessing a rising snow line that calls for immediate ecological conservation. The mountainous regions in Longnan have vulnerable eco-systems and backward economies. All of these present new challenges in Gansu’s pursuit of traditional industries. Therefore the province must turn to the alternative of developing eco-industries with tourism at the core. Consideration should be given to the capacity of the environment and the eco-system while promoting tourism and efforts should be made to enhance the eco-system, tackle pollution, and build a sound environment.

In addition, duplications in major tourism resources remain outstanding, calling attention to conservation and coordinated development. Gansu is home to a significant amount of grottos, sites for religious rites and worships, heritage sites of human activities, abandoned historic cities and settlement sites. There are over 65 objects of each resource type and most of them are of fine quality. Duplications affect in-depth
appreciation of similar tourist destinations as people see little difference and tend to be much more impressed by what they see for the first time.

Section Two: Strategic Position of Gansu’s Tourism Industry

1. The Economic Position of Gansu’s Tourism Industry

1.1 As a new source for economic growth, tourism should become a pillar industry underpinning Gansu’s economy in the near future and a leading industry in the long run.

Efforts should be made to lay a solid ground for the tourism industry of Gansu in five years, bring the industry into full swing in 10 years, enable marvelous strides in 15 years and build it into a leading industry in 20 years. That is, in the coming 15 to 20 years or so, Gansu is to host a tourism industry of magnitude and strong economic growth, fully upgrade and optimize its industrial structure based on the boom of tourism. That being achieved, Gansu will be well on its way towards a well-off society in an all-round way, and a harmonious and environment-friendly society with a benign circle of cultural advancement and ecological conservation. Therefore in the 11th Five Years, tourism should be developed into a pillar industry and aim at being a leading industry in the long term. According to our forecast, this objective can be met. (Table 5-9)

Tourism is a rising industry friendly to the environment. As a comprehensive economic sector, the industry is extensively related to society, economies, and ecology as it delivers economic returns, and social and ecological benefits. A booming tourism industry adds to the GDP and fiscal income, energizes economic growth, builds economic strength, expands domestic demands through increased consumption, earns foreign exchange, boost foreign trade and help to cover the foreign trade deficit. Besides, tourism is substantially value added. According to statistics, every US dollar earned by China’s tourism industry adds USD 3.12 to the national economy and USD 5.9 to the utilized foreign capital. It is calculated by the World Tourism Organization that each direct RMB Yuan earned by tourism brings RMB 4.3 Yuan worth of added value to related industries in the national economy. In China, the tourism economy has become a new source for economic growth and the industry has been pillars in many regions. Tourism contributes to regional economies. From 1985 to 1988, the income from international tourism boosted the national economy by 3.5 to 5 folds. Between 2000 and 2005, Gansu’s tourism industry witnessed sustained rapid growth. Compared with its neighbors, the province’s total tourism income increased by 1.71 folds, following Sichuan and Inner Mongolia, and followed by Qinghai, Shaanxi,
Xinjiang and Ningxia. In 2006, the total tourism income topped RMB 8 billion Yuan, indicating that the industry had become a new engine for economic growth.

### Table 4-9 Forecast for Tourism Development in Gansu Province from 2006 to 2020

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>GDP (100 million yuan)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>High</td>
<td>1558.9</td>
<td>12.21</td>
<td>965.1</td>
<td>11.31</td>
<td>4838.5</td>
</tr>
<tr>
<td>Middle</td>
<td>1558.9</td>
<td>12.21</td>
<td>2853.4</td>
<td>10.6</td>
<td>4919.9</td>
</tr>
<tr>
<td>Low</td>
<td>1558.9</td>
<td>12.21</td>
<td>2687.3</td>
<td>9.5</td>
<td>4134.7</td>
</tr>
<tr>
<td>Total tourism income (100 million yuan)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>55.26</td>
<td>24.37</td>
<td>210.2</td>
<td>24.94</td>
<td>530.39</td>
</tr>
<tr>
<td>Middle</td>
<td>55.26</td>
<td>24.37</td>
<td>172.3</td>
<td>20.86</td>
<td>368.72</td>
</tr>
<tr>
<td>Low</td>
<td>55.26</td>
<td>24.37</td>
<td>136.4</td>
<td>16.25</td>
<td>266.26</td>
</tr>
<tr>
<td>Total Tourism Income/GDP (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>3.54</td>
<td>7.09</td>
<td>10.96</td>
<td>15.93</td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>3.54</td>
<td>6.04</td>
<td>8.21</td>
<td>10.69</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>3.54</td>
<td>5.08</td>
<td>6.44</td>
<td>8.06</td>
<td></td>
</tr>
</tbody>
</table>

Note: the data for 2004 is obtained in the year 2004.

The productivity of tourism in Gansu is much higher than that of other industries. The labor productivity at the China International Tourist Service (Gansu) in 2002 is RMB 194,000 Yuan/person, and that of industrial enterprises (all State-owned enterprises (SOE) and non-SOE above designated size) is RMB 41,600 Yuan in the same period. Those who work in tourism in Gansu also contribute more to pre-tax profits on a per capita basis than their peers in other areas. The potential for value creation by tourism workforce is immense. (Table 5-10)

As things stand, tourism has become the fastest growing industry in Gansu, an emerging sector of the greatest potential, and a new type of engine driving the economy of Gansu. Being a rising pillar industry in regional economy, tourism is now playing a more and more important role in the economic growth of cities, prefectures and counties, poverty eradication, employment, and the building of the environment. 13 out of the 14 cities and prefectures in Gansu have specifically identified tourism as a major industry or a pillar for growth. In the 11th Five Years Plan period, investment projects of tourism have been performing quite well. (Table 5-11)

### Table 4-10 Per Capita Pre-tax Profits of China International Tourist Service (Gansu) vs. Other Areas

<table>
<thead>
<tr>
<th>Area</th>
<th>Indicator</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-tax Profits/Capita of China International Tourist Service (10,000 yuan/person)</td>
<td>2.3</td>
<td>1.9</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Beijing</td>
<td>Pre-tax Profits/Capita of China International Tourist Service (10,000 yuan/person)</td>
<td>6.9</td>
<td>4.7</td>
</tr>
<tr>
<td>Shanghai</td>
<td>Pre-tax Profits/Capita of China International Tourist Service (10,000 yuan/person)</td>
<td>3.6</td>
<td>2.3</td>
</tr>
<tr>
<td>Yunnan</td>
<td>Pre-tax Profits/Capita of China International Tourist Service (10,000 yuan/person)</td>
<td>0.8</td>
<td>0.7</td>
</tr>
<tr>
<td>Gansu</td>
<td>Pre-tax Profits/Capita of China International Tourist Service (10,000 yuan/person)</td>
<td>0.3</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Table 4-11 Investment Efficiency of Tourism Development Projects in Gansu in the 11th Five Years

<table>
<thead>
<tr>
<th>Period</th>
<th>Total Investment to Planned Tourism Projects (RMB 10,000)</th>
<th>coefficient of investment efficiency (lower-limit)</th>
<th>Income increase due to tourism investment (lower-limit) (RMB 10,000)</th>
<th>coefficient of investment efficiency (upper-limit)</th>
<th>Income increase due to tourism investment (upper-limit) (RMB 10,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11th Five Years</td>
<td>1602431</td>
<td>0.61</td>
<td>977482.91</td>
<td>0.72</td>
<td>1153750.32</td>
</tr>
</tbody>
</table>

Therefore, in the course of the 11th Five Years, Gansu must grant priority to the tourism industry given its significant role in bringing affluence to the people, and efforts should be made to solicit policy and funding support from the state.

1.2 The tourism industry should be a strategic sector that optimizes Gansu’s industrial structure, changes the pattern of economic growth and serves as a pilot driving force.

The resources-based industries in Gansu suffer from irrational structures and weak
performance due to enduring conventional economic growth pattern that is energy intensive, and inefficient. Furthermore, those industries lack a sustained momentum for growth as they face two stumbling blocks: resources shortage and environment degradation.

In such context, it is important for the province to enable tourism to energize its forward and backward industries, and provide impetus to the first, second and tertiary industries. From a strategic standpoint in the long run, it makes good sense to consolidate tourism as a point for breakthroughs, an engine that drives related industries and the circular economy with its extensive connections, environmental friendliness, strong momentum for growth and the role as a pioneer. Efforts should be made to guide and replace some traditional industries through the development of comprehensive tourism, develop a new type of industrial eco-system that is diversified and structurally rational. Thus a benign circle of broad industrial development could be achieved and the conventional economic growth pattern of Gansu could be changed.

2 Social Position of the Tourism Industry

2.1 Tourism should serve as a major channel for employment in Gansu.

The tourism industries in developing and underdeveloped countries are service-oriented and labor-intensive. Tourism is ranked as one of the most powerful engines driving the modern economy. The employment multiplier of characteristic tourism industry is 3, and that of core tourism industry is 8. That means the tourism industry should be given a big role in boosting the domestic demand and employment in Gansu. (Table 5-12)

<table>
<thead>
<tr>
<th>Period</th>
<th>Total investment to tourism projects (RMB 10,000)</th>
<th>Employment opportunities generated from every RMB 10,000 tourism income</th>
<th>Tourism income increase due to investment (lower-limit) (RMB 10,000)</th>
<th>Potential for employment through tourism income (lower-limit)</th>
<th>Tourism income increase due to investment (upper-limit) (RMB 10,000)</th>
<th>Potential for employment through tourism income (upper-limit)</th>
</tr>
</thead>
</table>

Table 4-12 Potential for Employment from Tourism Project Investment in the 11th Five Years in Gansu
2.2 Tourism should serve as a new driving force for Gansu’s urbanization and regional sustainable development.

The backwardness of Gansu in the aspect of urbanization and urban socio-economic growth is not compatible to the drive of tourism, nor are the urban infrastructure, the tertiary industry or the outlook and style of cities ready to meet the demand. In particular, grave challenges exist in terms of building up tourism cities and sightseeing spots. The tourism industry belongs to the urban economy and is environment-friendly. Its development could facilitate Gansu’s building of tourist cities and towns and the process of urbanization. To develop eco-tourism constitutes an important strategy to achieve efficient, comprehensive and balanced regional developments. Besides, the tourism industry is expected to absorb a large amount of surplus labor, expediting the transfer of rural population to cities. In this way, the industry could substantially ease the pressure on the ecology and environment in the countryside, mediate the strained relationship between the rural population and lands, provide a panoramic perspective of the urban-rural relation, and promote sustainable development.

2.3 To develop comprehensive tourism should present an essential way in which Gansu will make strategic breakthroughs in building a harmonious society, further open up to the outside and promote social progress and civilization.

It is important for Gansu to vigorously promote domestic and international exchanges and cooperation through the development of tourism. This is also an opportunity for the province to change the mindset of local citizens, further open up to the outside, and develop a better sense of modern civilization. Tourists would bring with them advanced cultures, concepts, information, technologies and human flows which help the province further open up and progress socially and culturally. Inbound tours fall in the same category of export trade and it is also true for outbound tours and the import trade. In other words, inbound and outbound tourism is the export and import of services while the export and import trade is the sales and purchase of products.

3. The ecological position of tourism

Tourism should be positioned as a strategic industry for Gansu’s efforts to protect and
restore the ecology and environment, and coordinate the relation between the environment and socio-economic development. Given Gansu’s water resource scarcity, fragile eco-systems and backward economy, it is necessary for the province to protect the environment and in the meanwhile expedite socio-economic development. The future direction lies in a win-win and sustainable path for ecology and economy. Tourism produces no tangible goods and its core product is a full array of services to tourists. Comprehensive tourism puts man before everything and is consumption-oriented, providing tourist flows, capital, information, development opportunities and markets to underdeveloped regions. Eco-tourism in particular, is environment friendly, a “smokeless industry” with little resources depletion and small negative impacts on ecology. The development of eco-tourism, a rising industry, serves economic growth, eases pressure on the environment, recovers the eco-system, coordinates the relation between ecology and socio-economic development, creates harmony among society, economy and ecology in regions, and boosts sustainable development. One integral part of building the ecology and environment is to bring green to tourist destinations. In this connection, tourism development, once receives great momentum, will significantly improve Gansu’s eco-environment and stimulates sustainable development.

Section Three  Gansu’s Strategy of Tourism Development

1 Strategy of Comprehensive Tourism

1.1 Focus on develop the industrial system of comprehensive tourism and change the conventional pattern of economic growth.

Comprehensive tourism identifies tourism as the driving force and builds its industrial system based on the synergy of tourism-related factors (transport, accommodation, catering, travel, entertainment, shopping and study). Such a synergy spans over industries, regions, ownerships and resources. The comprehensive tourism system satisfies various tourism demands, and generates comprehensive benefits (in terms of economic growth, domestic demand, employment, environment protection, cultural advancement, and the change of economic growth pattern). It also efficiently utilizes all tourism resources and environments and presents a new type of socio-economic activity that coordinates the relation between man and nature. (Figure 4-1)
Comprehensive tourism is in line with the scientific concept of development and the five arrangements of overall planning and can therefore fulfill related requirements. It is also a new type of driving force for Gansu to build a well-off society in an all-round way, achieve strategic breakthroughs in developing a harmonious and environment-friendly society, and bring peripheral regions to the central stage.

Based on available tourism resources, locations, and strategic positioning, Gansu’s comprehensive tourism strategy identifies tourism as a pioneering industry which extends the industrial chain and builds up a comprehensive tourism system. Such developments are expected to promote the circular economy at the provincial level, change the pattern of economic growth and replace old and weak industries. Via industrial multiplier effects, related industries will also receive momentum for growth.
and thus the industrial structure of Gansu as whole will be optimized, the pattern of economic growth will be changed, the regional economy will made headways, the eco-system will be further developed and the environment will be better protected.

In outlying and poverty-stricken areas where tourism resources are abundant, efforts should be made to develop the eco-tourism industry, extend the industrial chain, and enable tourism to play a central role as the flagship in a new industrial system. Within the framework of such a system, old and weak industries will be replaced, related industries of tourism will gain ground, the dominate position of tourism will be reinforced, and the regional economy will be energized.

In the short run, Gansu should take into account local conditions, select typical areas as follows, facilitate the interactive growth of tourism and advantaged industries, substitute weak industries, and develop pilot regions for comprehensive tourism.

Inter-promotion Pattern (Ecology and Tourism)—tourism serves as a pioneer that promotes eco-industries and builds eco-environment. Gannan Prefecture could be a pilot area.

Linkage Pattern (Agriculture and Tourism)—sightseeing agriculture forges a synergy with tourism to galvanize related sectors in the first and tertiary industries. Regions enjoying robust developments of agriculture and tourism could be pilot areas.

Business plus Tourism—business and trade team up with tourism to stimulate related sectors in the first and tertiary industries. Liangzhou District in Wuwei City could try this pattern.

Linkage Pattern (Culture and Tourism)—Gansu should input significantly into the development of culture industries, integrate the comparative strengths of culture industries and tourism so as to forge synergies and achieve co-developments. Tongwei County, the hometown of calligraphy and paintings could adopt this pattern and develop tourism as a way to alleviate poverty.

Linkage Pattern (Transport and Tourism)—tourism promotes transport development and transport facilitates tourism. Thus the comprehensive tourism will receive momentum for leapfrogging developments. Pilot areas could be regions under large scale transport construction that complements the development of tourist destinations.

Linkage Pattern (Industry and Tourism)—tourism develops in tandem with advantaged industries. Yumen City and Baiyin City could be pilot areas.

Dominant Pattern—Dunhuang City, and Suzhou of Jiuquan City could try this pattern.
Substitute Pattern—Gannan, Linxia, Chengxian County, Zhangxian County and Dangchang could play the pilot role.

1.2 The brand strategy should be adopted featuring the Silk Road and the eco-tours. Quality tourism products should be developed and diversified.

Tourism products are the life of tourism while brands are the subsistence of those products. Take Xinjiang as an example, the region reviewed its standing as a tourist destination with a vast territorial expanse, decentralized tourist spots and moderate resources endowment before re-positioning its market strategy. Xinjiang highlights its characteristic resources such as folklore, lakes, glaciers, grasslands, historic sites and deserts. It advocates the “experience of tours” to build up unique brands and is now well on its way towards robust tourism development. Drawing on Xinjiang’s success, Gansu has to implement the brand strategy in its pursuit of tourism, boost publicity of its punch product—the Silk Road, establish the brand of eco-tours to fascinating landscape, diversify quality tourism products and restructure its product mix.

1.2.1 Core tourism products

Core tourism products of Gansu encompass cultural tours featuring first and foremost the Silk Road, the classic tour of ancestors’ culture, the tours of experiencing folk customs and ethnic culture, the eco-tours to peripheral mountains and rivers, and arid deserts, the newly-developed green industrial tours to the west of the Yellow River, and the booming tours to holiday resorts.

Classic cultural tours in Gansu include the quintessence tour of the Silk Road, the tour to the cradle of ancient Chinese civilization; to the hometown of Xihuang, the ancestor of culture; to the development trajectory of the Zhou Dynasty and the Qin Dynasty and the cultural of farming; to typical Great Walls in different dynasties; and to the corridor of grottos and the corridor of arts.

1.2.2 Characteristic tourism products

The mix includes traditional tourism products of urban tours, industrial tours, root-seeking tours, educational tours on natural science, expedition tours, and festive
tours. It also encompasses new products such as open-air camping, educational tours imparting China’s revolutionary traditions, landmark tours, etc.

1.3 Pattern of Interactive Development for Center-Peripheral Tourism

Efforts should be made to reinforce the tourism hubs, and provide impetus to peripheral regions in the implementation of this pattern: center-peripheral tourism destinations-tourism lines.

Tourism is a bridge that connects the central and peripheral areas and an engine that drives their interaction. The core-peripheral pattern brings the flow of man, commodities, information, and capital to both central and peripheral regions and promotes local tourism. Comprehensive service networks should be developed in major tourist attractions, tourist cities, and transport hubs, covering accommodation, catering, entertainment, shopping, etc. Tourism employment networks should be developed in transport hubs like airports, railway stations, and bus stops. Around big cities like Lanzhou, 2-to-3-hour holiday resorts should be built. As for medium-sized cities like Tianshui, Pingliang, Wuwei, Jiayuguan, and Jiuquan, 1-hour holiday resorts should be built to meet citizens’ growing demands. Along major travel transport lines, tourism economic development belts should be promoted and in small cities and towns capable of tourism development, the town-countryside tourism systems should be developed.

Efforts should be made to optimize the layout of Gansu’s tourist destinations. The current scenario where sightseeing spots are isolated from each other should be changed, and a case in point is the “Dunhuang Feitian” – Mount Maiji route. Flagship attractions should be built, such as to develop Dunhuang into an international tourist city, and promote central tourist cities in the Jiayu Pass-Jiuquan area. Existing tourist hubs such as Lanzhou should be further developed. Lanzhou, well situated at the north-west intersection of China and being an example of central modern city, should fully avail of its advantages, and reinforce its dual roles in being a hub of tourism and a major tourist attraction. It is significant to build Lanzhou into a central tourist city in the northwest, leading to the Hexi Corridor and the Silk Road in its northwest, Linxia and Gannan tourist destinations in the west, Longnan and Tianshui in the south, and other tourist attractions in the east. In this way, Lanzhou could also forge a synergy with counterparts in Shaanxi, Sichuan, Ningxia, Qinghai, Xinjiang and Tibet, shaping a tourism economy belt in west China. Input should be focused on fostering a quality tourism system with the Yellow River sightseeing at the core and redefining
Lanzhou’s image as a tourist city. Substantial input should be made to boost the publicity of such tourism products in respective market segmentations at various stages as “Lanzhou locals travel in Lanzhou”, “Gansu locals travel in Lanzhou”, “people in the northwest travel in Lanzhou” and “Chinese and world citizen travel in Lanzhou”. It is essential that the tourism of Lanzhou identify its highlights, to name just a few, the culture of the Yellow River, the Silk Road, the folk culture, a modern Lanzhou of scientific and cultural achievements, premium sightseeing experience of the Yellow River, summer resorts on the Loess Plateau, eco-tours of Longyuan, fascinating city views, exhibitions and conferences, a taste of folklore and ethnic cultures, and green tours. The aim is to redefine Lanzhou’s image, demonstrate its role as “a pearl of the Yellow River, a key city along the Silk Road, and the center of the northwest”, and raise its profile as a tourist destination. Besides, a number of tourist cities should also be developed, such as Tianshui, Dunhuang, Jiuquan, Wuwei, Pingliang, Qingyang and Hezuo.

Spot-route development should be promoted where the central attractions drive the development of others in a network of tourist detonations. Progress will be made from sightseeing spots, travel routes and lines to tourism belts with a view to forming the fascinating 1,000-li Silk Road of China. This belt will be the backbone of Gansu’s tourism. Along the traffic network featuring the Lanzhou-Xinjiang railway, the 312 and 310 national highways and to-be-built express ways, central cities should forge a synergy featuring Dunhuang, An’xi, Yuman, Jiayuguan, Jiuquan, Zhangye, Jinchang, Wuwei, Baiyin, Lanzhou, Dingxi, Tianshui, Pingliang and Qingyang. Those cities are expected to take up their share of responsibilities, team up with each other, share the achievements and benefits, and focus on building premium travel routes and an exclusive Silk Road experience.

Two wings stretch to the north and the south. Two wings indicate the tour of ancestry culture in east Gansu and the Yellow River (namely the tour of history and culture of farming), the tour of ethnic culture in Gannan and Linxia, the eco-tour and the tour of natural and historic heritage (the ancient biological fossil group). To the east, those wings connect the Silk Road tourist area reflecting cultures of the Qin and Han dynasties in Shaanxi, and to the west they lead to the miraculous view of the three gorges of the Yellow River in Yongjing, the No. 1 harbor of the Yellow River in Gannan, the Mengda heavenly pond in Qinghai, the wonder of Yellow River at the Longyang Gorge, and the ethnic culture in Tibet. Meanwhile, the 100-li Yellow River route in Lanzhou can go all the way to the northwest where the Yellow River presents
fascinating views in Baiyin, in Jingtau with grotesque stone formation, and extend to Ningxia, building the 1,000-li tourist route with a theme of the Yellow River.

To the north Gansu may team up with travel itineraries in Xinjiang, and to the south with Jiuzhaigou in Sichuan, as well as attractions in Yunnan, Guizhou and Sichuan. The eco-tour zone in Longnan can serve as a gateway to the appealing Jiuzhaigou in Sichuan, becoming a bridge between the northwest and southwest tourism in a bid to develop an enormous world-class tourism economic belt in west China.

A 1-3-6-hour tourist economic cycle featuring Gansu and surrounding areas should be built, and so should the 1-3-6-hour around-the-city tourist zone centering on Lanzhou, and the 1-hour holiday resorts surrounding Tianshui, Pingliang, Wuwei, Jiuquan and other medium-sized cities. The aim is to meet the growing demand of urban dwellers for holiday leisure. Besides, efforts should also be made to foster tourism economy belts along major transport lines and develop town-countryside tourism systems.

Six major routes should be developed, namely

A. the Silk Road: follows the Longhai-Lanzhou-Xinjiang railway and the 312 national highway going through Urumqi, Dunhuang, Jiuquan, Wuwei, Lanzhou, Pingliang and Xi’an; or from Lanzhou to Tianshui and then Xi’an;

B. the route of ancestry culture: along the 310 national highway, the route starts from Dingxi and goes to Tianshui, the 312 national highway in Pingliang and then Qingyang;

C. the route of Yellow River: the Baotou-Lanzhou railway and the Yellow River lead to Guide in Qinghai, Lanzhou, Yinchuan and Inner Mongolia;

D. the route of snow-capped Qinghai-Tibet plateaus with ethnic culture: along the Qinghai-Tibet railway there is Lanzhou, Xining, Golumd and Lhasa;

E. the eco-tour route of 100 valleys and 1,000 waterfalls in Longnan: the 212 national highway and the Lanzhou-Chongqing railway lead to Lanzhou, Lintao, Longnan and Jiuzhaigou; and

F. the route of the Hui and Tibetan ethnic cultures: the 213 national highway leads to Lanzhou, Linxia and Gannan.
1.4 Efforts should be focused on developing the market of surrounding regions of Gansu in the northwest and of the east coastal cities, meanwhile active steps should be taken to tap the overseas market.

The number of domestic tourists to Gansu decreases as distance increases, with an equal distribution of tourists in various parts of the province while some major attractions present tourist concentrations. The market covers tourists of all walks of life who mainly come from Gansu and neighboring regions. The percentage of tourists from Shaanxi, Qinghai, Ningxia, and Sichuan is respectively 16.13%, 4.88%, 4.62%, and 6.55%, accounting for 32.18% of the total. Many tourists come from metropolises like Beijing (7.01%) and Shanghai (3.2%). Those six provinces and municipalities altogether take up a share of 42.39% in terms of tourist number. Besides, tourists from Henan, Jiangsu, Zhejiang and Hebei account for 6%, 5.5%, 3%, and 3.5% respectively.

The domestic market positioning should be:

A. the first grade tourist source market: surrounding regions of Gansu (mainly Shaanxi, Sichuan, Qinghai and Ningxia ), the Beijing-Tianjin-Hebei region and north China (Beijing, Henan, Shandong, Hebei and Tianjin), the Yangtze River Delta (Shanghai, Jiangsu and Zhejiang), and the Pearl River Delta.

B. the second grade tourist source market: regions contribute over 1% tourists to Gansu belong to this category and enjoy immense potential. They include Gansu’s internal tourist market, Inner Mongolia in the northwest, Chongqing, Liaoning and Heilongjiang in the northeast, Fujian Province in the southeast coastal region, Yunnan Province and Guangxi Zhuang Autonomous Region in the southwest, Hunan, Hubei, Anhui and Shanxi in central China; and

C. the third grade tourist source market: markets that account for a small share of tourists with moderate economic growth and being far away from Gansu fall into the third grade. They include Jiangxi, Hainan, Guizhou, Jilin and Tibet.

To stimulate the domestic market, efforts in the near term should be committed to
speed up the development of the first grade market, vigorously expand the second grade market so as to transform it into the first grade, and moderately tap the third grade market.

As for the overseas market, the top ten foreign countries and regions on Gansu’s tourist list in 2002 (including Japan, Hong Kong, Macao, Taiwan, the USA, Singapore, the ROK, France, the UK, Germany and the Netherlands) make up 82.4% of the total. They are major overseas tourist sources for Gansu. Among them:

A. the first grade: Hong Kong, Macao, Taiwan, Japan, the USA, Singapore, and the ROK. Those are regions that enjoyed fast and steady growth from 1991 to 2002 and contribute more than 3.5% of Gansu overseas tourists;

B. the second grade: France, the UK, Germany, and the Netherlands which take a comparatively smaller market share at a lower speed of growth;

C. the third grade: countries and regions that account for 17.6% of Gansu’s overseas tourists, with a more than 1% market share and have witnessed rapid growth in recent years belong to this category. They include Malaysia, Canada, Australia, Switzerland, Italy, Spain, and Sweden; and

D. markets yet to be tapped: those are countries that exhibit rapid growth over the past five years but take a less than 1% market share. They include Thailand, New Zealand, Indonesia, the Philippines, and Russia.

1.5 Proactive steps should be taken to promote the tourism related to agriculture, farmers and the countryside, and gradually open up the countryside tourism market.

In view of the issue of agriculture, farmers and the countryside, the rapid development of urbanization and the advent of the times of leisure, unfailing efforts should be made to boost the tourism related to agriculture, farmers and the countryside to help solving the problems in rural China, find an access to breakthroughs in building the new socialist countryside, and balance urban and rural developments. Part of the agricultural resources should be tapped for the purpose of tourism, products of agricultural tourism should be developed and quite a number of standardized rural tourism households and hi-tech agricultural parks should be built. Thus the product series of agricultural tourism could play its role based on the concept of new socialist
countryside, featuring rural lifestyles, local specialties, and pastoral sceneries, well-off and eco-friendly villages. Effective steps should be taken to energize countryside tourism so as to facilitate the restructuring of the rural economy, offer more jobs, increase farmers’ income and build the new socialist countryside. Meanwhile, input should also be devoted to the tourism market related to farmers. As countryside tourism progresses, ethnic group habitats and poor regions could shake off poverty and enjoy prosperity, and witness the restructuring of the agricultural industry. Tourism development should be closely related to the building of new socialist countryside, so that accordingly a number of tourism-for-poverty-eradication projects and agricultural eco-tour demonstration projects could be launched. In this way, countryside tourism may develop in a broader sense at a higher level and act as an important strategy for the building the new countryside.

Section Four Solutions and Suggestions

1 Administrative Systems of tourism should be established at provincial and subsidiary levels to strengthen the strategic role of the government at the preliminary development stage.

Administrative Systems of tourism should be established at provincial and subsidiary levels. Provincial leaders should head the leading group on tourism coordination of Gansu whose membership includes leaders of related departments. Correspondingly, leading groups at subsidiary levels should be in place to play a role as a coordinator, decision-maker and supervisor of tourism development within their scope of jurisdiction. This aims to utilize internal mechanisms and provide incentives to mobilize local departments and all social quarters to develop comprehensive tourism. Reforms should be carried out on tourism administrative bodies, enabling tourism bureaus to become the authority of tourism rather than public institutions affiliated to the government.

At the preliminary stage, Gansu’s tourism development should stick to the principle of government taking the lead, being market-based and involving social quarters. In the course of the 11th Five Years, the province should focus on the following tasks: the government takes the lead to put forward innovative concepts, and is in charge of strategic missions such as exercising macro-control and providing services in terms of tourism laws and regulations, infrastructure, organizational guarantee, tourism environment, administration, coordination, and supervision.
Efforts should be made to advance the reform of modern corporate system on tourism. To enhance the innovativeness of companies in the tourism industry, it is necessary to properly handle the issue of state-owned assets, enable innovation in the management system of state-owned enterprises (SOE), change the current operation pattern of travel agencies, and promote new models that enable non-SOEs to take part in the development, management and protection of tourism resources.

2 Four major tourism development programs should be implemented.

2.1 Tourism for Employment Program

When implementing the strategy of vigorously developing comprehensive tourism, the Tourism for Employment Program of Gansu should be introduced. Governments at all levels and related departments should work out corresponding programs. A wide array of preferential policies should be formulated to encourage the participation of surplus labor and laid-off workers in the development of comprehensive tourism. More employment opportunities should be offered by the core tourism industry, complementary industries and related industries with a view to solving the employment issue of Gansu.

2.2 Program on Regional Cooperation in Tourism: building a world-class tourism economy belt in west China featuring the Silk Road

Efforts should be made to bring into full play the geographic location of Gansu as it connects six provinces, and serves as a major strategic gateway for central China to the west region, Tibet and habitats of the Mongolian ethnic groups and nationalities in Ningxia. Gansu also locates in the interconnection of tourist destinations in the northwest, southwest, Qinghai and Tibet. So it is feasible to build Lanzhou into the biggest transport hub of tourism in the northwest, and develop Gansu into a key transport link in the northwest and even in the tourist destinations in west China, leading to Silk Road, the Yellow River sightseeing areas, the ancient tracks in the Tang-Tibet Ancient Road, the Red journey, and the eco-tours. The aim is to substantially expand the tourism market in west China and further develop travel routes and products. In the same time, it makes sense to take the Silk Road as a bridge that extends to the northwest and the southwest in a bid to utilize local tourism
resources such as historic sites, ethnic culture and natural sceneries. Resources in different regions should complement one other, and regional cooperation in tourism should be carried out so as to develop quality tourism products, open up an inter-provincial market and build a world-class “Silk Road” tourism economic belt.

2.3 Human Resources Program

It is important to introduce mechanisms for incentives and competition, increase government funding to train professionals for tourism and intensify cooperation among departments and industries in the field of tourism, education, personnel management, labor and social welfare, and science and technology. The role of higher education institutions and tourism training bases, both inside and outside Gansu, should be brought into full play to bring up entrepreneurs and professional teams. According to the need of tourism, it is also necessary to display diversity and flexibility in training professionals that meet various demands. Tourism training centers should be set up to develop a contingent of interdisciplinary professionals as well as experts. Efforts should be made to provide pre-job, incumbent, and change-of-position training and pertinent evaluation of professional skills. The tourism professional rank examinations, qualification certification and selection of “star-guides” should be promoted. Moreover, it is also essential to highlight the education of professional ethics with a view to upholding the moral standard in the tourism industry and fully upgrading the service quality.

2.4 Tourism for Poverty Alleviation Program: asking for policy support from national experiment zones of poverty alleviation through tourism

The national experiment zone of poverty alleviation through tourism is an innovative move by the state to fight against poverty in the new century. The zones enjoy preferential supports in terms of national bond projects, subsidiaries of tourism, free grants from foreign governments and international organizations, poverty alleviation funds, development planning, construction, management, personnel training and marketing.

In line with the development of such experiment zones, tourism for poverty alleviation programs should be introduced at the provincial and subsidiary levels and become part of the tourism strategy. The aim is to help peripheral regions shake off poverty through tourism development. In the near term, the program should go to
carefully-selected poor regions with fine tourism resources, broad market prospects, and feasible tourist accesses. Taking into account the local economic performance and practical demands of tourism product development, efforts should be made to work out sound plans and corresponding policies before applying to the project of national experiment zones. First of all, priorities should be granted to develop central tourism areas to attract a certain number of tourists so as to provide momentum to surrounding areas. Thus the local processing industry of produce, by-products and specialties could be developed. In this course, it is necessary to observe the rules of tourism economy, forge a synergy between production and sales, develop related industries and upgrade the comprehensive capability of receiving tourists and earning income. Attention should be given to provide impetus to related sectors, namely to vigorously develop related service industries, agriculture, and industry based on the tourism market with an aim to stimulate the all-round growth of local economies. Connections with local governments and relevant departments should be further developed so as to solicit more support. Meanwhile efforts should be made to raise the profile of tourist destinations, and boost publicity along with market promotion. It is essential to engage local citizens in the drive of tourism and improve the administrative systems of tourism.

3. Build up tourism’s capacity of market-based operations.

3.1 Diversify the ownership of tourism companies.

In line with the requirement of improving the socialist market economy and speeding up the reform of SOEs, reforms should be carried out on tourism companies to diversify their ownerships. More policy support should be given to existing tourism SOEs and the reform on ownership should be expedited through various ways such as restructuring, merge, lease, bankruptcy, contracting management, shareholding, and sell-off. The aim is to change the mechanism on which those companies are run, and make them able to develop expertise, strong brands, the economy of scales and into conglomerates. Efforts should be made to attract more investment from home and abroad and from advantaged or renowned enterprises in and outside Gansu. By means of shareholding, acquisition, concession and joint venture, tourism companies could be established as foreign-ventures and joint-ventures. Equal importance should be attached to vigorously developing non-state owned tourism companies, and encouraging varied economic players and social forces to invest in tourism economic entities and develop projects so as to build up the scale of the industry and enhance compositeness.
3.2 Take active steps to explore market-based models for managing tourist destinations.

Confirmed to the principle of “investors get dividends and decision-makers shoulder risks”, the right to manage tourism resources and destinations should be open to domestic and foreign investors with an aim to mobilize multi-party investment. In line with the pattern of three separated rights (ownership, the right to management and the right to operation), efforts should be made to adopt open calls and open biddings by means of concession, transfer, contracting, leasing, etc. The goal is to take active steps to explore market-based approaches to develop and manage tourism resources so as to accelerate the development of tourist destinations. Revenues should be distributed in appropriate proportions with a view to fully boost related regions, industries and departments.

3.3 Give full play to tourism associations and intermediaries, and regulate the practice of tourism companies.

What’s alarming in Gansu in 2007 is that quite a number of tourism companies found it hard to do business when market competition lapsed into a vicious cycle of price war. Some tourist agencies attracted customers with low prices. Some went so far as to earn no more than dozens of RMB for one tourist group while still others even failed to make ends meet. The vicious competition has seriously hurt the sound development of Gansu’s tourism market.

It is necessary to build up provincial, municipal and prefectural tourism associations, improve tourism management regulations and employ professionals, with a view to making those associations the bridge between the government and market entities. It is important to fully avail these associations of their role in promoting self-discipline, providing services and standing for the interests and demands of market entities with an aim to improve the mechanism of self-discipline in the tourism industry, and regulate the market and corporate practices. When it comes to the certification of fine tourist cities, star hotels, tourist destinations, and star-rating cruise ships on inland rivers, the management of tour guides and interpreters, and the grading of tour guides, it makes good sense to let the industry turn to self-discipline, coordination and consultation. Besides, the Agreement on Honest Business Operation should be formulated to ensure business creditability and fair competition and coordinate relations inside the industry.

In the same time, in view of the high cost of tourism companies in off-seasons and their difficulties in doing business, the government could introduce preferential policies to ease the burden of companies, help them out of hardship and enable them to become big and strong.
3.4 Set up the Gansu Provincial Tourism Investment Company, Ltd.

Efforts should be made to encourage Gansu’s development and investment companies to set up a provincial tourism investment company, Ltd. The company should first of all, serve as a platform of financing. Through government’s creditable funds, it could extensively solicit funding from financial institutions and other social quarters to carry out tourism projects. During the 11th Five Years, the aim is to solicit RMB 20-30 billion Yuan so as to guide and facilitate the upgrading and development of tourism products in Gansu. Second, the company should play a major role in tourism project investment. In this way, mega-projects could bring comprehensive developments with priorities given to the development of tourism resources, tourist destinations, and high-class facilities and the infrastructure construction. Third, the company should shoulder the important responsibility of leading and expediting the development of Gansu’s tourism industry.

4. Tourism Promotion Strategies

Although it boasts a wide range of tourism products which possesses strong uniqueness, elegant taste and big variety, Gansu Province has still experienced inadequate development and promotion of tourism products due to relatively weak communication. Therefore, various means and ways should be adopted to further enhance the public’s recognition of traditional tourism products such as Silk Road Tour and to promote the development of new products like remote mountain eco-tours, cool leisure holiday tours, and ancestral culture root-seeking tours so as to turn them into more widely accepted and highly valued brands of tourism products. Based on the reality of Gansu Province, the promotion campaign should be enhanced with more diversified means to expand the market of tourism. The marketing efforts to promote tourism products could be made in the following aspects:

4.1. Combined Promotion Means

The government will play a leadership role in forging the synergy for tourism promotion.

The government will lead the efforts to improve the “hard” and “soft” environment for a well-established tourism industry, to expand international and regional cooperation, and to leverage non-government resources under the government guidance to create the synergy for a better image of the Province and enhance regional attractiveness.

The government will also guide the media promotion campaigns through cultural
events, artistic activities and movies and TV programs. With the cultural progress, Gansu will distinguish itself as a province rich in culture. Various innovative artistic works will present a panoramic view of Gansu’s unique culture, history, natural world and social development. Media promotion of Gansu’s highlights will foster the synergy of different social sectors for tourism marketing.

The province has decided to create a good image of citizenship through “the Campaign for Building a Civilized and Harmonious Society”, a good image of its tourism industry guided by the provincial tourism standard and proper administration, and a good image of the region with convenient social services and enabling environment. With the leadership role of the government and extensive public participation, the tourism industry of Gansu will soon be highly recommended throughout China.

4.2 Increased Investment in Tourism Promotion

Gansu Province should increase its investment in tourism promotion, for its current funds for tourism promotion is pretty limited and much lower than that of its neighboring provinces. The province should increase the funds for tourism promotion, reform the fund management and set up a development fund for tourism so as to ensure the funding for tourism promotion. The fund for tourism promotion should be separated from the fund for tourism administration and should find its earmarked position in the government budget and be allocated annually.

4.3 Focused and Differentiated Marketing

Tailored tourism products should be offered to customer groups different in cultural backgrounds, ages and budgets. For example, efforts should be made to consolidate such tourism products for markets in Taiwan, Hong Kong, Macao and Japan as Family Origin Exploration Tour and Religion Pilgrimage Tour. Products for Hong Kong customers who prefer leisure and relaxation may include Leisure Holiday Tour, Eco-Tour, Study Tour and other special tour products so as to increase the revisiting rate. Efforts should be made to further develop Leisure Holiday Tour, Cultural Tour, Ethnic and Natural Experience Tour for the US market where freedom and ecology are highly valued. Mountain-climbing Tour, Self-driving Tour, Cross-country Tour, Gliding Tour and other sport-oriented products should be developed for the South Korean market. For the Singapore market, Cultural and Natural Highlight Tour based on the attractiveness of Chinese culture should be promoted.
4.4 Net-worked Tourism

Gansu should work together with its neighbors in product promotion, route design, infrastructure building in an effort to set up a closely connected tourism network in an expanded market.

4.5 Combined Promotion Via Media, Festival and Caravan

4.5.1 Unleash commercial ads about Gansu tourism on major domestic newspapers and magazines to promote tourism products.

4.5.2 Shoot a new documentary of Gansu tourism, to design a logo of Gansu tourism, and to launch a series of programs about Gansu tourism in channels of the China Central Television (CCTV) to introduce the life, customs and tourism products in Gansu.

4.5.3 Set up commercial ads bulletin boards showcasing natural beauty at tourism spots in Gansu and welcome signs at squares, bus and railway stations, docks, airports, main streets, entrances and other public places in major cities of Gansu.

4.5.4 Launch an advertising campaign along major transportation routes such as the Beijing-Kowloon Railway and the Shanghai-Chengdu Highway; to set up roadside ad boards and to put ads on seatback on trains and airplanes and on handles on buses in an effort to attract more tourists and passengers, who happen to go through Gansu, to stop for a brief tour; and to improve internet websites for an enhanced on-line promotion for tourism products.
4.5.5 Make use of existing festival celebrations of certain scales in the province, such as Pinliang Kongdong International Wushu (martial arts) Festival, Qingyang International Fragrant Sachet Festival, Gannan Shambhala International Tourism and Art Festival by setting up ad boards, staging performances and sending brochures in festival hosting cities to showcase Gansu tourism products.

4.5.6 Launch the promotion campaign of “Sending Gansu Tourism Products to Your Doorway”; to train in tourism off-season a group of qualified promotion staff who have a good knowledge of local customs and traditions; and to organize road shows by tourism promotion caravans in major target market cities.

Appendix: Major Tourism Investment Projects of Gansu Province

1. Overview of Tourism Development Projects in Gansu Province

The Gansu Province Tourism Development Plan from the 11th Five-year Plan Period to 2020 has listed 590 projects with a total investment of RMB 18,587,360,000 Yuan. These projects could be divided into four categories: major projects of the Gansu Province Tourism Development Plan from the 11th Five-year Plan Period to 2020, the World Bank financed projects of the Gansu Province Tourism Development Plan from the 11th Five-year Plan Period to 2020, “Red Tour” projects of the Gansu Province Tourism Development Plan from the 11th Five-year Plan Period to 2020, and key scenic area (spot) road construction projects of the Gansu Province Tourism Development Plan from the 11th Five-year Plan Period to 2020.

1.1 Major Projects of the Gansu Province Tourism Development Plan from the 11th Five-year Plan Period to 2020

The number of major projects of the Gansu Province Tourism Development Plan from the 11th Five-year Plan Period to 2020 is 239 with an estimated total investment of RMB 13,153,410,000 Yuan, including an investment of RMB 10,733,920,000 Yuan during the 11th Five-year Plan Period. (Table 5-13)
<table>
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<th>Region</th>
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<th>Total Investment (RMB 10,000 Yuan)</th>
<th>Investment in the 11th Five Year Plan Period (RMB 10,000 Yuan)</th>
<th>Region</th>
<th>Number of Major Projects</th>
<th>Total Investment (RMB 10,000 Yuan)</th>
<th>Investment in the 11th Five Year Plan Period (RMB 10,000 Yuan)</th>
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</table>

1.2 Key Scenic Area (Spot) Road Construction Projects of the Gansu Province Tourism Development Plan from the 11th Five-year Plan Period to 2020

The number of key scenic area (spot) road construction projects of the Gansu Province Tourism Development Plan from the 11th Five-year Plan period to 2020 reaches 287, which will build 6583 km roads with an estimated investment of RMB 3,041,621,000 Yuan.

2. Construction Timetable of Major Tourism Projects in Gansu Province

Based on the current status of Gansu tourism industry and the prioritization of major projects, and in accordance with the principle of orderly development, the construction timetable of major tourism projects in Gansu has been defined as follows: in the near term, a solid foundation will be laid for tourism development, which will focus on the construction of roads, service facilities and some key scenic areas and spots; the mid-and-long-term focus will be on the improvement, upgrading and brand-building of scenic areas and spots, to extend the axis from top scenic areas (spots), to build more 4A Class and 5A Class tourism scenic areas, to develop a number of projects for scenic areas with great potential and far-reaching influence, to set up “Flying Dragon” series of tourism products and series of golden tour routes, and to establish the inter-dependent industrial community of comprehensive tourism and to optimize its structure.
2.1 Near Term (in the 11th Five Years) Major Tourism Projects

The 11th Five Year Plan period will witness the implementation of a breakthrough strategy in tourism development which will focus on the making of top scenic areas and golden tour routes: based on the core tourism products, characteristic tourism products and specialized tourism products, a layered and targeted approach has been adopted to launch the classic cultural tourism projects (such as the Project on Scenic Area of Ancestral Culture, and the Silk Road Culture Scenic Area Project), projects on scenic areas of folk and ethnic culture (for example, the “Fragrant Sachet Festival” Scenic Area Project in Qingyang, and the “Wushu (martial arts) Festival” Scenic Area Project in Pinliang), the “Red Tour” Scenic Areas Projects, Central Tourism City Projects and Tourists Center Projects (details as seen in Section Three and Appendix of this chapter: Table of Major Projects of the Gansu Province Tourism Development Plan from the 11th Five-year Plan Period to 2020; Table of Projects Financed by the World Bank of the Gansu Province Tourism Development Plan from the 11th Five-year Plan Period to 2020; and Table of “Red Tour” Projects of the Gansu Province Tourism Development Plan from the 11th Five-year Plan Period to 2020).

2.1.1 Projects on Major Tourism Products

2.1.1.1 Silk Road Tour

① Efforts should be made to build the Huaxia Grottoe Garden at Mogao Caves (a national exhibition venue for refined grotto culture) by virtual technology, to improve the efficiency of tours and to protect the historic and cultural legacy of grottoes. Priorities will be the construction of simulated grottoes of Chinese arts, the Thousand-Year Dream Park of the Silk Road, the Dunhuang Music World, the Hot Spring Village, the Virtual Visitor Center of Mogao Caves, and the development of peripheral scenic areas of the Mogao Caves.

② Protect Yulin Grottoes, build its tourist infrastructure and develop peripheral scenic areas.

③ Develop package tour products of the Maiji Mountain Scenic Area and Quxi.

④ Develop the Mati Temple Grottoes scenic area.

⑤ Implement the major project on Bingling Temple Grottoes, promoting coordinated development of eastern, central and western Gansu. Develop the golden tour route of Tianshui – Bingling Temple – Qinghai – Mati Temple – Dunhuang.

⑥ The Enabling Project on Silk Road Tour in the Ancient Capital Liangzhou (present-day Wuwei of Gansu Province) will focus on the integration between the Silk Road and the culture of the ancient capital. Priorities are the construction of Tang-Dynasty-style architecture in the Nanchengmeng Community of the Liangzhou District in Wuwei, the improvement of ancient architecture on the Tianti Mountain,
and the building of the Ancient City in Western Liang (400-421 AD) which includes palaces, streets, restaurants, stores, temples and ancient military facilities.

### 2.1.1.2 Great Wall Culture Tour

1. Develop the Great Wall scenic area at the Jiayu Pass in a comprehensive manner and the theme area of the Jiayu Pass and the Jiutian city, and improve key scenic areas of the Ming Dynasty Great Wall in Gansu. The priority is to build the Great Wall sight-seeing corridor.

2. Develop key scenic areas along the Han-Dynasty Great Wall. Priorities will be the construction of the cluster of typical Great-Wall architecture across the Yangguan Pass in Dunhuang, the Yumen Pass, the ancient city Hecang, the Han-Dynasty Great Wall, the ancient city Dunhuang, the Suoyang City in Anxi, the Changcheng Town of Liangzhou District in Wuwei, the building of Han-Dynasty style Wine City at the wine production base, the remodeling of the Desert Park and the Cultural Sceneries at the Wildlife Breeding Base, the construction of the Desert Wonderland, and the restoration of the Yanshou Temple.

### 2.1.1.3 Ancestral Culture Tour

1. The Chinese Fuxi Ancestral Park is part of the project (comprehensive development of the Fuxi Temple Scenic Area), focusing on the construction of the Changhe Hall (Fuxi Memorial Exhibition Hall), the Recalling Garden (featuring outdoor gardens, memorial sculptures, and memorial halls of sages who promoted Fuxi Culture in the Chinese history) and the Worship Altar (a venue for worship).

2. Qin’an Dadiwan Cultural Relics Park

3. Taoist Holy Land on Kongdong Mountain: Key projects centered on the Kongdong Mountain, “the No. 1 Taoist Mountain in China”, will be the construction of the Chinese Taoism Temple on Kongdong Mountain, the Kongdong Mountain Resort, the Palace of Heavenly Queen, and the Jingchuan Hot Spring Garden for Taoism Health Preservation.

4. The Zhou People’s Ancestor Park of Loess Farming Culture (comprehensive development of the scenic area of the Zhou People’s Ancestral Mausoleum): the focus is on the construction of the Park of Cave Dwelling on the Loess Plateau and the Ancestral Culture Park of TCM Master Qibo.

5. “Longyuan Cultural Exposition ” consists of several key projects in Lanzhou City: the Hall of Thousand-year Evolution (large modern hall where modern information technology is used to simulate the evolution of Gansu Province over the past eight thousand years and demonstrate the culture of ancient human race), the Longyuan Landscapae Hall (a medium-sized exhibition hall), the Glorious World Palace (a large exhibition center with a mix of halls), the Longyuan Folklore Hall, the Hall of Elites and the Yellow River Theater.
Projects on Western Xia Dynasty Culture include the expansion of the Western Xia Dynasty Museum in the Liangzhou District of Wuwei, the restoration of Western Xia Dynasty Tombs in the west suburb, the construction of Haimu Cave Scenic Area, and the building of the Western Xia Dynasty Pedestrian Street and the Huguo Temple of the Western Xia Dynasty.

2.1.1.4 Gansu Folk Culture Tour

1. Lanzhou-Yellow River Scenery Project: Efforts should be made to enhance the scenery of two mountains in the south and north of Lanzhou and the scenery along the Yellow River so as to enhance the construction of the One Hundred Li (literally 50 km) Scenery along the Yellow River in Lanzhou. Input should be made to build the Jincheng Pass (a commercial tourism area) resembling ancient downtowns, the Lanzhou Book City, the Lanzhou Food Court of Gansu Delicacies, and the Lanzhou Conference and Exhibition Center so as to develop the Lanzhou Urban Tour.

2. Taoism Health Preservation Resort of Kongdong Montain and Folk Culture Village.

3. Projects on important festivals should be carried out on the Chinese Ancestral Culture Festival, the comprehensive development and innovation of Folk Culture and Arts of Qingyang Fragrant Sachet, the Dunhuang International Festival of Culture and Arts, and the Great Wall Frontier Beacon Festival.

4. The comprehensive project cluster should be developed on the tour of Tibetan ethnic customs in Gannan with the Shambhala culture and ecological park in Xiahe as the focus.

5. The comprehensive project cluster of Hui ethnic customs tour in Linxia.

6. The project of scenic area for Tibetan ethnic culture tour in Tianzhu.

7. The project of Yugu ethnic customs tour and sightseeing at the Mati Temple in Sunan.

8. The project of Mongolian ethnic customs tour and sightseeing on the snow mountain in Subei.

9. The project of Kazak ethnic customs tour and sightseeing along the Sugan Lake in Aksay.

2.1.1.5 Peripheral Mountain Eco-tour

1. Provide a model for developing ecological tour in Gansu Province with the pilot project of the all-nature eco-park of Yellow River in Shouqu of Maqu County. Efforts should be made to gradually develop scenic areas such as the Yeli pass–Yehai Lake, the Huangnianzi Gou, the Red Cliff Valley, the Sangke Plain, the Dazong Lake, the Dangzhou Plain, the Zecha Stone Forest, and the Gahai Lake, and work on the
tourism punch product called the mysterious Tibetan Shambhala.

② Focus on developing the hundred-valley and thousand-waterfall eco-tour in Longnan by building scenic areas such as the Guan’è Gou, the Heavenly Pool of the Wenxian County, and the Wanxiang Cave in Wudu.

③ Input should be made to develop desert exploration tours by perfecting the Yardan National Geopark in Dunhuang and developing Jinchang’s Badain Jaran Desert exploration attraction.

④ Main construction projects for the sight-seeing and exploration tour at the Qilian Snow Mountain and glacier include sight-seeing and exploration tours of the Qiyi glacier and the Toumingmengke glacier.

⑤ Attention should be given to the construction of desert parks, the expansion of the Sand Plant Garden in Liangzhou District of Wuwei City, the greening of major scenic spots, the hardening of park paths and tourism roads, and the construction of shelter forests and amenities.

2.1.1.6 Leisure and Holiday Tour

It is important to select proper places within Gansu and make them eco-friendly summer resorts with nation-wide influence.

① The construction of leisure tour zones on the outskirt of central cities should focus on Lanzhou, Tianshui, Jiayuguan, Suzhou, Ganzhou District, Liangzhou District, Jinchang, Baiyin downtown area, Kongdong District, and Xifeng District.

② Efforts should be made to develop hot spring resorts in Tangyu of Qingshui, in Luomen of Wushan, in Tongwei and in Dunhuang.

③ Efforts should be made to develop forest resorts at the Guiqing Mountain, the Yeli Pass, the Songming Cliff and the Xiaochuan cherry blossom forest in Chengxian County.

④ Efforts should be made to develop water resorts at the Liujiaxia Reservoir, in Gahai Lake, in the Heavenly Pool in Wenxian County and at the Yuanyangchi Reservoir.

2.1.1.7 Characteristic Tour

① Industrial tour projects: Gansu should launch China’s first brand of industrial tour products such as the industrial relic park in the petroleum city Yumen, the relic park of Baiyin, the industrial tour site of the capital of nickel Jinchang and the industrial tour site of the Jiuquan Iron and Steel Company.

② Major projects of the Red Tour: priorities include developing tourism products memorizing the triumphant junction of the Long March in Huining, such as the Lazikou tour, the site of the Ejie Conference, the Hadapu Red Army site, the “Minzhou Conference” Memorial Hall, and the “Bangluozhen Conference” site.
Products should also be developed to memorize the Western Route of the Red Army which encompass the Hubaokou site, the trail bridge, the Hengliang Mountain, the site of the Yongfeng Battle, the site of the Nijiaying Battle, the Command Headquarters in Yongchang, the site of the Gaotai Battle, the Martyr Mausoleum in Gaotai, the site of the “Hongshiwo Conference” and the Monument in Anxi.

Construction projects will be carried out on Longxi Li Family’s dragon palace and the Longxi Hall. Input should be made to renovate and improve the supporting infrastructure of tourist attractions and develop products for the Li family’s root-seeking tours.

Hexi (West of the Yellow River) green industrial sight-seeing corridor: Gansu should build the thousand li (500 km) green industrial tourism zone on the Hexi Corridor along the Lanzhou-Xinjiang Railway and the 312 National Highway, and take steps through several stages to develop such attractions as the Oasis Exposition Park on Alcohol Culture, the green food industrial base, the one hundred thousand mu (6666.7 hectares) vineyard, the green industry sight-seeing zone, the special-featured recreational farm, the water conservation technology demonstration park, the water conservation forest, the water and soil conservation project demonstration zone, and the demonstration park of environmental treatment.

2.1.2 Major Projects of Tourism Infrastructure

2.1.2.1 The 11th Five-Year Plan will witness the construction of transport infrastructure network that underpins the development of Gansu’s tourism, covering railways, airports, water transportation and highways, connecting tourist source markets and major scenic areas (Please refer to Section 4 of this Chapter and the attached table titled Transportation Projects Schedule of Major Scenic Area (Spot) in Gansu’s Tourism Development Plan from the 11th Five-Year Plan Period” to 2020). The aim is to gradually build a transport network with great accessibility, connecting central tourist cities and major scenic areas in Gansu with major existing and potential tourist source markets.

2.1.2.2 Efforts should focus on the construction of service infrastructure to support Gansu’s tourism industry, including catering service facilities, first aid centers, hotels and restaurants, postal and telecommunication projects, shopping centers, and power supply facilities in major scenic areas and central tourist cities. The aim is to continuously improve the service infrastructure network so as to meet the demand of existing and potential tourists (Please refer to the Project List for details).

2.1.3 Major Projects on Building Tourism Eco-Environment

During the 11th Five-Year Plan period, the building of tourism eco-environment will be carried out through major projects in three aspects, namely the eco-environment treatment of regions, scenic areas and cities. For cities, the focus is on central cities such as Lanzhou, Tianshui, Baiyin and Dunhuang. For regions, the focus is on the
Shiyang River, the part of the Heihe River in Gansu, the Shule River, the part of the Yellow River in Shouqu, the Liujiaxia Reservoir area, the western Hanshui River, the middle and lower reaches of the Bailongjiang River, the water conservation forest of the Qilian Mountain, the 4th-phase project of the “Three-North” shelter forest belt, the Yangtze River shelter forest, the protection of natural forest resources, the return of lands for reforestation, the protection of wild fauna and flora, the building of natural reserves, and the control of water and soil erosion of the Loess Plateau. And for scenic areas, efforts should be made to restore the water level of the Yueya spring. The aim is to improve the eco-environment for regional tourism in Gansu and promote tourism development.

2.1.4 Major Projects on Hotels and Restaurants

It is important to build exclusive, middle-class and economy hotels, restaurants and motels in a gradual manner in central tourism cities with the growth of tourists during the 11th Five Years. Meanwhile attention should be given to improve the software and hardware of tourist reception services across the province.

2.1.5 Visitor Center Projects

Visitor centers will be built in central tourism cities (e.g. Lanzhou and Dunhuang) and 4A class scenic areas in Gansu during the 11th Five-Year Plan period.

Key projects:

① Class I Visitor Center, namely the provincial-level visitor center, will be set up in downtown Lanzhou.

② Class II Visitor Centers, namely regional visitor centers, will see the first of its kind be set up in Dunhuang, an international tourist destination in the short run. Those centers will also be in place in Class II tourism cities in the province such as Jiuquan, Jiayuguan, Zhangye, Wuwei, Pingliang and Tianshui. In the long run, such centers will be built in Class III tourism cities such as Yumen, Jinchang, Baiyin, Linxia and Qingyang. Other tourist towns (cities) with appropriate condition may also be quipped with visitor centers too.

③ Class III Visitor Centers, namely visitor centers of scenic areas, will be build in high-end (5A) national tourist destinations like the Dunhuang Mogao Caves scenic area in the short run. Other scenic areas with appropriate conditions may also build visitor centers which will be upgraded to Class III Visitor Center when they meet certain requirements. In the long run visitor centers of scenic areas will be built in all high-end (above 3A) scenic areas.

2.1.6 First Aid Center

During the 11th Five-Year Plan period, visitors’ first aid centers will be established gradually in central tourism cities such as Lanzhou, Dunhuang, Jiuquan-Jiayuguan
and Tianshui. Scenic areas rated above 3A will be equipped with such centers. This is aimed at improving the capability of medical assistance and emergence response and ensuring tourists’ safety and health.

1.2 Major Mid-and-Long Term (2011-2020) Tourism Projects

1.2.1 Based on the construction of transport infrastructure network during the 11th Five Years, the accessibility between major scenic areas and tourist source markets should be improved so as to form a full-fledged transport network for tourism.

1.2.2 Based on the construction of the tourism service network during the 11th Five-Year Plan period, efforts should be made to upgrade the basic tourism service system of the province in an effort to form an interoperable and efficient network system.

1.2.3 Based on the top scenic areas and golden tour routes developed during the 11th Five Years, a focus will be the improvement and upgrading of existing scenic areas with an aim of having more 4A or 5A tourist destinations, and expand golden tour routes by extending existing routes, exploring new golden routes so as to develop a number of scenic spots of great potential and influence (specific projects as seen in the attached Gansu Province Major Tourism Development Projects from the 11th Five-Year Plan Period to 2020)
<table>
<thead>
<tr>
<th>Item</th>
<th>Project Name</th>
<th>Site</th>
<th>Project Description</th>
<th>Construction Description</th>
<th>Duration</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Longyuan Cultural Exposition</td>
<td>Southern bank of the Yellow River Scenic Belt in the downtown of Lanzhou</td>
<td>It is a thematic park aiming at cultural sightseeing, experience and education of local traditions. The project is dominated by both static and dynamic displays and demonstrations which invite visitor participation.</td>
<td>1. Hall of Thousand-year Evolution, a large modern demonstration hall; 2. Longyuan Landscape Hall, a medium-sized exhibition hall; 3. Glorious World Palace, a large exhibition center with a mix of halls; 4. Longyuan Folklore Hall; 5. Hall of Elites 6. Yellow River Theater</td>
<td>2006—2020</td>
<td>The purpose is to build a significant cultural and scenic area to showcase the historic, cultural and tourism frameworks of Lanzhou City. It might serve as a symbol of the tourism industry in Lanzhou and a symbol for cultural tourism of the province.</td>
</tr>
<tr>
<td>2</td>
<td>Hexi green industrial sight-seeing corridor</td>
<td>Green industrial sites along the Hexi Corridor in Wuwei, Zhangye and Jiuquan</td>
<td>A synergy among industries of forestry engineering, oasis agriculture, agricultural by-product processing, livestock by-product processing, sight-seeing agriculture, forestry, hydraulic engineering, brewage and beverage will be forged for the development of tourism. Typical entities will be</td>
<td>1. Oasis Exposition Park on Alcohol Culture and green food industrial base; 2. 100,000 mu (6666.7 hectares) oasis vineyards, green industry sight-seeing zone and special-featured recreational farm; 3. Water conservation technology demonstration park; 4. Water conservation forest, the water and soil</td>
<td>2006—2020</td>
<td>The purpose is to create a new category of tourism products, or to launch an innovative tourism product that would become first-class and distinguish themselves from other similar domestic destinations with leading brands.</td>
</tr>
<tr>
<td>Item</td>
<td>Project Name</td>
<td>Site</td>
<td>Project Description</td>
<td>Construction Description</td>
<td>Duration</td>
<td>Note</td>
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<tr>
<td>3</td>
<td>Huaxia Grottoe Garden</td>
<td>Downtown area of Dunhuang City</td>
<td>The target is mid-and-high-end tourists, with a focus on the spiritual need for and appreciation of ancient culture; while consideration is also given to mass tourism by making the tour more acceptable. The relation of labor division and mutual-complementarity will be established with the Dunhuang Visitor Center and the Mogao Caves Visitor Center.</td>
<td>conservation project demonstration zone, and the demonstration park of environmental treatment.</td>
<td>2006—2020</td>
<td>The purpose is to overcome the shortcomings of the Dunhuang cultural tours of grottos such as the lack of variety of tourism products, short stay and low spending of tourists, and the gap between professionalism and tourist demands.</td>
</tr>
<tr>
<td>4</td>
<td>Open-Air Camping Zone in Hexi</td>
<td>Dunhuang “Yardan City” and Yugu “Danxia Palace”</td>
<td>Against the fantastic natural scenes, the camping zone does not interfere with or modify the hinterland of Yardan and Danxia. So the natural and dynamic style is preserved. Tourism activities will be confined to the peripheral area of Yardan.</td>
<td>1. Visitor Reception Station; 2. Camping Zone; 3. Healthy Walking Trail; 4. Mini Science and Technology Park</td>
<td>2006—2020</td>
<td>The purpose is to establish a natural camping zone in the most primitive style in China so as to provide visitors who set foot on the wilderness of the west with a taste of the real natural and ecological exploration trips.</td>
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<tr>
<td>Item</td>
<td>Project Name</td>
<td>Site</td>
<td>Project Description</td>
<td>Construction Description</td>
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<tr>
<td>5</td>
<td>Tianma Entertainment</td>
<td>Shandan Army Horse-Breeding Farm</td>
<td>Highlight the Horse Farm Tour Culture to demonstrate the historic tie between mankind and horses; to launch horse-riding events on the natural pasture of Qilian Mountain and review the ups-and-downs of ancient ethnic cultures of the Qilian Mountain in view of the ethnic culture interaction started from the Han Dynasty.</td>
<td>1. Shandan Horse Exposition Park; 2. High Mountain Leisure Pastures; 3. Horse Racing Ring</td>
<td>2006—2020</td>
<td>The purpose is to enhance the recognition and reputation of the Shandan Army Horse Farm as the world’s second largest of its kind so as to open a new way for the development of tourism in the deep Qilian Mountain; to enhance the tourism image of “Flying Dragon” and “Galloping Bronze Horse” of Gansu Province, and to build leisure resorts based on the mountainous pasture and China’s largest horse farm.</td>
</tr>
<tr>
<td>6</td>
<td>Chinese Fuxi Ancestral Park</td>
<td>Tianshui City</td>
<td>This is a scenic spot of classic culture, with a combination of high-quality replicated ancient architecture and gardens to improve the comprehensive attractiveness. It serves as a major venue for cultural festivals jointly developed with the Tianshui Fuxi</td>
<td>1. Changhe Hall (Fuxi Memorial Exhibition Hall); 2. Recalling Garden (featuring outdoor gardens, memorial sculptures, and memorial halls of sages); 4. Worship Altar as a venue for worship</td>
<td>2006—2020</td>
<td>The purpose is to set up in east the main pillar for Gansu’s tourism image of “Flying Dragon”, making it one of the core classic scenic spots and another sacred cradle of the Chinese culture.</td>
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<td>Item</td>
<td>Project Name</td>
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<td></td>
<td>Tibetan Shambhala Innovative Tourism</td>
<td>Xiahe County and Maqu County of Gannan Tibetan Autonomous Prefecture</td>
<td>Cultural Festival and a major venue for daily worship.</td>
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<td>7</td>
<td></td>
<td></td>
<td>It is an innovative tourism product offering the experience of indigenous Tibetan culture in natural environment. With Shambhala as the core image and Xiahe Labrang Temple and the Yellow River in Shouqu of Maqu County as the core scenic areas, it will align some ecological and ethnic scenic areas to form a new highlight of tourism in Gannan and the Gansu Province.</td>
<td>1. the project of Xiahe Tibetan Buddhism Cultural and Ecological Garden; 2. the project of the Eco-tourism Demonstration Garden of the Yellow River in Shouqu of Maqu County</td>
<td>2006—2020</td>
<td>The purpose is to develop innovative tourism products of the mysterious Tibetan Shambhala, offering tourists personal experience of the essence of the Tibetan ultimate ideal --- Shambhala, and let them appreciate the indigenous beauty of the Yellow River in Shouqu of Maqu County and explore the mysterious and profound culture of Tibetans.</td>
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<td>Item</td>
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<td>9</td>
<td><strong>Exposition Park Of Farming Culture by Zhou People’s Ancestor</strong></td>
<td>Xifeng District of Qingyang City</td>
<td>These are innovative tourism products combining ancestral and folk cultures.</td>
<td>1. Exposition Park of Cave Dwelling on the Loess Plateau; 2. Exposition Park of TCM Master Qibo; 3. Fragrant Sachet Folk Culture and Art Festival</td>
<td>2006—2020</td>
<td>The purpose is the building of the Exposition Park Of Farming Culture by Zhou People’s Ancestor, the Exposition Park of Cave Dwelling on the Loess Plateau and the Fragrant Sachets Folk Culture and Art Festival, to offer visitors the history of the farming culture on the Loss Plateau, to worship the ancestors of farming and traditional Chinese medicine, and to enable a better sense of pride and unity of the Chinese nation.</td>
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<td>10</td>
<td><strong>Taoist Holy Land on Kongdong Mountain</strong></td>
<td>Kongdong District of Pinliang City</td>
<td>The project aims to demonstrate the solemnity and mystery of the famous Kongdong Taoist Mountain and the sacredness and grandeur of the Taoist holy land. The characteristic architectures, cultural sites and tourism services are to translate the Taoist culture into a perceptible experience of tourists. The site aims at becoming a landmark of the city’s characteristic buildings.</td>
<td>1. Chinese Taoism Temple on Kongdong Mountain; 2. Kongdong Taoist Academy; 3. Kongdong Mountain Resort, and the Palace of Heavenly Queen; 4. Kongdong Taoist Health Preservation Mountain Resort and Folk Culture Village; 5. Hot Spring Garden for Taoism Health Preservation.</td>
<td>2006—2020</td>
<td>The purpose is to build the famous brand of the Taoist mountain by establishing the commercial tourism service network featuring the Kongdong Mountain, the Palace of Heavenly Queen, the Taoist Culture Exposition, the Hot Spring Garden for Taoism Health Preservation, the Taoist Taitong Mountain, the concept of “Harmony between Man and Nature”, health preservation in nature, fitness, holiday leisure and sightseeing areas, and the urban Taoist culture.</td>
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<tr>
<td>Item</td>
<td>Project Name</td>
<td>Project Description</td>
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<td>I</td>
<td>Major Projects on Tourism Products</td>
<td>1. Based on the Huaxia Grottoe Garden at Mogao Caves (a national exhibition venue for refined grotto culture), efforts should focus on building simulated grottoes of Chinese arts, the Thousand-Year Dream Park of the Silk Road, the Dunhuang Music World, the Hot Spring Village, the Virtual Visitor Center of Mogao Caves, and the development of peripheral scenic areas of the Mogao Caves. 2. Input should be made to protect the Yulin Grottoes, build tourism infrastructure and develop peripheral scenic areas. 3. Develop package products featuring the Maiji Mountain Scenic Area and Quxi. 4. Develop the Mati Temple Grotto scenic area. 5. Carry out the major project of the Bingling Temple Grotto and promote balanced development of eastern, central and western Gansu. Launch the golden tour route of Tianshui – Bingling Temple – Qinghai – Mati Temple – Dunhuang.</td>
<td>2006-2010</td>
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<tr>
<td>1</td>
<td>Silk Road Tour</td>
<td>1. Develop the Jiayu Pass Great Wall scenic area in a comprehensive manner and the Great Wall scenic area of Jiayu Pass and Jiuquan city, and improve key scenic area of the Ming-Dynasty Great Wall in Gansu. Priority should be granted to build the Great Wall sight-seeing corridor. 2. Develop key scenic areas along the Han-Dynasty Great Wall, focusing on the construction of Dunhuang Yangguan Pass, Yumen Pass, and the ancient city in Hecang, Han-Dynasty Great Wall, the ancient city in Dunhuang, and the Suoyang city in Anxi.</td>
<td>2006-2010</td>
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<td>2</td>
<td>The Great Wall Culture Tour</td>
<td>1. Chinese Fuxi Ancestral Park (comprehensive development of the Fuxi Temple Scenic Area), focusing on the construction of the Changhe Hall (Fuxi Memorial Exhibition Hall), the Recalling Garden (featuring outdoor gardens, memorial sculptures, memorial halls of sages who promoted Fuxi Culture in the Chinese history) and the Worship Altar (a venue for worship). 2. Qin’an Dadiwan Cultural Relics Park. 3. Taoist Holy Land on Kongdong Mountain: Key projects centered on the Kongdong Mountain, “the No. 1 Taoist Mountain in</td>
<td>2006-2010</td>
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China”, will be the construction of the Chinese Taoism Temple on Kongdong Mountain, the Kongdong Mountain Resort, the Palace of Heavenly Queen, and the Jingchuan Hot Spring Garden for Taoism Health Preservation. 4. Zhou People’s Ancestor Park of Loess Farming Culture (comprehensive development of the scenic area of the Zhou People’s Ancestral Mausoleum): the focus is on the construction of the Park of Cave Dwelling on the Loess Plateau and the Ancestral Culture Park of TCM Master Qibo. 5. “Longyuan Cultural Exposition ” consists of several key projects in Lanzhou City: the Hall of Thousand-year Evolution (large modern hall where modern information technology is used to simulate the evolution of Gansu Province over the past eight thousand years and demonstrate the culture of ancient human race), the Longyuan Landscape Hall (a medium-sized exhibition hall), the Glorious World Palace (a large exhibition center with a mix of halls), the Longyuan Folklore Hall, the Hall of Elites and the Yellow River Theater.

<p>| 4 | Gansu Folk Culture Tour | 1. Lanzhou-Yellow River Scenery Project: Efforts should be made to enhance the scenery of two mountains in the south and north of Lanzhou and the scenery along the Yellow River so as to enhance the construction of the One Hundred Li (literally 50 km) Scenery along the Yellow River in Lanzhou. Input should be made to build the Jincheng Pass (a commercial tourism area) resembling ancient downtowns, the Lanzhou Book City, the Lanzhou Food Court of Gansu Delicacies, and the Lanzhou Conference and Exhibition Center so as to develop the Lanzhou Urban Tour. 2. Taoism Health Preservation Resort of Kongdong Mountain and Folk Culture Village. 3. Projects on important festivals should be carried out on the Chinese Ancestral Culture Festival, the comprehensive development and innovation of Folk Culture and Arts of Qingyang Fragrant Sachet, the Dunhuang International Festival of Culture and Arts, and the Great Wall Frontier Beacon Festival. 4. The comprehensive project cluster should be developed on the tour of Tibetan ethnic customs in Gannan with the Shambhala culture and ecological park in Xiahe as the focus. 5. Develop the comprehensive project cluster of Linxia Hui ethnic group customs tour. 6. The project of scenic area for Tibetan ethnic culture tour in Tianzhu. 7. The project of Yugu ethnic customs tour and sightseeing at the Mati Temple in Sunan. 8. The project of Mongolian ethnic customs tour and sightseeing on the snow mountain in Subei. 9. The project of Kazak ethnic customs tour and... | 2006-2010 |</p>
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<tr>
<td>5</td>
<td>5</td>
<td>Peripheral Mountain Eco-Tour</td>
<td>1. Provide a model for developing ecological tour in Gansu Province with the pilot project of the all-nature eco-park of Yellow River in Shouqu of Maqu County. Efforts should be made to gradually develop scenic areas such as the Yeli pass –Yehai Lake, the Huangnianzi Gou, the Red Cliff Valley, the Sangke Plain, the Dazong Lake, the Dangzhou Plain, the Zecha Stone Forest, and the Gahai Lake, and work on the tourism punch product called the mysterious Tibetan Shambhala. 2. Focus on developing the hundred-valley and thousand-waterfall eco-tour in Longnan by building scenic areas such as the Guan’e Gou, the Heavenly Pool of the Wenxian County, and the Wanxiang Cave in Wudu. 3. Input should be made to develop desert exploration tours by perfecting the Yardan National Geopark in Dunhuang and developing Jinchang’s Badain Jaran Desert exploration attraction. 4. Main construction projects for the sight-seeing and exploration tour at the Qilian Snow Mountain and glacier include sight-seeing and exploration tours of the Qiyi glacier and the Toumingmengke glacier.</td>
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<td></td>
<td>6</td>
<td>Leisure and Holiday Tour</td>
<td>2006-2010</td>
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<td></td>
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<td>1. The construction of leisure tour zones on the outskirts of central cities should focus on Lanzhou, Tianshui, Jiayuguan, Suzhou, Ganzhou District, Liangzhou District, Jinchang, Baiyin downtown area, Kongdong District, and Xifeng District. 2. Efforts should be made to develop hot spring resorts in Tangyu of Qingshui, in Luomen of Wushan, in Tongwei and in Dunhuang. 3. Efforts should be made to develop forest resorts at the Guiqing Mountain, the Yeli Pass, the Songming Cliff and the Xiaochuan cherry blossom forest in Chengxian County. 4. Efforts should be made to develop water resorts at the Liujiaxia Reservoir, in Gahai Lake, in the Heavenly Pool in Wenxian County and at the Yuanyangchi Reservoir.</td>
<td>2006-2010</td>
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sightseeing along the Sugan Lake in Aksay.
1. Industrial tour projects: Gansu should launch China’s first brand of industrial tour products such as the industrial relic park in the petroleum city Yumen, the relic park of Baiyin, the industrial tour site of the capital of nickel Jinchang and the industrial tour site of the Jiuquan Iron and Steel Company. 2. Major projects of the Red Tour: priorities include developing tourism products memorizing the triumphant junction of the Long March in Huining, such as the Lazi’kou tour, the site of the Ejie Conference, the Hadapu Red Army site, the “Minzhou Conference” Memorial Hall, and the “Bangluozhen Conference” site. Products should also be developed to memorize the Western Route of the Red Army which encompass the Hubaokou site, the trail bridge, the Hengliang Mountain, the site of the Yongfeng Battle, the site of the Nijiaying Battle, the Command Headquarters in Yongchang, the site of the Gaotai Battle, the Martyr Mausoleum in Gaotai, the site of the “Hongshiwo Conference” and the Monument in Anxi. 3. Construction projects will be carried out on Longxi Li Family’s dragon palace and the Longxi Hall. Input should be made to renovate and improve the supporting infrastructure of tourist attractions and develop products for the Li family’s root-seeking tours. 4. Hexi (West of the Yellow River) green industrial sight-seeing corridor: Gansu should build the thousand li (500 km) green industrial tourism zone on the Hexi Corridor along the Lanzhou-Xinjiang Railway and the 312 National Highway, and take steps through several stages to develop such attractions as the Oasis Exposition Park on Alcohol Culture, the green food industrial base, the one hundred thousand mu (6666.7 hectares) vineyard, the greed industry sight-seeing zone, the special-featured recreational farm, the water conservation technology demonstration park, the water conservation forest, the water and soil conservation project demonstration zone, and the demonstration park of environmental treatment.

### II Major Projects on Tourism Infrastructure

| 1 | Transport Infrastructure Network | The network covers railways, airports, water transportation and highways, connecting touristsource markets and major scenic areas (Please refer to Part 4 of this Chapter and the attached table titled Transportation Projects Schedule of Major Scenic Area (Spot) in Gansu’s Tourism Development Plan from the 11th Five-Year Plan Period” to 2020). The aim is to gradually build a transport network with great accessibility, connecting central tourist cities | 2006-2010 |
and major scenic areas in Gansu with major existing and potential tourist source markets.

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<tr>
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<th>Major Projects on Building Tourism Eco-Environment</th>
<th>2006-2010</th>
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<tbody>
<tr>
<td>III</td>
<td>It mainly includes including catering service facilities, first aid centers, hotels and restaurants, postal and telecommunication projects, shopping centers, and power supply facilities in major scenic areas and central tourist cities. The aim is to a continuously improve the service infrastructure network so as to meet the demand of existing and potential tourists (Please refer to Part V of this Chapter for details).</td>
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<tr>
<th></th>
<th>Major Projects on Hotels and Restaurants</th>
<th>2006-2010</th>
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<tbody>
<tr>
<td>IV</td>
<td>It is important to build exclusive, middle-class and economy hotels, restaurants and motels in a gradual manner in central tourism cities with the growth of tourists during the 11th Five Years. Meanwhile attention should be given to improve the software and hardware of tourist reception services across the province.</td>
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<tr>
<th></th>
<th>Visitor Center Projects</th>
<th>2006-2010</th>
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<tbody>
<tr>
<td>V</td>
<td>Visitor centers will be built in central tourism cities (e.g. Lanzhou and Dunhuang) and 4A class scenic areas in Gansu during the 11th Five-Year Plan period.</td>
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<tr>
<td></td>
<td>Class I Visitor Center</td>
<td>2006-2010</td>
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<tr>
<td>1</td>
<td>The provincial-level visitor center will be set up in downtown Lanzhou.</td>
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<tr>
<td></td>
<td>Class II Visitor Center</td>
<td>2006-2010</td>
</tr>
<tr>
<td>2</td>
<td>These are regional visitor centers which will see the first of its kind be set up in Dunhuang, an international tourist destination in the short run. Those centers will also be in place in Class II tourism cities in the province such as Jiuquan, Jiayuguan, Zhangye, Wuwei, Pingliang and Tianshui. In the long run, such centers will be built in Class III tourism cities such as Yumen,</td>
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Jinchang, Baiyin, Linxia and Qingyang. Other tourist towns (cities) with appropriate condition may also be equipped with visitor centers too.

<p>| 3 | Class III Visitor Center | These are visitor centers of scenic areas which will be build in high-end (5A) national tourist destinations like the Dunhuang Mogao Caves scenic area in the short run. Other scenic areas with appropriate conditions may also build visitor centers which will be upgraded to Class III Visitor Center when they meet certain requirements. In the long run visitor centers of scenic areas will be built in all high-end (above 3A) scenic areas. | 2006-2010 |
| VI | First Aid Center | Visitors’ first aid centers will be established gradually in central tourism cities such as Lanzhou, Dunhuang, Jiuquan-Jiayuguan and Tianshui. Scenic areas rated above 3A will be equipped with such centers. This is aimed at improving the capability of medical assistance and emergence response and ensuring tourists’ safety and health. | 2006-2010 |</p>
<table>
<thead>
<tr>
<th>City/Prefecture</th>
<th>Item</th>
<th>Project Name</th>
<th>Administered by</th>
<th>Size and Content</th>
<th>Duration</th>
<th>Estimated Total Investment (RMB 10,000 Yuan)</th>
<th>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</th>
<th>Source of Funds</th>
<th>Preliminary Work</th>
<th>Note</th>
</tr>
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<tbody>
<tr>
<td>Provincial-Level</td>
<td>1</td>
<td>Gansu Tourism Supermarket</td>
<td>Gansu Province</td>
<td>Total construction area of 6000 square meters, with parking lots and green areas</td>
<td>2006—2010</td>
<td>5298</td>
<td>5298</td>
<td></td>
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<tr>
<td>Provincial-Level</td>
<td>2</td>
<td>Gansu Tourism Human Resource Development Center</td>
<td>Gansu Province</td>
<td>Planned to build a 3-storey building featuring meeting halls, a training center and a service center, with an average of 5100 square meters; the meeting hall covers an area of 900 square meters.</td>
<td>2006—2010</td>
<td>1400</td>
<td>1400</td>
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<tr>
<td>Provincial-Level</td>
<td>3</td>
<td>Project on Holiday Resort of Yanerwan along Yellow River, Lanzhou</td>
<td></td>
<td>Infrastructure, service facilities, accommodation and modern recreational facilities</td>
<td>2006—2020</td>
<td>50420</td>
<td>25000</td>
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<td>Subtotal (3)</td>
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<td></td>
<td>57118</td>
<td>31698</td>
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<tr>
<td>Lanzhou City</td>
<td>4</td>
<td>Demonstration site of the project on water diversion from Datong River to Qinwangchuan</td>
<td>the Region</td>
<td>Exhibition hall and supporting facilities</td>
<td>2006—2010</td>
<td>5800</td>
<td>5800</td>
<td>Loans, external investments, self-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>City/Prefecture</td>
<td>Item</td>
<td>Project Name</td>
<td>Administered by</td>
<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
<td>Note</td>
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<td>5</td>
<td>Gansu Folk Customs Park</td>
<td></td>
<td>Initial development work such as road construction</td>
<td>2006—2010</td>
<td>1173</td>
<td>1173</td>
<td>financi, etc.</td>
<td></td>
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<td></td>
<td>6</td>
<td>Xuejiawan Folk Village</td>
<td></td>
<td>Exhibition hall and supporting facilities</td>
<td>2006—2010</td>
<td>1000</td>
<td>1000</td>
<td></td>
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<td></td>
<td>7</td>
<td>Bapangjia Valley Holiday Resort in Lanzhou</td>
<td></td>
<td>Develop scenic spots, scenic areas, facilities and infrastructure, accommodation, and modern recreational facilities</td>
<td>2006—2010</td>
<td>2100</td>
<td>2100</td>
<td></td>
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<td></td>
<td>8</td>
<td>Project on Xinglong Mountain National Scenic Area in Lanzhou</td>
<td></td>
<td>Infrastructure, service facilities and ecological protection</td>
<td>2006—2010</td>
<td>2016</td>
<td>2016</td>
<td></td>
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<td></td>
<td>9</td>
<td>Tulugou National Forest Park in Lanzhou</td>
<td></td>
<td>Infrastructure, service facilities and ecological protection</td>
<td>2006—2010</td>
<td>4946</td>
<td>4946</td>
<td></td>
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<td></td>
<td>10</td>
<td>Renshou Mountain Tourism Development Zone of the Silk Road in Lanzhou</td>
<td></td>
<td>Infrastructure, service facilities and ecological protection</td>
<td>2006—2010</td>
<td>8904</td>
<td>8904</td>
<td></td>
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<td></td>
<td>11</td>
<td>Yellow River</td>
<td></td>
<td>Yellow River miniature</td>
<td>2006—2010</td>
<td>10645</td>
<td>5000</td>
<td></td>
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<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
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<tr>
<td>Lanzhou</td>
<td>12</td>
<td>Culture Park</td>
<td></td>
<td></td>
<td>15</td>
<td></td>
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<td></td>
<td></td>
<td>Project on Lanzhou Tianfusha Palace Tourist Development</td>
<td></td>
<td>Infrastructure, service facilities and ecological and environment protection</td>
<td>2006—20 15</td>
<td>10201</td>
<td>6000</td>
<td>Loan, external investments, self-financing</td>
<td></td>
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<td></td>
<td>13</td>
<td>Project on Jiuzhou Culture Park in Lanzhou</td>
<td></td>
<td>Infrastructure, service facilities and building of the scenic spot</td>
<td>2006—20 15</td>
<td>15207</td>
<td>7000</td>
<td>Loan, external investments, self-financing</td>
<td></td>
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<td></td>
<td>14</td>
<td>Lanshan Ecological Park</td>
<td></td>
<td>Infrastructure and four parks</td>
<td>2006—20 20</td>
<td>110000</td>
<td>15000</td>
<td>Loan, external investments, self-financing</td>
<td></td>
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<td></td>
<td>15</td>
<td>Peace Peony Garden</td>
<td></td>
<td>Ten thousand mu (666.7 hectares) peony park and supporting facilities</td>
<td>2006—20 20</td>
<td>5000</td>
<td>5000</td>
<td>Loan, external investments, self-financing</td>
<td></td>
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<td>Subtotal (12)</td>
<td></td>
<td></td>
<td></td>
<td>176992</td>
<td>63939</td>
<td>Loan, external investments, self-financing</td>
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<tr>
<td>Baiyin</td>
<td>16</td>
<td>Scenic Area of Wonderful Yellow River Canyon in Baiyin the Region</td>
<td></td>
<td>The scenic area covers a total area of 3500 hectares, with 54 scenic spots and 8 artificial scenic spots planned to be built.</td>
<td>2006—20 10</td>
<td>9000</td>
<td>9000</td>
<td>Loan, external investments, self-financing</td>
<td></td>
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<td></td>
<td>17</td>
<td>Yellow River Stone Forest Scenic Area</td>
<td></td>
<td>Infrastructure; tourism projects; construction of gardens; resources and environment protection; personnel training, culture development, market</td>
<td>2006—20 10</td>
<td>4781</td>
<td>4781</td>
<td>Loan, external investments, self-financing</td>
<td></td>
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<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
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<td>Preliminary Work</td>
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<td>promotion and so on</td>
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<td></td>
<td>18</td>
<td>Shoulu Mountain Forest Park</td>
<td>the Region</td>
<td>The park will cover a total area of 573.54 hectares, with tourist facilities planned to cover 2232 square meters. Major projects will cover an area of 15 hectares, with 45 artificial scenic spots.</td>
<td>2006—2010</td>
<td>733</td>
<td>733</td>
<td>etc.</td>
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<tr>
<td>Baijin</td>
<td>19</td>
<td>Wufoyan Temple Yellow River Tour</td>
<td></td>
<td>Construction includes: relics restoration, Yellow River aquatic amusement park, rafting, artificial lake, swimming center, fishing pool, marine exhibition hall, trail bridge over the Yellow River, “Wufu Council on the Promotion of Resistance against Japanese Aggression” Monument, desert eco-park and other recreational and service facilities</td>
<td>2006—2010</td>
<td>2290</td>
<td>2290</td>
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<tr>
<td></td>
<td>20</td>
<td>Junction Park - Peach Blossom Mountain - Niumen Cave-Tiemu Mountain</td>
<td></td>
<td>Construction of infrastructure, development of scenic spots and supporting service facilities.</td>
<td>2006—2010</td>
<td>1500</td>
<td>1500</td>
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<td>21</td>
<td>Mamingxin Church</td>
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<td>22</td>
<td>Project on the Hotel of Three Red Army Forces’ Junction</td>
<td>Build a three-star tourist hotel in the county</td>
<td>2006—2010</td>
<td>1600</td>
<td>1600</td>
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<td></td>
<td>Shuiquan Village “North Wudang Mountain – Fushou Mountain – Moya Stone Carving – Han Mausoleum in Huangwan – site of Xiaobaozi mutiny in Shuiquan – site of Bianjiatai underground communist party activities</td>
<td>Urgent repair and protection of cultural relics, verification study and planning of places of historic interest and revolution sites, publication of relevant literatures, build cultural relics protection halls and 4 monuments; build an ecological shelter forest covering an area of 1000 mu (66.7 hectares) and its water irrigation system; build two gardens, an artificial lake and pavilions on North Wudang Mountain; and build two holiday resorts covering 4000 square meters to develop aquatic tourism on the Yellow River. Build a martyr monument for Zhang Dongjiao; a monument for the Xiaobaozi mutiny; a Museum of</td>
<td>2006—2010</td>
<td>530</td>
<td>530</td>
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<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
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<td>Baiyin</td>
<td>23</td>
<td>Hongshan Temple, Longfeng Mountain tourism resources</td>
<td>the Region</td>
<td>Bianjiatai Underground Communist Party Activities; and a 14-kilometer tourism designated highway from No. 109 highway to Huangwai.</td>
<td>2006—2010</td>
<td>8000</td>
<td>8000</td>
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<td>25</td>
<td>Faquan Temple scenic area in Jingyuan County</td>
<td></td>
<td>Projects include the greening of the scenic area, infrastructure construction, protection and repair of cultural relics, holiday leisure, and sight-seeing</td>
<td>2006—2010</td>
<td>6746</td>
<td>6746</td>
<td></td>
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<td></td>
<td>26</td>
<td>Juewu Mountain scenic area in Jingyuan County</td>
<td></td>
<td>Increase the percentage of green land and forest coverage, fortify and repair existing historic architecture and build infrastructure in the scenic area.</td>
<td>2006—2010</td>
<td>3000</td>
<td>3000</td>
<td></td>
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<td></td>
<td>26</td>
<td>Juewu Mountain scenic area in Jingyuan County</td>
<td></td>
<td>Increase the percentage of green land and forest coverage, fortify and repair existing historic architecture and build infrastructure in the scenic area.</td>
<td>2006—2010</td>
<td>3000</td>
<td>3000</td>
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<td></td>
<td>26</td>
<td>Hasi Mountain forest scenery</td>
<td></td>
<td>Build a 10-kilometer road to the top of the mountain and a 4-kilometer walk, 10 pavilions, reception posts, hotels and restaurants, restore cultural landscape and build an amusement park.</td>
<td>2006—2010</td>
<td>7000</td>
<td>7000</td>
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<td></td>
<td>28</td>
<td>Zhengba High-Tech Agricultural Sight-seeing Park in Dongwan Town,</td>
<td></td>
<td>Non-pollution vegetable production sightseeing area, new variety and new technology visiting area, rare vegetables and flowers visiting area, fruit</td>
<td>2006—2010</td>
<td>1000</td>
<td>1000</td>
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<td>City/Prefecture</td>
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<tr>
<td>Jingyuan County</td>
<td>29</td>
<td>Project on the “Happy Rural Household” Base</td>
<td></td>
<td>production and processing area and quality raisin production area</td>
<td></td>
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<td></td>
<td>30</td>
<td>Forty-kilometer Yellow River scenery tour in Jingyuan County</td>
<td></td>
<td>Infrastructure and service facilities</td>
<td>2006—2010</td>
<td>859</td>
<td>859</td>
<td></td>
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<td></td>
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<td></td>
<td>Develop such scenic areas as the Wujin Gorge, the Hongluo Temple, the Hubaokou, the watermill of the Yellow River, a rock in the mid-stream, the iron bridge over the Yellow River, riverside view, the Luming Park and the Wulan Mountain.</td>
<td>2006—2015</td>
<td>16000</td>
<td>8000</td>
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<td>City/Prefecture</td>
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<td>Baiyin</td>
<td>31</td>
<td>Geothermal Resources Development Project in Tingchuan’s Baoji Village</td>
<td>the Region</td>
<td>Build a 1600-meter deep geothermal well; a 15-kilometer road in the fields, a 6-kilometer high voltage power supply line; a bowling center covering 1500 square meters, a golf court covering 800 mu (53.33 hectares), a five-storey full-frame business and trade building, a five-star Hongshalong Hotel with a construction area of 12000 square meters and a medical and healthcare center of 4000 square meters; complete the infrastructure construction of heating and gas supply to the downtown area as well as the greening and brightening projects; and build 200 solar greenhouses to vigorously develop planting and breeding industries.</td>
<td>2006—2015</td>
<td>22000</td>
<td>10000</td>
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<td>Subtotal (16)</td>
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<td>70839</td>
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<td>Dingxi</td>
<td>32</td>
<td>Quiqing Mountain Resort</td>
<td>the Region</td>
<td>Build roads, stony cliff plank roads, sightseeing pavilions, corridors and reception facilities as well as water supply and telecommunication systems in the scenic area; and improve the quality of the environment.</td>
<td>2006—20 10</td>
<td>856</td>
<td>856</td>
<td>Loan, external investments, self-financing, etc.</td>
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<td>33</td>
<td>Zheyang Mountain Resort</td>
<td></td>
<td>Build roads, cement staircases, bridges, a museum, memorial pavilions, etc in the scenic area, improve the environment of the scenic area and build the water and power supply systems.</td>
<td>2006—20 10</td>
<td>777</td>
<td>777</td>
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<td>34</td>
<td>Memorial Hall of Red Army’s Yankai Conference in Long March</td>
<td></td>
<td>Purchase requisition of the conference site, the site of the Fourth Red Army Command Headquarters, and the residence and office site of leaders of Northwest Bureau of the CPC Central Committee; restore the memorial hall, build roads, protect the environment and build water supply facilities in the scenic area.</td>
<td>2006—20 10</td>
<td>8100</td>
<td>8100</td>
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<td>35</td>
<td>Tai Mountain Park and Mausoleums of the Yuan Dynasty</td>
<td>Build 2.5-kilometer roads, touring walks, cultural relic exhibition room, an ancestral shrine and a parking lot as well as the power supply and telecommunication facilities in the scenic area.</td>
<td>2006—2010</td>
<td>2221</td>
<td>2221</td>
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<td>36</td>
<td>Memorial Hall of Red Army’s Minzhuo Conference in Long March</td>
<td>Sanshilipu Memorial Hall of Long March, site of the Erlang Mountain Battle during Red Army’s Long March, site of the Soviet Government in Minxian County, mausoleum of martyrs on Erlang Mountain, and site where the Central Red Army stationed in Minxian County.</td>
<td>2006—2010</td>
<td>8762</td>
<td>8762</td>
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<td>37</td>
<td>Erlang Mountain Provincial Forest Park and Langdu Grassland in Jinchang</td>
<td>Build two forest resorts with comprehensive sceneries and service facilities in the Erlang Mountain and the Nanchuan Miaopu, build roads, reception facilities, and power supply and telecommunication systems and improve the environment of the scenic</td>
<td>2005—2010</td>
<td>889</td>
<td>889</td>
<td>Loan, external investments, self-finan</td>
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<td>38</td>
<td>Longxi’s Renshou Mountain – Longxi Hall scenic area</td>
<td></td>
<td>Develop such scenic spots as Longxi Hall tourist reception area, Ancestor Worship Area, Sacrifice Area, Lihe Mausoleum and Lijing Temple, Li Bai’s hometown, reading hall, and Lihe’s southern garden.</td>
<td>2005—2010</td>
<td>3199</td>
<td>3199</td>
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<td>39</td>
<td>Li Family’s Dragon Palace Restoration Project</td>
<td></td>
<td>Focus on the repair of Juxian Building, Jungong Building, Shubian building (frontier guard building), the west wing of the Northern palace, the yard of the back hill, the No. 2 and 3 Gate of Beitian, the main hall in the east, the North-South buildings and rockeries.</td>
<td>2005—2010</td>
<td>1214</td>
<td>1214</td>
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<td>40</td>
<td>West Lake aquatic park</td>
<td></td>
<td>It covers an area of 318 mu (21.2 hectares). The construction includes: digging construction area for the aquatic park, service facilities, recreational facilities, fishing and aquatic</td>
<td>2005—2010</td>
<td>4154</td>
<td>4154</td>
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<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
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<td>41</td>
<td></td>
<td>Nanping Mountain Ecological Tour development project</td>
<td></td>
<td>amusement and fitness facilities.</td>
<td></td>
<td>2005—2010</td>
<td>2598</td>
<td>2598</td>
<td></td>
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<tr>
<td>42</td>
<td></td>
<td>Yuelu Mountain Revolutionary Martyr Memorial Hall and ecological tour project</td>
<td></td>
<td>Build roads, stone plank road built along the cliff, water supply, telecommunication facilities, visitor center, lookout pavilion and environment protection facilities.</td>
<td>2005—2010</td>
<td>3531</td>
<td>3531</td>
<td></td>
<td></td>
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<tr>
<td>43</td>
<td></td>
<td>Taohe River scenery</td>
<td></td>
<td>7.5-kilometer long riverside road at the east and west sides of Taohe River of Santan Park respectively, including road asphalt paving and greening and building of tourist facilities.</td>
<td>2005—2010</td>
<td>1550</td>
<td>1550</td>
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<tr>
<td>Dingxi</td>
<td>44</td>
<td>Lintao County’s ancient cultural relics protection, ancient culture museum and tourism development project</td>
<td>the Region</td>
<td>Build a 6-square kilometer cultural relics of Majiayao, Xindian and Siwa, green area of 6000 mu (400 hectares), a 3000-square meter exhibition hall and a 2000-square meter ancient village. Repair front and back palaces and ancillary structures on both sides of the City God Temple, buildings, pavilions and a tablet corridor imitating the ancient architecture.</td>
<td>2005—20 10</td>
<td>1650</td>
<td>1650</td>
<td>Loan, attracting external investments, self-financing</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>45</td>
<td>Jinyu Euro-Asian Garden</td>
<td></td>
<td>Tourist and vacation village: artificial beach, a botanical garden, a bird garden, a children’s amusement park and a shipping garden.</td>
<td>2006—20 10</td>
<td>4118</td>
<td>4118</td>
<td></td>
<td></td>
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<tr>
<td>Dingxi</td>
<td>46</td>
<td>Diaochan Lake</td>
<td>the Region</td>
<td>It will cover an area of 991 mu (66.1 hectares), including 479 mu (31.9 hectares) water area. Build recreational and vacation, fishing and aquatic amusement facilities as well as green land and a square.</td>
<td>2005—20 10</td>
<td>6000</td>
<td>6000</td>
<td>Loan, attracting external investments</td>
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<td>47</td>
<td>Shuiquan Village and Xugongtang Memorial Hall</td>
<td></td>
<td>Build recreational and amusement facilities, villas, a banquet hall, pavilions, buildings, corridors, bridges, windowed veranda, pavilions on terrace, an orchard, a fishing pool, a swimming pool, boating, water supply, environment protection and greening facilities. Build the memorial hall, the entrance gate, pavilions, a wall corridor, power supply and water diversion facilities, repair roads and green the attraction.</td>
<td>2006—2010</td>
<td>996</td>
<td>996</td>
<td>Self-financing</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>48</td>
<td>Qinglan Village geothermal resource development</td>
<td></td>
<td>Build a rehabilitation reception center, green the environment, plant flowers, medicinal herbs and vegetables, and raise wild animals.</td>
<td>2005—2010</td>
<td>2168</td>
<td>2168</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>49</td>
<td>Anding District tourist scenic area development and construction of supporting</td>
<td></td>
<td>Develop ecological, village tour and sight-seeing areas of the scenic spots of Xiyuan Mountain, South Mountain and East Mountain, phase-II supporting infrastructure of Yuhu (Jade Lake) park,</td>
<td>2005—2010</td>
<td>8965</td>
<td>8965</td>
<td></td>
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<tr>
<td>50</td>
<td>infrastructure Jiuhua valley and stone gate.</td>
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<tr>
<td>51</td>
<td>Comprehensive development of hot springs in Tongwei County Build a comprehensive vacation village with catering, boarding, swimming, parking, entertainment, shopping, reception and coordination facilities.</td>
<td></td>
<td>2005—2010</td>
<td>9977</td>
<td>9977</td>
<td></td>
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<tr>
<td>52</td>
<td>Lulu Mountain Build a 38-kilometer long highway, walks in the scenic area, environment protection and water supply facilities, pavilions, terraces and towers in it.</td>
<td></td>
<td>2005—2010</td>
<td>2100</td>
<td>2100</td>
<td></td>
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<tr>
<td>53</td>
<td>Dingxi tourist service training center Service and training facilities as well as star-rated hotels.</td>
<td></td>
<td>2005—2010</td>
<td>1000</td>
<td>1000</td>
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<td></td>
<td>Weiyuan Tianjin Valley – Lianfeng Mountain – Taibai Mountain – double stone gate scenic areas Build roads, lookout pavilions, bridges and telecommunication systems in these scenic areas and improve their environment.</td>
<td></td>
<td>2005—2015</td>
<td>15000</td>
<td>10000</td>
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<td>Gannan</td>
<td>54</td>
<td>Gannan Prefecture tourist product R&amp;D center</td>
<td>the Region</td>
<td>Proposed to build a 2000-square meter four-story R&amp;D building to develop ethnic group costumes, jewelry and jade, textile, embroidery, root carving and Yao ink stone.</td>
<td>2005—2010</td>
<td>2930</td>
<td>2930</td>
<td>Loan, attracting external investments, self-financing</td>
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<tr>
<td></td>
<td>55</td>
<td>Shambhala tourist and entertainment city in Gannan Prefecture</td>
<td></td>
<td>Proposed to build Gannan tourist and vacation city with a full range of facilities for sight-seeing, recreation, vacation and health care purposes.</td>
<td>2005—2010</td>
<td>2216</td>
<td>2216</td>
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<td></td>
<td>56</td>
<td>Comprehensive development of Ganjia scenic area in Xiahe County</td>
<td></td>
<td>Develop the tour of Baishiya Cave climbing, repair the town of Bajia in Ganjia and build a grass rink in Ganjia Prairie.</td>
<td>2005—2010</td>
<td>1334</td>
<td>1334</td>
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<td></td>
<td>57</td>
<td>Comprehensive development of Malu tourist scenic area in Zhuoni County</td>
<td></td>
<td>Develop scenic spots of Malu district, Zhagulu, Kache and Shimen Valley and build reception facilities.</td>
<td>2005—2010</td>
<td>3447</td>
<td>3447</td>
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<tr>
<td></td>
<td>58</td>
<td>Class III tourist highway of Malu in Zhuoni County</td>
<td></td>
<td>Build an 11-kilometer long Class III tourist highway, with 9 meters in width planned and good drainage facility and</td>
<td>2005—2010</td>
<td>3280</td>
<td>3280</td>
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<td></td>
<td>59</td>
<td>Ala in Luqu</td>
<td>safety signposts.</td>
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<td></td>
<td>59</td>
<td>Construction of Diebu County – Jiuzai Valley tourist highway</td>
<td>Proposed to build a 64-kilometer long Class III highway</td>
<td>2005—2010</td>
<td>7365</td>
<td>7365</td>
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<tr>
<td></td>
<td>60</td>
<td>Comprehensive development project of the World's No. 1 Bay of the Yellow River ecological tour in Maqu County</td>
<td>Purchase 3 motor boats, 5 tour buses, 20 Tibetan tents and 3 wharfs, and build a Tibetan tent-style hotel, and 120-kilometer long highway.</td>
<td>2005—2010</td>
<td>3800</td>
<td>3800</td>
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<td></td>
<td>61</td>
<td>Maqu Folk Garden project</td>
<td>Gesaer Museum, folk culture exhibition park</td>
<td>2005—2010</td>
<td>6873</td>
<td>6873</td>
<td></td>
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<td></td>
<td>62</td>
<td>Zhouqu Beach – Dahiaogou Scenic Area development</td>
<td>Roads in the scenic area, water supply and drainage, development of the scenic spots and entertainment service facilities.</td>
<td>2005—2010</td>
<td>8790</td>
<td>8790</td>
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<td></td>
<td>63</td>
<td>Luquzhecha – Gahai – Langmusi</td>
<td>A Zhecha vacation village and communication facilities</td>
<td>2005—2010</td>
<td>8390</td>
<td>8390</td>
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<td>comprehensive development project</td>
<td>64</td>
<td>Comprehensive development of Lintan New City scenic area</td>
<td></td>
<td>vacation village, Langmusi Hotel and development of scenic spots</td>
<td></td>
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<tr>
<td>Hezuo-Yeli Pass Class III Tourist Highway</td>
<td>65</td>
<td>Build a new 105-kilometer long Class III highway and put in place its drainage facilities and safety signposts</td>
<td>2005—20 10</td>
<td>6798</td>
<td>6798</td>
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<tr>
<td>Ejie-Zhagana scenic area development project</td>
<td>66</td>
<td>Repair the relics of Ejie Conference and set up communication, water supply and drainage and service facilities of Zhagana scenic area</td>
<td>2005—20 10</td>
<td>8765</td>
<td>8765</td>
<td></td>
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<td>Development of Luergou scenic area in Lintan</td>
<td>67</td>
<td>Roads in the scenic area, communication, water supply and drainage and reception facilities</td>
<td>2005—20 10</td>
<td>5742</td>
<td>5742</td>
<td>Loan, attracting external investment</td>
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<td>Ski Resort project in Gannan Prefecture</td>
<td>68</td>
<td>Roads in the scenic area, ski equipment, lounge, etc. infrastructure such as water and power supply facilities</td>
<td>2005—20 10</td>
<td>9890</td>
<td>9890</td>
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<td>Tibet</td>
<td>69</td>
<td>Tibetan Culture Research Center in Gannan Prefecture</td>
<td></td>
<td>Tibetan Culture Exhibition Hall, Tibetan Character Research Result Exchange Center</td>
<td>2005—2010</td>
<td>6892</td>
<td>6892</td>
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<td></td>
<td>70</td>
<td>Gannan’s tourism resource development project</td>
<td></td>
<td>Comprehensive development of ecological tourism, development of red tour scenic area and historic relics</td>
<td>2005—2010</td>
<td>8765</td>
<td>8765</td>
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<td>71</td>
<td>Cuifeng Mountain Vacation Village in Zhouqu County, Gannan Prefecture</td>
<td></td>
<td>Accommodation facility and infrastructure</td>
<td>2005—2010</td>
<td>512</td>
<td>512</td>
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<td></td>
<td>72</td>
<td>Yeli Pass Natural Scenic Area in Lintan County, Gannan Prefecture</td>
<td></td>
<td>Accommodation facility and infrastructure</td>
<td>2005—2010</td>
<td>1792</td>
<td>1792</td>
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<tr>
<td>Linxia City</td>
<td>73</td>
<td>Comprehensive tourist area development project in Linxia City</td>
<td></td>
<td>Transportation facilities in the scenic area, building of scenic spots, sanitation facilities, five parks, Ethnic Culture Exposition Park, relocation of Butterfly Building</td>
<td>2005—2010</td>
<td>8000</td>
<td>8000</td>
<td>Loan, attracting external</td>
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**Subtotal (19)**

Total:

- 105981
- 105981

- **Note**
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<tr>
<td>Linxia</td>
<td>74</td>
<td>Comprehensive development project of Lianhua (Lotus) Mountain Natural Reserve in Kangle County</td>
<td>administered by</td>
<td>Transportation facilities in the scenic area, building of scenic spots, sanitation facilities and power supply and communication facilities</td>
<td>2005-2010</td>
<td>6500</td>
<td>6500</td>
<td>investments, self-financing</td>
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<td>75</td>
<td>Galuping Tourist Service Area project in Jishishan County</td>
<td></td>
<td>Boarding and lodging area, ancient and folk culture experience and shopping area, recreational and entertainment area, riverside scenery, green agriculture sight-seeing area and supporting infrastructure.</td>
<td>2005-2010</td>
<td>1488</td>
<td>1488</td>
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<td>76</td>
<td>Huangcaoping, Gaoxinping comprehensive tourism development project in Jishishan County</td>
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<td>Transportation facility in the scenic area, building of scenic spots, sanitation facility and power supply and communication system.</td>
<td>2005-2010</td>
<td>5000</td>
<td>5000</td>
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<td>Linxia</td>
<td>77</td>
<td>Natural Bathing the Region</td>
<td></td>
<td>Five villas, one hotel, parking lots, natural swimming pool, children’s</td>
<td>2005-2010</td>
<td>2300</td>
<td>2300</td>
<td>Loan, attracting</td>
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<td></td>
<td>78</td>
<td>Beach at the Three Georges of the Yellow River</td>
<td></td>
<td>amusement park and aquatic entertainment facilities</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Bingling Stone Forest Geopark project</td>
<td></td>
<td>Develop six area of Potala Palace exploration area, Loess Plateau customs area, rock-climbing area, a journey to the west gallery and adventure area, the world of paradise touring area and water curtain and heaven gate area and their supporting boarding, lodging, transportation, visiting, shopping and entertainment facilities.</td>
<td>2005-2010</td>
<td>7289</td>
<td>7289</td>
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<td></td>
<td>79</td>
<td>Taiji Lake Aquatic Park in Yongjing County</td>
<td></td>
<td>Ancient-style view corridor, 5 villas of different styles, recreation room for the elderly, cafeteria, aquatic entertainment facility and tourist facilities.</td>
<td>2005-2010</td>
<td>762</td>
<td>762</td>
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<td></td>
<td>80</td>
<td>Development of 100-Mu (6.67 hectares) tourist service area in Songmingyan</td>
<td></td>
<td>Songmingyan Entertainment City, Songmingyan Vacation Village, a street of tourist souvenirs, etc.</td>
<td>2005-2010</td>
<td>3000</td>
<td>3000</td>
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<td>Item</td>
<td>Project Name</td>
<td>Administered by</td>
<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
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<tr>
<td>81</td>
<td>National Forest Park</td>
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<tr>
<td>82</td>
<td>Comprehensive development of ancient fossil tour in Hezheng</td>
<td></td>
<td>Construction of supporting infrastructure and scenic spots</td>
<td>2005-2010</td>
<td>5000</td>
<td>5000</td>
<td></td>
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<tr>
<td>83</td>
<td>Tourist infrastructure project of Liumei Beach Scenic Area in Hezheng County</td>
<td></td>
<td>Mainly focus on construction of transportation facility, sanitation facility, water supply and drainage systems, management and service project and greening in the scenic area</td>
<td>2005-2010</td>
<td>1480</td>
<td>1480</td>
<td></td>
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<td>84</td>
<td>Comprehensive development of Lianhua (Lotus) Scenic Area in Linxia</td>
<td></td>
<td>Comprehensive vacation village integrating entertainment, tourist services, aquatic park, camping and recreation in one.</td>
<td>2005-2010</td>
<td>1450</td>
<td>1450</td>
<td></td>
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<td></td>
<td>Comprehensive development project of “Xinmin-Malang-Taizi Mountain”</td>
<td></td>
<td>Mainly focus on construction of transportation facility, scenic spots, sanitation facility, and power supply and communication system in the scenic area.</td>
<td>2005-2010</td>
<td>2400</td>
<td>2400</td>
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<td>Item</td>
<td>Project Name</td>
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<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
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<td>85</td>
<td>Scenic Area in Guanghe County</td>
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<td>86</td>
<td>Comprehensive development of Huaishu Pass and restoration of Mafulu’s hometown in Linxia County</td>
<td></td>
<td>Mainly focus on the construction of transportation facility, scenic spots, sanitation facility, and power supply and communication system in the scenic area.</td>
<td>2005-2010</td>
<td>5160</td>
<td>5160</td>
<td></td>
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<td>86</td>
<td>Development of tourist souvenirs and the project of Ning River Hotel in Hezheng County</td>
<td></td>
<td>Various tourist souvenirs reflecting the local features of Hezheng County and a three-star hotel providing boarding, lodging and entertainment services, with 8 stories for its main building and a construction area of 12000 square meters.</td>
<td>2005-2010</td>
<td>3000</td>
<td>3000</td>
<td></td>
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<tr>
<td>87</td>
<td>Taizi Mountain Scenic Area project in Linxia County</td>
<td></td>
<td>Infrastructure and development of the scenic area</td>
<td>2005-2010</td>
<td>1503</td>
<td>1503</td>
<td>Loan, attracting external</td>
<td></td>
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<tr>
<td>88</td>
<td>Liujiaxia Dinosaur National Geopark</td>
<td></td>
<td>Infrastructure and development of the scenic area</td>
<td>2005-2010</td>
<td>3849</td>
<td>3849</td>
<td></td>
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<td>City/Prefecture</td>
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<td>Size and Content</td>
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<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
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<td>89</td>
<td>Comprehensive development of Sanchaping Scenic Area and Yinjilinjia River Beach Natural Scenic Area</td>
<td></td>
<td>Infrastructure and development of the scenic area</td>
<td>2005—2010</td>
<td>1863</td>
<td>1863</td>
<td>investments, self-financing</td>
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<td>90</td>
<td>Development of the Mausoleum of Martyrs of China’s Red Army Western Route Force in Gulang County, Wuwei City</td>
<td>the Region</td>
<td>Build a memorial hall, corridor of martyrs, sculptures, pavilions, terraces and verandas in the Mausoleum of the Martyrs of the Western Route Force and secure road hardening and greening of the scenic area</td>
<td>2005—2010</td>
<td>1910</td>
<td>1910</td>
<td>Loan, attracting external investments, self-financing</td>
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<td></td>
<td>91</td>
<td>Phase III project of the infrastructure construction of Leitai scenic area in Wuwei</td>
<td></td>
<td>Develop into a first-class tourist hot spot in the western region with various functions, full facilities, special features and quality services to attract tourists and match up with the national standard</td>
<td>2005—2010</td>
<td>5340</td>
<td>5340</td>
<td>self-financing</td>
<td></td>
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<td>Item</td>
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<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
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<tr>
<td>92</td>
<td>A new museum in Wuwei city</td>
<td>Build a high-standard, modern museum that covers an area of 200 million square</td>
<td>2005—20</td>
<td>3600</td>
<td>3600</td>
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<td>meters and has a total construction area of 10000 square meters and develop into</td>
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<td>a scenic area with distinct features, good services and taste to attract tourist.</td>
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<td>93</td>
<td>Hai-Zang Park South Lake project</td>
<td>The Hai-Zang South Lake will cover an area of 52 hectares, with 1900 meters</td>
<td>2005—20</td>
<td>15000</td>
<td>15000</td>
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<td>from its south end to its north end and an average width of 250 meters.</td>
<td>10</td>
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<tr>
<td>94</td>
<td>Phase I project of Haimudong Grottoes repair</td>
<td>Build an exhibition room of cultural relics, roads and supporting reception</td>
<td>2005—20</td>
<td>15000</td>
<td>15000</td>
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<td></td>
<td></td>
<td>facilities.</td>
<td>10</td>
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<td>95</td>
<td>Development of Lianhua (Lotus) Mountain Ecological Tourist Area</td>
<td>Restoration of the original scenery of Lianhua Mountain, building of an</td>
<td>2005—20</td>
<td>4500</td>
<td>4500</td>
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<td>artificial lake, parking lots and roads in the scenic area, greening, cable</td>
<td>10</td>
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<td>construction and construction of</td>
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<td>Wuwei</td>
<td>96</td>
<td>Development of “Sarban’s Manes Bone Tower” of Baita Temple in Liangzhou</td>
<td></td>
<td>reception service facilities. Baita Temple is the place that witnessed the integration of Tibet into China’s territory. It has great historical significance to repair “Sarban’s Manes Bone Tower” of Baita Temple in Liangzhou.</td>
<td>2005—2010</td>
<td>1170</td>
<td>1170</td>
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<td></td>
<td>97</td>
<td>Repair and Development of Kumarajiva Scenic Spot in Liangzhou the Region</td>
<td></td>
<td>Build 23 buildings simulating Qing Dynasty architecture, covering an area of 28850 square meters. The whole repair and development project will be implemented in three stages and the ultimate goal is to build a scenic spot that is good for Buddhist activities, sight-seeing and academic exchanges and research.</td>
<td>2005—2010</td>
<td>3364</td>
<td>3364</td>
<td>Loan, attracting external investments, self-financing</td>
<td></td>
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<tr>
<td></td>
<td>98</td>
<td>Desert Park in Liangzhou District</td>
<td></td>
<td>Build into a desert park that is good for scientific research, sight-seeing, conference and vacation.</td>
<td>2005—2010</td>
<td>1000</td>
<td>1000</td>
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<td>City/Prefecture</td>
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<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
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<td>99</td>
<td>Development of Tianti Mountain Grottoes Scenic Spot in Liangzhou District</td>
<td></td>
<td>Repair part of sculptures and murals in the existing 18 grottoes, focusing on developing part of the grottoes build in North Liang and Tang Dynasty; build supporting facilities such as protective facility; build into a tourist area that integrates culture in tourism.</td>
<td>2005—20 10</td>
<td>980</td>
<td>980</td>
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<td>100</td>
<td>Pharmacy King Hot Mineral Spring Resort project in Wuwei</td>
<td></td>
<td>This project will cover an area of 4 hectares, with a construction area of 22660 square meters, including 104 Deluxe, standard and economic rooms, 208 beds, a comprehensive recreation center, a heated swimming pool and outdoor hot mineral water swimming pool.</td>
<td>2005—20 10</td>
<td>3180</td>
<td>3180</td>
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<td></td>
<td>101</td>
<td>Shimengou Amusement Park</td>
<td></td>
<td>Proposed to build a large amusement park that can hold 300 people, covering an area of 400 hectares, alone with its supporting amusement programs and facilities.</td>
<td>2005—20 10</td>
<td>2500</td>
<td>2500</td>
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<td>Project Name</td>
<td>Administered by</td>
<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
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<td>102</td>
<td>Tianzhu</td>
<td>“Three Gorges” Scenic Area project</td>
<td></td>
<td>Build a Tibetan yurt-style hotel with a construction area of 10000 square meters, a suspended cable, a skating rink, hunting ground and a racetrack; raise and train horses, yaks and deer, and develop 15 scenic spots and 10 restaurants of local cuisine.</td>
<td>2005—2010</td>
<td>1600</td>
<td>1600</td>
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<td>103</td>
<td>Tianzhu</td>
<td>Three Gorges Benkang Danxia Landform Tourist Area</td>
<td></td>
<td>Planned to build a tourist area covering 100,000 square meters. Carve a 20-30 meter tall outdoor Buddha on the stone wall and build sight-seeing paths and supporting service facilities.</td>
<td>2005—2010</td>
<td>5000</td>
<td>5000</td>
<td></td>
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<tr>
<td>104</td>
<td>Wuwei</td>
<td>Huazang Riverside Forest Park project in Tianzhu County</td>
<td></td>
<td>Planned to build a riverside Forest Park covering an area of 300 mu (20 hectares), including 7 function areas of Central Scenic Area, Peal Lake Scenic Area, Folk Recreation Center, Children’s Amusement Center, Tibetan Culture Area, Park Administration Area and Wild Animal &amp; Plant Area.</td>
<td>2005—2010</td>
<td>2704</td>
<td>2704</td>
<td>Loan, attracting external investments, self-</td>
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<td>105</td>
<td>Gulang County</td>
<td>Construction of Mulutan Ecological</td>
<td></td>
<td></td>
<td>2005—2010</td>
<td>1896</td>
<td>1896</td>
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<td>City/Prefecture Item</td>
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<td>project</td>
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<td>Tourist Area, development of Maling Mount Forest Scenic Area, infrastructure construction of Longquan Temple Scenic Area</td>
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<td>Minqin County project</td>
<td></td>
<td></td>
<td>Development of Shengrong Temple tour, construction of a large Recreation Park in the Horticulture Farm, Development of Rui’an Bao tour, Development of Hongshanya Reservoir tour</td>
<td>2005—2010</td>
<td>4150</td>
<td>4150</td>
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<tr>
<td>Project of restoring the Confucius Institute of the Confucius Temple in Wuwei</td>
<td></td>
<td></td>
<td>Facility improvement and scenic spot construction</td>
<td>2005—2010</td>
<td>4130</td>
<td>4130</td>
<td></td>
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<tr>
<td>Desert sight-seeing and exploration tour project in Liangzhou</td>
<td></td>
<td></td>
<td>Construction of scenic spot, development of scenic area, improvement of facilities, infrastructure, lodging facility, modern entertainment and recreational facility, etc.</td>
<td>2005—2010</td>
<td>660</td>
<td>660</td>
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<td><strong>Subtotal (19)</strong></td>
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<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
<td>Note</td>
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<tr>
<td>Jinchang</td>
<td>109</td>
<td>Recreation and vacation tourist area in the ancient city of Yongchang</td>
<td>the Region</td>
<td>Improve reception facilities</td>
<td>2005—2010</td>
<td>8000</td>
<td>8000</td>
<td>Loan, attracting external investments, self-financing</td>
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<tr>
<td></td>
<td>110</td>
<td>Liqian Cultural Tourist Area</td>
<td></td>
<td>Construction of Liqian ancient city</td>
<td>2005—2010</td>
<td>5000</td>
<td>5000</td>
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<tr>
<td></td>
<td>111</td>
<td>Western Route Force Red Theme Tourist Area</td>
<td></td>
<td>Create tourist products of Red Revolution as the theme</td>
<td>2005—2010</td>
<td>500</td>
<td>500</td>
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<tr>
<td></td>
<td>112</td>
<td>Yunzhuang Temple Religious and Folk Tourist Area</td>
<td></td>
<td>Renovate Yunzhuang Temple, restore relics of the original grottoes, and build reception facilities.</td>
<td>2005—2010</td>
<td>2000</td>
<td>2000</td>
<td></td>
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<tr>
<td></td>
<td>113</td>
<td>Shengrong Temple Cultural Relics Tourist Area</td>
<td></td>
<td>Restore Shengrong Temple and build roads in the Tourist Area.</td>
<td>2005—2010</td>
<td>4000</td>
<td>4000</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>115</td>
<td>East Lake Scenic Area</td>
<td></td>
<td>Development of the scenic area</td>
<td>2005—2010</td>
<td>15000</td>
<td>15000</td>
<td></td>
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<td>City/Prefecture</td>
<td>Item</td>
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<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
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<tr>
<td>Zhangye</td>
<td>116</td>
<td>Technology Plaza</td>
<td>Jinchuan No. 1 Gate, a botanical garden and a Technology Museum.</td>
<td>2005—2010 8000 8000</td>
<td></td>
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<td></td>
<td>Subtotal (8)</td>
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<td></td>
<td>2005—2010 44500 44500</td>
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<tr>
<td></td>
<td>117</td>
<td>Sunan County project</td>
<td>the Region</td>
<td>Dongliugou Yugu Recreation Village, facility construction of Ethnic Group Customs Garden Xiaritala Lake Scenic Area in Huangcheng, Yangtai Valley Scenic Area, Laohugou Scenic Area in Huangcheng, Changgou Temple Scenic Area, Matisi Scenic Area, Jinta Temple Scenic Area, Multi-Color Sand Forest Geopark, Haiyagou Scenic Area, Machangtan Scenic Area, Qiyi Glacier Scenic Area, Qilian Heaven Pool Scenic Area and Wenshu Temple Scenic Area.</td>
<td>2006—2010 7135 7135</td>
<td>Loan, attracting external investments, self-financing</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>118</td>
<td>Dahu (Great Lake) Bay Scenic Area</td>
<td></td>
<td>Expand, beautify and green sight-seeing roads around the Lake, build a bird island and 5 center islands of different sizes, further improve the supporting infrastructure development of aquatic</td>
<td>2006—2010 5000 5000</td>
<td></td>
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<td>Size and Content</td>
<td>Duration</td>
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<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
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<tr>
<td>119</td>
<td>Ancient relics of Luotuo (Camel) City</td>
<td></td>
<td>Overall planning, greening of the ancient relics, Phase II project, building of a museum, archeological excavation of part of the ancient tombs</td>
<td>2006—2010</td>
<td>4000</td>
<td>4000</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>120</td>
<td>Xiaohaizi Reservoir Scenic Area</td>
<td></td>
<td>Improve supporting infrastructure for raising, irrigation and recreation.</td>
<td>2006—2010</td>
<td>5000</td>
<td>5000</td>
<td></td>
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<tr>
<td>121</td>
<td>Yueya Lake Park Recreation Area</td>
<td></td>
<td>Build a Tablet Wall, beautify the Park, and develop supporting greening facilities.</td>
<td>2006—2010</td>
<td>1000</td>
<td>1000</td>
<td></td>
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<tr>
<td>122</td>
<td>Hexi “Three-Garden” Sight-seeing Area</td>
<td></td>
<td>Improve the supporting facility of the Industrial Park, green and beautify the sight-seeing area.</td>
<td>2006—2010</td>
<td>2000</td>
<td>2000</td>
<td></td>
<td></td>
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<tr>
<td>123</td>
<td>Wutongquan Temple</td>
<td></td>
<td>Build and expand part of the Temple structures, and repair and restore their color paintings</td>
<td>2006—2010</td>
<td>1000</td>
<td>1000</td>
<td></td>
<td></td>
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<tr>
<td>124</td>
<td>Suangquan Lake Shipping Park</td>
<td></td>
<td>Build a center lake, a water closet, Mongolia yurt, recreation center and other infrastructure</td>
<td>2006—2010</td>
<td>2721</td>
<td>2721</td>
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<td>Duration</td>
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<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
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<td></td>
<td>125</td>
<td>Danxia Landform</td>
<td></td>
<td>Build low cost road in the scenic area, rail, a lookout and a square.</td>
<td>2006—20 10</td>
<td>1150</td>
<td>1150</td>
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<tr>
<td></td>
<td>126</td>
<td>Xianggu Temple</td>
<td></td>
<td>Build the entrance to the mountain, a square, side hall of the Temple and infrastructure.</td>
<td>2006—20 10</td>
<td>858</td>
<td>858</td>
<td></td>
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<tr>
<td></td>
<td>127</td>
<td>Pingchuan Suolong Pool</td>
<td></td>
<td>Road construction in the scenic area, planning of the scenic area and greening and beautification.</td>
<td>2006—20 10</td>
<td>3612</td>
<td>3612</td>
<td></td>
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<tr>
<td></td>
<td>128</td>
<td>Haichaoba Forest Park</td>
<td></td>
<td>Haichaoba Reservoir Entertainment Area, a Vacation Village</td>
<td>2006—20 10</td>
<td>3210</td>
<td>3210</td>
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<tr>
<td></td>
<td>129</td>
<td>Biandukou Natural Scenery Tourist Area</td>
<td>Region</td>
<td>A Vacation Village, a racetrack, and a hunting ground</td>
<td>2006—20 10</td>
<td>1093</td>
<td>1093</td>
<td>Loan, attracting external investments, self-financing</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>130</td>
<td>Yanzhi Mountain Natural Scenic Area</td>
<td></td>
<td>Build a reception station, a Summer Resort, the Temporary Palace of Emperor Yang in the Sui Dynasty, Memorial Hall of Huo Qubing, Red Army Memorial Hall and an artificial lake.</td>
<td>2006—20 10</td>
<td>1200</td>
<td>1200</td>
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<td>Item</td>
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<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
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<tr>
<td>131</td>
<td>Xinheduo Great Wall Scenic Area</td>
<td>City/Prefecture</td>
<td>Build a Silk Road Exhibition Hall and “the Great Wall” miniature, and build and improve the ancient caravansary of Xinheduo</td>
<td>2006—20 10</td>
<td>1000</td>
<td>1000</td>
<td></td>
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<tr>
<td>132</td>
<td>Buddha Tourist Area</td>
<td>City/Prefecture</td>
<td>Big Buddha Temple service facilities improvement, construction of “Buddha Heaven” cave, bridge, stone steps, Red Amy Museum, watch tower</td>
<td>2006—20 10</td>
<td>1600</td>
<td>1600</td>
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<tr>
<td>133</td>
<td>Machang Pasture Scenic Area</td>
<td>City/Prefecture</td>
<td>Scenic road renovation, construction of valley forest area, pasture scenic area, agricultural sight-seeing area, resort, hunting ground, visitor center</td>
<td>2006—20 10</td>
<td>5000</td>
<td>5000</td>
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<tr>
<td>134</td>
<td>Development of the southern part of the Big Buddha Temple</td>
<td>City/Prefecture</td>
<td>Restore religious buildings, infrastructure and greening</td>
<td>2006—20 10</td>
<td>7200</td>
<td>7200</td>
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<tr>
<td>135</td>
<td>Expansion of Sweet Spring Park</td>
<td>City/Prefecture</td>
<td>Relocation of residents within the planned construction area of the Park, construction of scenic spots by deadline, additional 100 mu (6.67 hectares) area of the park</td>
<td>2006—20 10</td>
<td>3600</td>
<td>3600</td>
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<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
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<td>137</td>
<td>Ganzhou District Projects</td>
<td></td>
<td>Construction of Dongda Mountain scenic area, international hunting ground, Erba Water Amusement Park, Daxiekou Summer Resort, Lining Temple, Liuquan Hongjin Resort</td>
<td>2006—2010</td>
<td>3023</td>
<td>3023</td>
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<tr>
<td>138</td>
<td>Kanglong Temple International Hunting Ground in Sunan Yugu Ethnic Autonomous County</td>
<td></td>
<td>Infrastructure, accommodation facilities</td>
<td>2006—2010</td>
<td>5683</td>
<td>5683</td>
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<td>139</td>
<td>Black Water State relics “Cultural Tourist City”</td>
<td></td>
<td>Facility improvement, infrastructure, relics protection, environment treatment</td>
<td>2006—2010</td>
<td>1198</td>
<td>1198</td>
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<td>140</td>
<td>Shigangdun Agricultural Hi-tech Tourist Park in Zhangye City</td>
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<td>Scenic area development, scenic spot construction, Scenic area development, scenic spot construction, facility improvement, infrastructure, modern entertainment facilities modern</td>
<td>2006—2010</td>
<td>3023</td>
<td>3023</td>
<td></td>
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<td>City/Prefecture</td>
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<td>Size and Content</td>
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<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
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<td>141</td>
<td>Northwest Desert Tree Park in Zhangye City</td>
<td></td>
<td>entertainment facilities, sightseeing and leisure facilities</td>
<td>2006—20 10</td>
<td>548</td>
<td>548</td>
<td>Loan, attracting external investments, self-financing</td>
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<tr>
<td>Zhangye</td>
<td>142</td>
<td>Sunan Mati Temple Scenic Area Snow-covered Mountain and Waterfall Scenic Area Development</td>
<td>Region</td>
<td>Facility improvement, accommodation facilities, modern entertaining facilities</td>
<td>2006—20 10</td>
<td>2797</td>
<td>2797</td>
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<td>143</td>
<td>Sunan Mati Temple Scenic Area Folk Customs Park</td>
<td>Region</td>
<td>Infrastructure and facility improvement, scenic area development, scenic spot construction, facility improvement, infrastructure, modern entertainment facilities</td>
<td>2006—20 10</td>
<td>996</td>
<td>996</td>
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<td>Jiuguan</td>
<td>144</td>
<td>West Han Dynasty Relics in Jiuguan</td>
<td>Region</td>
<td>Scenic area cultural program, relics protection, infrastructure construction</td>
<td>2006—20 10</td>
<td>2780</td>
<td>2780</td>
<td>Loan, attracting external investments</td>
<td></td>
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<tr>
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<td>145</td>
<td>Lovebird Mother-and-Son Lake, Yushu</td>
<td>Region</td>
<td>Supporting entertaining facilities, scenic area greening and road construction</td>
<td>2006—20 10</td>
<td>8017</td>
<td>8017</td>
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<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
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<td>146</td>
<td>Temple Tourism Development Area</td>
<td></td>
<td>Five-star construction combining dinning, accommodation, entertaining facilities</td>
<td>2006—2010</td>
<td>4000</td>
<td>4000</td>
<td></td>
<td></td>
<td>investments, self-financing</td>
<td></td>
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<tr>
<td>147</td>
<td>Dunhuang Yardan Geomorphologic Village</td>
<td></td>
<td>Ecological leisure valley, wild animal zoo, water amusement park</td>
<td>2006—2010</td>
<td>5090</td>
<td>5090</td>
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<tr>
<td>148</td>
<td>Subei “Three Parks and One Valley” Construction</td>
<td></td>
<td>Ecological protection, purchase of entertainment facilities and service facilities</td>
<td>2006—2010</td>
<td>1330</td>
<td>1330</td>
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<tr>
<td>149</td>
<td>Akesai Folk Custom Park</td>
<td></td>
<td>Construction of a military museum, simulating rocket launchers, greening and supporting facilities</td>
<td>2006—2010</td>
<td>3000</td>
<td>3000</td>
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<tr>
<td>150</td>
<td>Aeronautics Expo Museum</td>
<td></td>
<td>Sand boarding and other entertaining facilities</td>
<td>2006—2010</td>
<td>4712</td>
<td>4712</td>
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<tr>
<td>151</td>
<td>Chinese Sand boarding Base in Mingsha Mountain</td>
<td></td>
<td>Build a museum of Kumaraively</td>
<td>2006—2010</td>
<td>4000</td>
<td>4000</td>
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<tr>
<td>152</td>
<td>West River Beach</td>
<td></td>
<td>Open-air restoration display based on the comprehensive protection of the</td>
<td>2006—2010</td>
<td>2000</td>
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<th>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</th>
<th>Source of Funds</th>
<th>Preliminary Work</th>
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<tr>
<td>146</td>
<td>Temple Tourism Development Area</td>
<td></td>
<td>Five-star construction combining dinning, accommodation, entertaining facilities</td>
<td>2006—2010</td>
<td>4000</td>
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<td>147</td>
<td>Dunhuang Yardan Geomorphologic Village</td>
<td></td>
<td>Ecological leisure valley, wild animal zoo, water amusement park</td>
<td>2006—2010</td>
<td>5090</td>
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<td>148</td>
<td>Subei “Three Parks and One Valley” Construction</td>
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<td>Ecological protection, purchase of entertainment facilities and service facilities</td>
<td>2006—2010</td>
<td>1330</td>
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<td>149</td>
<td>Akesai Folk Custom Park</td>
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<td>Construction of a military museum, simulating rocket launchers, greening and supporting facilities</td>
<td>2006—2010</td>
<td>3000</td>
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<td>150</td>
<td>Aeronautics Expo Museum</td>
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<td>Sand boarding and other entertaining facilities</td>
<td>2006—2010</td>
<td>4712</td>
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<td>151</td>
<td>Chinese Sand boarding Base in Mingsha Mountain</td>
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<td>Build a museum of Kumaraively</td>
<td>2006—2010</td>
<td>4000</td>
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<td>Wuaisi Tomb Scenic Area</td>
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<td>154</td>
<td>Beida River Scenic Area</td>
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<td>Expand and build religious worship venues and display places</td>
<td>2006—2010</td>
<td>4500</td>
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<td>156</td>
<td>Suzhou District Folk Customs Museum</td>
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<td>Build a large luminescent cup factory integrating manufacturing, sales and product demonstration</td>
<td>2006—2010</td>
<td>996</td>
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<td>Shazaoyuan Yardan Ecological Tourist Area</td>
<td>Jiuquan the Region</td>
<td>Scenic area development, infrastructure and service facilities</td>
<td>2006—2010</td>
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<td>Shihai Natural Scenic Area Infrastructure Construction</td>
<td>Jiuquan the Region</td>
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<td>2006—2010</td>
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<td>160</td>
<td>Oasis-Circulation Desert Scenic Area</td>
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<td>161</td>
<td>Subei Shibaocheng Fortress Ancient Battlefield Relics Tourism Development</td>
<td>Subei County</td>
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<td>2006—2010</td>
<td>3967</td>
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<td>Subei Wild Horse Peak Heaven Pool (Delenuoer) Tourism Development</td>
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<td>2006—2010</td>
<td>4283</td>
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<td>Harteng International Hunting Ground</td>
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<td>2905</td>
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<td>Dunde Glacier</td>
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<td>2006—20 10</td>
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<td>Changma Cave</td>
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<td>2006—20 10</td>
<td>7055</td>
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<td>1411</td>
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<td></td>
<td>Yumeng Petro Industrial Base</td>
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<td>169</td>
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<td>Construction of Duhuang “Five Dynasties’ Culture Village”</td>
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<td>Infrastructure, service facilities and ecological protection</td>
<td>2006—20 15</td>
<td>25124</td>
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<td>170</td>
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<td>Subei Transparent Dream Glacier</td>
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<td>Construction of roads, hotels, horse racing ground and other infrastructure</td>
<td>2006—20 15</td>
<td>14122</td>
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<td></td>
<td>Yitang Lake Tourism Development Area</td>
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<td>Construction of roads and hospitality facilities</td>
<td>2006—20 15</td>
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<tr>
<td>172</td>
<td>Improve the Guancheng cultural Region</td>
<td>the Region</td>
<td>Explore the Great Wall culture, restore Ancient Caravansarys, tea houses,</td>
<td>2006—20 10</td>
<td>1200</td>
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<td>restaurants and inner city buildings</td>
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<td>173</td>
<td>Wei and Jin Dynasties Folk Culture Tourist Area</td>
<td>Jiayu Pass Region</td>
<td>Folk Culture Village, simulate sceneries in the Wei and Jin dynasties, build sight-seeing agricultural area and hunting area, build sight-seeing vineyard and winery based on Jiugang 100,000 mu (6,666.7 hectares) vineyard, renovate the road between the downtown of Jiayu Pass City to Wei and Jin tombs.</td>
<td>2006—2010</td>
<td>2700</td>
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<td>174</td>
<td>Xuanbi Great Wall --- Shiguan Valley Relics Area and First Tower of the Great Wall</td>
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<td>Entrance and the start point of the section of the great wall; comprehensive service area; Xuanbi Great Wall ancient defense system area; Black Mountain rock painting, climbing and adventure area; Huanggaoying Oasis Leisure and sightseeing area; Running across the Battlefield military sport field; Huguo (Country-blessing) Temple worship area</td>
<td>2006—2010</td>
<td>750</td>
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<td>175</td>
<td>Qi Glacier Environment Protection, Adventure, Climbing Exploration Tourist Area</td>
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<td>silk road culture corridor etc; construction of dam, projects of sightseeing, adventure, drifting etc.</td>
<td>2006—2010</td>
<td>3000</td>
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<td>Gliding Sport Tourist Area</td>
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<td>Build glacier cable-car, road from the glacier to Qinghai Tuole pasture</td>
<td>2006—2010</td>
<td>2237</td>
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<td>Silk Road Culture Tourist Area</td>
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<td>Construction of the gliding sport tourist area infrastructure, gliders and aircraft models exhibition hall</td>
<td>2006—2010</td>
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<td>Xincheng Grass Lake Wetland Ecological Tourist Area</td>
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<td>Surrounding environment building, water amusement project, build supporting facilities</td>
<td>2006—2010</td>
<td>5000</td>
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<td>179</td>
<td>Jiugang Forest Park</td>
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<td>Build forest park with scenery similar to that of southern China</td>
<td>2006—2010</td>
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<td>Kongtong Mountain Scenic Area Infrastructure Construction</td>
<td>the Region</td>
<td>Road construction, scenic area water supply and drainage system, electricity supply project, ecological environment treatment project, cultural relics resource protection project</td>
<td>2005—2010</td>
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<td>181</td>
<td>Tiatong Forest Park Ecological Tourism</td>
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<td>It is planned to build the main functional areas including the entertainment and leisure area, sightseeing and tourist area, forest area, build Taigong Village, Mongolia Yurt, wooden houses and other scenic spot facilities; The artificial lake, great wall on the ridge, look-out tower, youth amusement ground cable-car and other scenic spot facilities will be set up.</td>
<td>2005—2010</td>
<td>3589</td>
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<td>Pingliang</td>
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<td>Longying Temple Scenic Area Development and Construction</td>
<td>the Region</td>
<td>It is planned to build 7 functional areas, including the hill and water area for amusement and leisure, old temple area, arts and entertainment, forest scenic spot, sight-seeing area, water and sunshine beach area, administrative area and dining service area.</td>
<td>2006—2010</td>
<td>9020</td>
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<td>183</td>
<td>North Mountain Forest Park infrastructure and Willow Lake Park Renovation and Expansion</td>
<td>the Region</td>
<td>Mongolia Yurt, wooden houses, fishing center, look-out tower, Youth Amusement Ground, cable-car, Horse Racing Ground and other scenic spots facilities; park roads hardening, electricity supply facility, water supply facility, three functional areas: sports and fitness area, central tourist area, swimming and leisure area, South Mountain scenic spot and roads building</td>
<td>2006—2010</td>
<td>3637</td>
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<td>184</td>
<td>Water Amusement Park Construction</td>
<td>the Region</td>
<td>Water Amusement Park, Water Fun Park, Botanical Garden, Children’s Park, Time Square, Photo Studio, KTV with dining facility</td>
<td>2005—2010</td>
<td>1574</td>
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<td>Yaochi Scenic Area Development</td>
<td>Build 7 scenic spots including the entrance square, meeting and performance square, Yaochi Park, Seven Immortal Park, Peach Park, Guoshui Palace and water supply, electricity supply, roads and other supporting facilities and infrastructure.</td>
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<td>186</td>
<td>Hot Spring Resort</td>
<td>Focus on scenic area development, expand tourist reception capacity of the scenic area, improve service functions, build a multi-functional resort combining shopping, entertainment, spa, vacation, leisure.</td>
<td>2005—2010</td>
<td>8323</td>
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<td>187</td>
<td>Tianjia Valley Ecological Scenic Area Development</td>
<td>Focus on scenic spots construction and scenic area development, build an ecological tourist resort with accommodation, entertainment and leisure facilities.</td>
<td>2005—2010</td>
<td>1230</td>
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<td>188</td>
<td>Wanyan Folk Customs Village Scenic Area</td>
<td>Build a resort with the Folk Customs Village Museum, Wanyan Wuzhu Horse Ground and supporting facilities</td>
<td>2006—2010</td>
<td>2082</td>
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<tr>
<td>Pingliang</td>
<td>189</td>
<td>Dragon Spring Temple --- Five Dragon Scenic Area Comprehensive Development</td>
<td>the Region</td>
<td>Within the Dragon Spring Temple build a four-storied simulating ancient style reception center with a construction area of 2800 square meters, a park covering an area of 220 mu (14.7 hectares), a Dragon Tablet Park with the Chinese character “dragon” written by famous calligraphers, Dragon Spring Resort combining leisure, entertainment and dinning; build 11 km road in Five Dragon Mountain and electricity supply and water supply systems, build 16 scenic spots like the Needing-grinding Cave, Bell Tower, Folk Customs Museum.</td>
<td>2005—2010</td>
<td>2435</td>
<td>2435</td>
<td>Loan, attracting external investments, self-financing</td>
<td></td>
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<tr>
<td></td>
<td>190</td>
<td>Cloud Cliff Temple Tourist Development Area Infrastructure Construction</td>
<td></td>
<td>Build temple gate, parking lot, road and restore grottos, artificial scenic spots, totaling 5 projects</td>
<td>2006—2010</td>
<td>3960</td>
<td>3960</td>
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<td>Item</td>
<td>Project Name</td>
<td>Administered by</td>
<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
<td>Note</td>
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<tr>
<td>191</td>
<td>Huangpushi Tourist Resource Exploration</td>
<td></td>
<td>Focus on scenic spots construction and scenic area development, work on “one house, two parks” as main projects with supporting scenic spots like Huangpushi tomb.</td>
<td>2005—20 10</td>
<td>3164</td>
<td>3164</td>
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<tr>
<td>192</td>
<td>Shang and Zhou Dynasties Cultural Famous City Development and Construction</td>
<td></td>
<td>Focus on scenic spots construction and scenic area development, work on “one city, four tour routes and eight scenic areas” to build a tourist city combining entertainment, leisure and service</td>
<td>2005—20 10</td>
<td>1208</td>
<td>1208</td>
<td></td>
<td></td>
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<tr>
<td>193</td>
<td>Lotus Terrace Scenic Area Development and Construction</td>
<td></td>
<td>Focus on providing water, electricity, road access and a leveled site, restore and improve natural and human scenic spots, improve hospitality facilities to establish a resort combining tourism, sightseeing and vacation.</td>
<td>2006—20 10</td>
<td>5740</td>
<td>5740</td>
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<td></td>
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<tr>
<td>194</td>
<td>Kongdong Water Amusement Park Construction</td>
<td></td>
<td>Service facilities and scenic spot construction</td>
<td>2006—20 10</td>
<td>1594</td>
<td>1594</td>
<td></td>
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<td>Subtotal (15)</td>
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<td>65581</td>
<td>58770</td>
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<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
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<tr>
<td>Qingyang City</td>
<td>195</td>
<td>Relics and Natural Scenic Area Belt in Xifeng District</td>
<td>the Region</td>
<td>Develop a tourist zone with Northern Grottoes Temple, Southern Xiaoheguo, Bajiazui Water Reservoir, Xinxing Park, Valley Park, with supporting infrastructure and resource exploration</td>
<td>2006—2010</td>
<td>8800</td>
<td>8800</td>
<td></td>
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<tr>
<td>Qingyang City</td>
<td>196</td>
<td>Qingyang City Farming Folk Culture Scenic Area</td>
<td>the Region</td>
<td>Build 5 functional areas (tourist, administrative and service area, leisure and vacation area, farming plant park area, entertainment area), 8 scenic areas (ancient farming area, Wuliang Terrace area, Phoenix Terrace, Small Eastlake, Small Westlake, East Gansu Folk Cave Residence, natural and ecological amusement), and 50 scenic spots</td>
<td>2006—2010</td>
<td>8000</td>
<td>8000</td>
<td>Loan, attracting external investments, self-financing</td>
<td></td>
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<tr>
<td>Qingyang City</td>
<td>197</td>
<td>China’s First Temple of Gongliu in China Scenic Area in Xifeng District</td>
<td></td>
<td>surrounding image-building area, Farming Development Exhibition Park, China’s First Temple of Gongliu, Loess Plateau Happy Valley</td>
<td>2006—2010</td>
<td>6000</td>
<td>6000</td>
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<td>City/Prefecture</td>
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<td>Duration</td>
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<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
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<td>198</td>
<td>Qingcheng County projects</td>
<td></td>
<td>Water Amusement Park construction, site-change and expansion of a museum, Qingliang Mountain scenic area development, Goose Pool Cave restoration,</td>
<td>2006—2010</td>
<td>6308</td>
<td>6308</td>
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<tr>
<td></td>
<td>199</td>
<td>Qingcheng County ancient city gate restoration</td>
<td></td>
<td>Restore and protect 5 ancient city gates and protect part of existing city wall with a construction area of 100,000 square meters</td>
<td>2006—2010</td>
<td>5000</td>
<td>5000</td>
<td></td>
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<tr>
<td></td>
<td>201</td>
<td>Ning County Jiulongchuan Forest Park construction</td>
<td></td>
<td>Forest view construction, develop a forest of 20,000 hectares, farming view creation, build 185 km roads, 15 km long bridges, human culture scenic spots construction, restore 38 scenic spots within the scenic area</td>
<td>2006—2010</td>
<td>3700</td>
<td>3700</td>
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<td>City/Prefecture</td>
<td>Item</td>
<td>Project Name</td>
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<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
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<td>Ning County</td>
<td>202</td>
<td>Pinggu Culture Tourist Village</td>
<td></td>
<td>Build Folk Customs Museum with a construction area of 800 square meters, restore Ningshou Temple and other temples, cut part of the hill and build a 400 mu (26.7 hectares) lake and water entertainment, build responding 2 scenic spots, supporting service facilities covering an area of 2000 square meters</td>
<td>2006—2010</td>
<td>3000</td>
<td>3000</td>
<td></td>
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<tr>
<td>Qingyang</td>
<td>203</td>
<td>Xiajia Valley Forest Park Hulu River Scenic Area</td>
<td>the Region</td>
<td>Restore 12 grottoes and 8 Buddhist temple with a construction area of 16,000 square meters, 15 km Class 4 road, 18 km electricity transmission facilities</td>
<td>2006—2010</td>
<td>3600</td>
<td>3600</td>
<td>Loan, attracting external investments</td>
<td></td>
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<tr>
<td></td>
<td>204</td>
<td>Pingdingchuan Forest Park</td>
<td></td>
<td>Restore 7 grottoes of Baoquan Temple, Lotus Temple, Anding Temple, 50 km Class 4 roads, 60 km electricity transmission facilities</td>
<td>2006—2010</td>
<td>3400</td>
<td>3400</td>
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<td>City/ Prefecture</td>
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<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
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<td></td>
<td>205</td>
<td>Construction of Xiajia Valley Forest Park and human settlement relics in Heshui County</td>
<td></td>
<td>Xiajia Valley Forest Park, Qingzhidao Qing Smoke and Flame Tower restoration, Qingzhidao Village Fishing Center, Folk Residence Exhibition Village, Qingzhidao Village Hunting Ground, Shaozhuang Caravansary, Song Dynasty Tower Park, Tang Dynasty Tomb Relics, Baojiazaizi Meeting Site restoration, Shenggong Spring School, Dashanmeng Deer Farm, Yellow River Elephant Unearthed Site, Qingzhidao Village Plant and Flowers Park, Cuifeng Temple on Cuifeng Mountain, New Moon Lake</td>
<td>2006—2010</td>
<td>10170</td>
<td>10170</td>
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<td></td>
<td>206</td>
<td>Silang River Tourist Area Development in Zhennign County</td>
<td></td>
<td>Complete restoration and protection of 17 scenic areas, build 50 km road from Anli Water Reservoir to Gongjiachuan and service facilities in the scenic area</td>
<td>2006—2010</td>
<td>3500</td>
<td>3500</td>
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<td>City/Prefecture</td>
<td>Item</td>
<td>Project Name</td>
<td>Administered by</td>
<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
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<td>207</td>
<td>Forest Park construction in Zhenning County</td>
<td></td>
<td>Expansion of Tiaoling Pass forest park, Ziwu Ridge natural forest scenic area development, Gucheng Ruochuan scenic area comprehensive development, human culture museum construction</td>
<td>2006—2010</td>
<td>7665</td>
<td>7665</td>
<td></td>
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<tr>
<td></td>
<td>208</td>
<td>Huachi Country Scenic Area Infrastructure</td>
<td></td>
<td>Build parking lot, greening, harden the roads, water supply and drainage system project, flood prevention project, power supply project</td>
<td>2006—2010</td>
<td>830</td>
<td>830</td>
<td></td>
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<td></td>
<td>209</td>
<td>Song Tower Park</td>
<td></td>
<td>Repair the Song Tower and the ancient great wall and smoke/flame signal tower on the top of the hills nearby, buy 100 mu (6.7 hectares) land to build the workshop of leather-silhouette show and embroidery, the show room and the leisure and entertaining service center, cave hotel, villas.</td>
<td>2006—2010</td>
<td>1150</td>
<td>1150</td>
<td></td>
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<tr>
<td>Qingyang</td>
<td>210</td>
<td>Xinglong Mountain Forest Parke in Huan County</td>
<td>the Region</td>
<td>Create 4.79 km evergreen forest, build 20 km roads in forest and 3 km sidewalk steps, fortify hills, repair 20 old temples, build 6 pavilions and a market.</td>
<td>2006—2010</td>
<td>1062</td>
<td>1062</td>
<td>Loan, attracting externa</td>
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<td>City/Prefecture</td>
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<td></td>
<td>211</td>
<td>Ziwu Ridge Reserve Xiajia Valley Forest Park Construction</td>
<td></td>
<td>Infrastructure, scenic area development</td>
<td>2006—2010</td>
<td>1668</td>
<td>1668</td>
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<td></td>
<td>212</td>
<td>Ning County Guihuayuan Forest Park and other construction</td>
<td></td>
<td>Guihuayuan Forest Park construction, Jiulongchuan Peach Flower Scenic Area, Xiangle Tourist Area Comprehensive Construction, Panke Ecological Resort, South Mountain Park, Liangping Fu Family Worship Hall, Changqing Yewang Resort, Dynasties Culture Museum (Place) Health Entertainment Center, Shuimeng Valley Resort, Zaosheng Yuhuang Valley Resort, Changqing Bridge Henyuan Resort, sports venue, Xinning Fusu Mausoleum, Zaosheng Yuhuanggou, Miaoziuping Villagers New Park, Miaoziuping Business and Service Street, Plant and Flower Park, Children’s Amusement Park, Ecological</td>
<td>2006—2015</td>
<td>23800</td>
<td>15600</td>
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<td>Item</td>
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<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
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<td>Tourism Comprehensive Development project covering 1000 mu (66.7 hectares) along the Chunrong Lake, folk culture tourism center, expansion project of Zaosheng Hu Family Temple and reception service facilities, restore Jutao Culture Temple in Jiao Village</td>
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<td>Subtotal (18)</td>
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<td>103236</td>
<td>95036</td>
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<td>213</td>
<td>Chinese Ancestral Culture Thematic Park Construction</td>
<td></td>
<td>Build the base for Chinese nation root-seeking and worship, national Yi culture Tourist Area, create mysterious atmosphere</td>
<td>2006—20 10</td>
<td>20000</td>
<td>20000</td>
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<tr>
<td>214</td>
<td>Maiji One Hundred Li (50 km) Ecological Tour Route</td>
<td></td>
<td>Build Maiji Amusement Park, Shimeng Ecological Folk Custom Park and Peach Flower Valley Forest Resort along the Tainbao highway.</td>
<td>2006—20 10</td>
<td>12000</td>
<td>12000</td>
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<td>215</td>
<td>Maiji Mountain Scenic Area Development</td>
<td></td>
<td>Develop and build Shimeng scenic area, Quxi scenic area, renovate Jieting scenic area, mainly focusing on building and improving road infrastructure, service facilities.</td>
<td>2006—20 10</td>
<td>5000</td>
<td>5000</td>
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<td>City/Prefecture</td>
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<td>Tianshui</td>
<td>216</td>
<td>Dadiwan Tourism Construction</td>
<td>the Region</td>
<td>Build museum, Folk Culture Village, restore ancient village, build Prehistory</td>
<td>2006—2010</td>
<td>6000</td>
<td>6000</td>
<td>Loan, attracting external investments, self-financing</td>
<td></td>
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<tr>
<td></td>
<td>217</td>
<td>Water Curtain Cave Scenic Area Infrastructure</td>
<td></td>
<td>Improve roads, build service facilities, create rock climbing and other tourist</td>
<td>2006—2010</td>
<td>3000</td>
<td>3000</td>
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<td></td>
<td></td>
<td>Construction</td>
<td></td>
<td>entertainment program</td>
<td></td>
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<td></td>
<td>218</td>
<td>Yunfeng Mountain Scenic Development and</td>
<td></td>
<td>Develop scenic spots such as Small Maiji Mountain, Five Finger Mountain, Taiji</td>
<td>2006—2010</td>
<td>3000</td>
<td>3000</td>
<td></td>
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<td></td>
<td></td>
<td>Construction</td>
<td></td>
<td>Bagua on Buddha Cliff, Magic Turtle Creak, build Xijian Village, camping field</td>
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<td>along the bank; develop grassland view appreciation and leisure tourist area.</td>
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<td></td>
<td>219</td>
<td>Wu Mountain Hot Spring Tourist Area Construction</td>
<td></td>
<td>Renovate and expand the swimming pool, spa facilities, renovate Pan’an-Wenquan</td>
<td>2006—2010</td>
<td>6000</td>
<td>6000</td>
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<td>expressway.</td>
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<td>220</td>
<td>Qingshui Hot Spring Tourist Area Construction</td>
<td></td>
<td>Renovate and expand the swimming pool, spa facilities, make use of the surround</td>
<td>2006—2010</td>
<td>5000</td>
<td>5000</td>
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<td>forest resource to develop the</td>
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<td>Administered by</td>
<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
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<td></td>
<td>221</td>
<td>Jihe River Tour Route</td>
<td></td>
<td>hot spring resort</td>
<td></td>
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<td></td>
<td>Build layered lake view, belt-shaped parks along the River, entertainment and leisure facilities</td>
<td>2006—2010</td>
<td>8000</td>
<td>8000</td>
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<tr>
<td></td>
<td>222</td>
<td>Other scenic spots construction</td>
<td></td>
<td>Improve the construction of Fuxi City, Liguang Tomb Park, Zhuge’s Force Terrace, restore the Nanguo Temple Sui Tower and the exploration of the tower’s basement, Zhao Chongguo Mausoleum, Yuquang Taoist Temple</td>
<td>2006—2010</td>
<td>5000</td>
<td>5000</td>
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<tr>
<td></td>
<td>223</td>
<td>Tianshui Gansu Daxiang Mountain infrastructure construction</td>
<td></td>
<td>infrastructure, scenic spot construction</td>
<td>2006—2010</td>
<td>2407</td>
<td>2407</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>224</td>
<td>Qingshui Huashiya scenic area comprehensive development</td>
<td></td>
<td>Infrastructure, scenic spot construction</td>
<td>2006—2010</td>
<td>614</td>
<td>614</td>
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<tr>
<td></td>
<td>225</td>
<td>Qingshui Hot Spring Village</td>
<td></td>
<td>Infrastructure</td>
<td>2006—2010</td>
<td>988</td>
<td>988</td>
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<tr>
<td>Item</td>
<td>Project Name</td>
<td>Administered by</td>
<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
<td>Note</td>
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<tr>
<td>226</td>
<td>Phoenix Mountain Scenic Area in Qing’an County</td>
<td></td>
<td>Scenic spot construction, infrastructure</td>
<td>2006—20 10</td>
<td>1884</td>
<td>1884</td>
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<tr>
<td>227</td>
<td>Xingdong Temple Scenic Area Development and Construction</td>
<td></td>
<td>Infrastructure, scenic spot construction, accommodation facilities</td>
<td>2006—20 10</td>
<td>2681</td>
<td>2681</td>
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<tr>
<td>228</td>
<td>Tianshui City Peach Flower Valley Ecological Tourist Area Construction</td>
<td></td>
<td>Facility improvement, accommodation facilities, scenic spot construction, infrastructure</td>
<td>2006—20 15</td>
<td>24219</td>
<td>12000</td>
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<td><strong>Subtotal (16)</strong></td>
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<td><strong>93574</strong></td>
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<tr>
<td>229</td>
<td>Heaven Pool Forest Park in Wen County</td>
<td>Longnan</td>
<td>22 km road within the scenic area, 20 km walking trail, 6 environment-friendly toilets, water supply and drainage system, visitor center with a floor area of 500 square meters</td>
<td>2006—20 10</td>
<td>1490</td>
<td>1490</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>230</td>
<td>Jifeng Mountain National Forest</td>
<td>Longnan</td>
<td>10 km road within the scenic area, 10 km walking trail</td>
<td>2006—20 10</td>
<td>710</td>
<td>710</td>
<td>Loan, attracti</td>
<td></td>
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<tr>
<td>City/Prefecture</td>
<td>Item</td>
<td>Project Name</td>
<td>Administered by</td>
<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
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<tr>
<td></td>
<td>231</td>
<td>Park in Cheng County</td>
<td></td>
<td>environment-friendly toilets, water supply and drainage system, visitor center with a floor area of 300 square meters</td>
<td>2006—2010</td>
<td>725</td>
<td>725</td>
<td>self-financing</td>
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<tr>
<td></td>
<td></td>
<td>Wanxiang Cave AA Class Scenic Area in Wudu District</td>
<td></td>
<td>5 km road within the Cave, lights in the 2nd and 3rd scenic area, 2 toilets in the Cave, water supply and drainage system, visitor center with a floor area of 300 square meters, the development of the 4th scenic area</td>
<td>2006—2010</td>
<td>1360</td>
<td>1360</td>
<td>external</td>
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<tr>
<td></td>
<td>232</td>
<td>Santan Provincial Scenic Area in Hui County</td>
<td></td>
<td>23 km road within the scenic area, 5 km walking trail, 5 environment-friendly toilets, water supply and drainage system, visitor center with a floor area of 300 square meters</td>
<td>2006—2010</td>
<td>1460</td>
<td>1460</td>
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<tr>
<td></td>
<td>233</td>
<td>Xixiasong Scenic Area in Cheng County</td>
<td></td>
<td>10 km walking trail within the scenic area, 3 environment-friendly toilets, visitor center with a floor area of 300 square meters 13 km electricity transmission wire and facilities</td>
<td>2006—2010</td>
<td>1460</td>
<td>1460</td>
<td></td>
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<tr>
<td>City/Prefecture</td>
<td>Item</td>
<td>Project Name</td>
<td>Administered by</td>
<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
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<tr>
<td></td>
<td>234</td>
<td>Daheba National Forest Park in Tangchang County</td>
<td></td>
<td>40 km road within the scenic area, 10 km walking trail, 10 environment-friendly toilets, visitor center with a floor area of 300 square meters</td>
<td>2006—2010</td>
<td>2260</td>
<td>2260</td>
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<tr>
<td></td>
<td>235</td>
<td>Kang County Provincial Scenic Area</td>
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<td>20 km road within the scenic area, 15 km walking trail, 4 environment-friendly toilets, visitor center with a floor area of 500 square meters</td>
<td>2006—2010</td>
<td>1240</td>
<td>1240</td>
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<tr>
<td></td>
<td>236</td>
<td>Qi Mountain Duke Wu Temple Scenic Area</td>
<td></td>
<td>Infrastructure, service facilities and scenic area development</td>
<td>2006—2010</td>
<td>257</td>
<td>257</td>
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<tr>
<td></td>
<td>237</td>
<td>Baima Tibetan Folk Custom Village in Wen County</td>
<td></td>
<td>Infrastructure, service facilities, scenic area construction and development</td>
<td>2006—2010</td>
<td>6789</td>
<td>6789</td>
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<tr>
<td></td>
<td>238</td>
<td>Zhangguolao Dengzhen Cave in Liangdang County and Yunping Natural Scenic</td>
<td></td>
<td>Infrastructure, scenic area construction and development</td>
<td>2006—2010</td>
<td>5362</td>
<td>5362</td>
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<tr>
<td>City/ Prefecture</td>
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<td>Size and Content</td>
<td>Duration</td>
<td>Estimated Total Investment (RMB 10,000 Yuan)</td>
<td>Funds Needed during the 11th Five Years (RMB 10,000 Yuan)</td>
<td>Source of Funds</td>
<td>Preliminary Work</td>
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<tr>
<td>Area</td>
<td>239</td>
<td>Duke Qing Mausoleum of Dabaozi Mountain in Li County</td>
<td></td>
<td>Infrastructure, service facilities, scenic area construction and development</td>
<td>2006—2010</td>
<td>4150</td>
<td>4150</td>
<td></td>
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<td></td>
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<td>1315341</td>
<td>1073392</td>
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Sub-report 5

Development Strategy of Non-public Economy in Gansu

AN Jianglin
Abstract

With its rapid growth since the 10th Five-year Plan (FYP), non-public economy in Gansu has become an important component of the overall regional economy. Despite that, it has still a significant gap to bridge compared with national average level in terms of overall scale, growth speed, quality of enterprises and the environment for development. The major barrier for the growth of non-public economy in Gansu is the overall poor quality of environment for growth in the region. The fundamental strategic guidelines and major measures for the development of non-public economy in Gansu are as follows: developing non-public economy growth in an upgraded overall environment; improving the policy system in the region for a more efficient local government; conducting mechanism and system reforms in the aspects of government, state-owned enterprises, as well as finance, technology and education related areas; strengthening local science & technology and educational capacity to build a region-wide & society-wide advanced culture that promotes innovation and entrepreneurship; strengthening infrastructure building and the movement towards a higher level of urbanization as well as adjusting and optimizing industrial structure, curbing pollutions and protecting biological environment; facilitating the improvement of operational systems in non-public organizations, and their capability of capital formation and accumulation; expanding the source of income for non-public economy, so as to gradually form a virtuous cycle: non-public economy’s growth contributes to the increase of government fiscal revenue, which in return enables a more rapid growth in non-public economy with higher quality; targeting to position non-public economy as the leading growth sector of regional economy in Gansu upon 10-15 years’ efforts to significantly enhance the overall quality of non-public economy and upgrade its industrial structure.
In the course of economic and social development in Gansu, it is of great importance to define the strategic role of non-public economy in future development and then to bring it into play in striving for a prosperous and comfortable life for the local people. Given that slow development and far lower-than-enough proportion of non-public economy in the aggregate economic volume explain the main reasons for the long-term backwardness of regional economy in Gansu, developing non-public economy should be the top strategic priority to ensure a rapid, sustainable and balanced economic development for a relatively long time to come, and more than a decade’s efforts are required to position non-public economy as the leading growth sector in overall provincial economy.

During a long-time development, a quite solid foundation has been maintained for non-public economy to move ahead rapidly in the future. Thanks to a series of important measures adopted since the 10th Five-year Plan (10th FYP), non-public economy has enjoyed rapid growth, which makes it a vital component of the overall regional economy, major channel for local employment, key source of fiscal revenue and new growth point in external trade. It has preliminarily shown its vitality with a wide prospect. However, it still has a wide gap to bridge compared with national average level in terms of overall scale, growth speed, quality of enterprises and the environment for development, with its key economic and technical indices being the lowest in China (among autonomous regions, municipalities and provinces). The main reasons lie in, except for weak regional economy, system and policy drawbacks which constrain the growth of non-public economy, and irrational industrial structure and insufficient major infrastructure. Considering all those facts, the sustainable and rapid development of non-public economy will be the challenging strategic task to accomplish for the years to come.

The major barrier for the growth of non-public economy in Gansu is the overall poor environment in the region. Constant efforts should be taken to improve the provincial infrastructure and soft environment so as to achieve the sustainable and rapid non-economy development. Therefore, the basic strategic guidelines are as follows: continuing to improve the overall development environment for the non-public sector; facilitating the improvement of its operational system and overall quality by giving priority to the development of advantageous industries, so as to keep the regional industrial structure in line with the trend of future market demands; giving more scope to the important role of non-public sector in driving regional aggregate economic growth, technology innovation, domestic and international trade and increase of civil and fiscal income as well as employment. All those strategic targets are one of the important parts of the efforts in economic restructuring and development shifting in Gansu.

Section 1 Status quo of Non-Public Economy in Gansu and Its Development Environment
1.1. Status quo of non-public economy in Gansu

Non-public economy generally represents sectors of economy other than state or collective economy. It includes self-employed, private, foreign and Hong Kong, Macau & Taiwan ownership, as well as non-state and non-collective sectors in the mixed ownership economy.

With considerable progress made during 10th FYP and its role in society strengthened, Gansu’s non-public sector has become an important component of the regional economy. In 2005, the non-public sector contributed RMB 69.8 billion of value added, accounting for 36.1% of GDP, and enjoyed an increase of 190% compared with 2000. The average annual growth rate during 10th FYP was 25.54% and the absolute GDP increased by 42.906 billion or 1.6 times higher than that of 2001.

By the end of 10th FYP, 98% of township enterprises and most small and medium sized state owned enterprises (SOEs) have been transformed to non-public enterprises (NPEs) through standard reform and restructuring. Medium and large SOEs have executed separation of the major and supporting business, with some of the supporting agencies transformed to NPEs. A large number of NPEs have assumed an important role in providing social services as having established non-governmental schools, kindergartens and hospitals. The number and total capital of individually-owned businesses and private companies significantly increased with substantial growth of employees in these sectors. By 2005, the total number of private enterprises has reached 38,100, 1.9 times of that in 2001; the registered capital was RMB 47,813 billion, 3 times of that in 2001; the average registered capital for each enterprise rose from RMB 807,000 in 2001 to RMB 1.255 million. Details for the development of individually-owned businesses and private companies during the 10th FYP are described in the following table.
Table 5-1  2001～2005 Development of individually-owned businesses and private companies

<table>
<thead>
<tr>
<th>Items</th>
<th>Unit</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Number</td>
<td>Annual Growth (%)</td>
<td>Number</td>
<td>Annual Growth (%)</td>
<td>Number</td>
</tr>
<tr>
<td>Individually-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>owned businesses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Number</td>
<td>10,000</td>
<td>298.3</td>
<td>9.36</td>
<td>30.8</td>
<td>3.2</td>
<td>33.2</td>
</tr>
<tr>
<td>Employees</td>
<td>10,000</td>
<td>54.74</td>
<td>9</td>
<td>56.2</td>
<td>2.7</td>
<td>61.7</td>
</tr>
<tr>
<td>Registered Capital</td>
<td>RMB 100 Million</td>
<td>33.32</td>
<td>22.84</td>
<td>39.4</td>
<td>21.9</td>
<td>45.50</td>
</tr>
<tr>
<td>Private Companies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Number</td>
<td>10,000</td>
<td>1.97</td>
<td>15.21</td>
<td>2.19</td>
<td>11.2</td>
<td>2.65</td>
</tr>
<tr>
<td>Employees</td>
<td>10,000</td>
<td>26.69</td>
<td>19.69</td>
<td>30.81</td>
<td>15.4</td>
<td>36.3</td>
</tr>
<tr>
<td>Registered Capital</td>
<td>RMB 100 Million</td>
<td>158.93</td>
<td>36.5</td>
<td>200.43</td>
<td>26.1</td>
<td>271.8</td>
</tr>
</tbody>
</table>

Source: statistics from Gansu Administration of Industry and Commerce.
Non-public economy has become the major employment channel for Gansu. During the 10th FYP, the number of employees in non-public economy reached 1.6981 million, 45.3% of the total employees in the urban area, with an increase of 241,800 or 16.6% than 2004. Within the total increased urban employees, 97.5% worked in the non-public sector.

Non-public economy has been a key source of fiscal income for the local government. In 2005, tax income from individual owned enterprises reached RMB1.92 billion, accounting for 20.8% of total tax income in the province, 18.6% higher than 2004 and 67% higher than 2001. In many municipalities (prefectures) and counties (cities, districts), the tax income from the non-public sector has become the major source for local fiscal income.

Non-public economy has also become the new growth point of foreign trade. With the growth of a number of private enterprises specialized in foreign trade, many of them have obtained the right of independent operation of import and export, which lead to rapid growth of foreign trade in the non-public sector. The volume of foreign trade in the non-public sector reached USD262.15 million in 2005, 535 times as that of 2001, among which USD218.01 million came from import and USD44.14 million from export. The volume of total trade, export and import increased by 13%, 6.2% and 65.9% respectively over the year 2004, representing 9.96%, 2.9% and 20% of the provincial total.

There are over 300 non-public technology-oriented companies in the province, roughly engaged in 23 specific areas within these 5 fields: electronic telecommunications, bio-medical manufacturing, medical equipment, instruments and meters. A great number of enterprises have developed products with independent intellectual properties, for example, Cheezheng Tibetan medicine has received golden awards internationally, the instrumental equipment of Haimo Company has achieved good sales results both domestically and internationally, electromagnetic contactors for tableland railway produced by Tianshui Xixing Electric Co., Ltd has filled in a blank area in the world market and its C228 serial has been officially specified by the Railway department. Tianshui Huayuan Technology Co. Ltd, which has seized over 60% domestic market share by its intelligent speed-control\& automatic traditional Chinese medicine pellet-making machines, has 13 self-developed patents with independent intellectual properties and another 30 patents were waiting for the approval of the State Intellectual Property Office.

The non-public economy is undergoing positive restructuring, with most enterprises adopting the modern company system. However, there is still a lack of medium and large enterprises as well as external-oriented enterprises in the sector. In 2004, for all the private owned enterprises, 17.4% were individual owned, 1.8% were partnership enterprises, 52.3% were private of limited liability, 16.5% private sharing-holding companies, 0.9% joint ventures with investment from Hong Kong, Macau and Taiwan, 1.8% were solely-funded Hong Kong, Macau and Taiwan enterprises, 1.8% were joint
ventures, and the rest 7.3% were in other forms. Most private owned enterprises are engaged in secondary and tertiary industries, representing 21.7% and 75% respectively of the total players in these two industries, while 3.3% of the enterprises in the primary industry are private owned. Majority of them are in wholesale and retail industry, comprising 50% of the enterprises of the sector. And the private enterprises are also focused on agro-byproducts processing, construction, real-estate, light manufacturing, mining, non-ferrous metal smelting and construction material manufacturing.

The economic aggregate of non-public economy in Gansu has increased significantly, initially forming comprehensive and widely distributed industrial system. Non-public sector represents 1/3 of our provincial economy in terms of added value, gross output value and tax income, making it a critical force for the economic development in Gansu.

1.2. Environmental assessment for the development of non-public economy in Gansu

1.2.1 Assessment of natural and socio-economic environment

With harsh natural conditions, quite a few cities, prefectures and counties are suffering from drought, extreme coldness, water shortage and frequent disasters. As a result, natural resources there can not fulfill the requirements of economic growth. With declining supplies in water and mineral resources, especially rapid exhaustion of important mineral resources, the industrial advantages dependent on natural resources will not sustain. Located in China inland and almost isolated from developed areas such as economic centers and coastal regions, the economic growth in Gansu is highly constrained due to inconvenience of transportation, high transport cost and inferior geographic location.

Recent years have witnessed improvement in infrastructure building in Gansu, e.g. transportation, telecommunications and irrigation works. However, it still falls behind national average compared to other regions. According to the statistics in 2006, the density of roads and railways in Gansu were only 68% and 52% of national average respectively. Highway mileage only consists 1.27% of national total, ranking 5th from the bottom among the 31 provinces. Urbanization level is low and the urban structure is not reasonable, which leads to poor foundation for the growth of secondary and tertiary industries. In 2006, with national average of 43.90%, the urbanization level in Gansu is only 31.09%, only higher than that of Tibet, Guizhou and Yunnan, while lower than most provinces and cities in western regions, not to mention that of most provinces in middle and costal area. The urban infrastructure is backward, with average space for housing per population, urban water consumption, urban gas consumption, public transportation per 10 thousand people, road space per capita and public green area per capita significantly lower than the national average. This gap made the non-public sector fail to come up with
competitive advantages due to higher cost and low profits.

The policy environment for the non-public economy in Gansu has been improved significantly in the following aspects: a series of new policies have been formulated in line with the national policies and local realities, setting up a local policy system that covers all aspects for the growth of non-public economy. Gansu has also approved and executed most policies that have been applied in other provinces, especially in the coastal areas, with similar content, which have not only improved the policy system for non-public sector, but also cleared the barriers in operational mechanism. However, compared to other provinces and the requirement of enterprise development, there are still some gaps to fill. According to a survey by National Bureau of Statistics in Gansu, the overall satisfaction of NPEs investigated on market economic environment in Gansu is 56%, with low satisfaction ratings in market system(51%), socio-economic credit (46%), market order(45%), services provided by the government(44 %), fair competition(43 %), local R&D capability(43 %), financing environment(39 %). It indicates that the policy environment for market economy needs to be improved.

Regional culture has both positive and negative impact on the growth of non-public economy. On the one hand, the general culture environment has been upgraded since the reform and opening up and entry into WTO. The efforts in culture development by government, entrepreneurs and technology/culture developers have achieved new results with market economy and IT society gradually becoming the dominant culture in the region and traditional local, ethical and family cultures facilitating the growth of non-public economy. On the other hand, some outdated ideas are impeding the non-public economy, such as the reluctance to take risks, superstition and discrimination to commercial production and market economy, governmental mindset that looks down upon private enterprises, and the reluctance to receive new knowledge, information, technology, talents and new way of live and work.

1.2.2. The overall assessment of environment for the growth of non-public economy.

In recent years, the overall environment for the economic growth in Gansu has been improved significantly. According to the sample testing result by the National Bureau of Statistics in Gansu, the overall satisfaction of NPEs for economic environment (including market environment, competition environment, infrastructure, human resources and quality, technology innovation and coordination) recorded 63%. The regions with favorable environment for investment and growth of non-public economy are concentrated in the urban area in Lanzhou, Tianshui, Baiyin and Hexi, where secondary and tertiary industries are more developed. The overall satisfaction scores in these regions are 67%, 55%, 53% and 50% respectively.
However, compared with other regions, the overall environment of Gansu still remains at a low level. According to the information provided by the research group of sustainable development strategy of China Academy of Sciences and China Reform Foundation, the comparative analysis shows that in terms of regional sustainable development capacity, market maturity, economic growth, modernization and innovativeness, most of Gansu's indices rank about 27th among all provincial regions in China, with few exceptions ranking top 20th. It indicates that the overall environment of Gansu for the growth of non-public economy (including natural conditions, ecological environment, economic and social environment and intellectual environment, etc.) is among the bottom 5. Therefore, it is a long-term strategic task for Gansu to upgrade its overall environment.

1.3. The major problems in Gansu's non-public economic growth

Based on the above analysis and evaluation, the most challenging problem for the non-public economy in Gansu is the low level of overall environment, which restricts non-economic growth in a comprehensive and fundamental way from the perspective of natural conditions, infrastructure and the level of socio-economic development. It weakens the environment supporting non-economic progress, limits the room for development and constrains its potential strength. Except for the abovementioned tough natural conditions, poor infrastructure, fragile ecological environment, backwardness in technology, education and regional social culture, the environment problems also lie in the following aspects:

1.3.1 Too many limitations in the policy system and the lack of supporting and feasible policies. The policies between the governments at different levels and between different sectors are unbalanced and inconsistent, such as the lack of coordination between the policies of the financial area and other sectors. The inconsistency between policy contents and its implementation environment and approaches lead to the lack of financial support and other material conditions, thus make the policies “a piece of paper”. In some key areas, there are not enough supporting policy nor required laws and regulations.

1.3.2 Serious obstacles in mechanism. The paces of reform and restructuring of the SOEs remain slow. A large amount of national economy has not been transformed to non-public economy through the reform as planned due to the slow and inappropriate actions during the reform and the avoidance of substantial issues. The laggard market reform, imperfect factor market, barriers in the flow of production factors, lack of fair competition and the slow development of intermediary service system and industry-education-research combined cooperation agencies all restrict the rapid development of the non-public economy. The restriction also comes from the unsound management system, lack of creative strategic thinking and scientific planning by governments as well as insufficient service management and innovations in startup training, investment, development strategy, technology, talent nurturing, import and
1.3.3 Inappropriate industrial and economic structure. There are a lot of difficult-to-solve problems in the relationship between the three industries, between light and heavy industry, between upstream and downstream of value chain, between public and non-public economy, between accumulation and consumption, between the urban and rural areas and between different regions, which have long restrained the non-public economy. The overall low level of industrialization and modernization in the agriculture restricts the development of NPEs in agriculture and in the second and tertiary industries in the rural area. The second industry is small in size, sharing low proportion in economic aggregate and weak in boosting economic development. The resource-based heavy industry and giant enterprises play a dominant role in the industrial system, with concentrated capital, high investment, high resource consumption and low output. In this context, it is difficult for the NPEs with low investment capability to enter this section. Those NPEs which are already doing business in the sector are small enterprises engaged in iron& steel, coal, machinery, cement and chemical fertilizer with high resource consumption and high pollution, most of which have been closed down under the national industrial policy. In the heavy industry, there are few enterprises and projects working in the mid to downstream of the value chain. The value chain is too short to create scale benefit for the vulnerable small and medium sized NPEs to compete in the market. The traditional sectors are dominating the tertiary industry with few featured advantages, so it is difficult to attract plenty investment from the non-public players.

1.3.4 Low quality of the non-public players. Restricted by poor overall environment, the non-public economy in Gansu started late and its gap with the east and middle regions in terms of capability and level of development is getting larger. The sectors and enterprises are not competitive in the national market and most enterprises are backward in technology, management, corporate governance and core competitiveness.

Section 2 The overall Strategy for the Non-public Economy in Gansu

2.1. The overall strategy for the development of non-public economy in Gansu

Given the poor overall regional environment and the resulted high cost of investment and operation of socio-economy and slow development of non-public economy, the basic strategy for Gansu is to: based on the provincial reality, fully realize and leverage all conveniences provided by the domestic and global counterparts; through unremitting hard work and an innovative working style, develop non-public economy in an improved
overall environment, including sound regional policy system, efficient government, better mechanism for SOEs, finance, science and technology and education, enhanced technology and education capacity, a region-wide & society-wide advanced culture that promotes innovation and entrepreneurship, improved infrastructure, restructured and optimized industry and protected eco-environment; advance the operational mechanism of non-public organizations and improve their capability of capital formation and accumulation through expanded economic channels, so as to gradually form a virtuous cycle of "non-public economic growth----increase of government fiscal revenue----faster and sound non-public economic growth".

The strategy includes the following key areas:
2.1.1. Improve the policy system that facilitates the development of non-public economy with better policies, timely new policies and updated and specified existing policies. Attention should also be paid on the implementation of these policies.

2.1.2. Improve the innovation system for a preferential environment for the non-public economy. We should focus on the continuous reform on SOEs, finance, technology and education, promote marketization of the regional economy by setting up and completing multi-level capital market and coordination system between banks, enterprises, government and intermediaries and expand the channel for direct and indirect financing for non-public economy.

2.1.3. Strengthen building of infrastructure to improve the hardware environment for non-public economy. We should focus on infrastructure, eco-environment and featured advantageous industries, technology and education to strengthen the major projects related to the overall economy and long term growth as well as accelerate urbanization, infrastructure network and supporting industries.

2.1.4. Improve the management mechanism for NPEs, upgrade the capacity of capital formation and accumulation and enhance self investment and attraction to outside investment, so as to facilitate self-development of the NPEs through market competition.

2.1.5. Measures should be taken to adjust industrial restructure, run some national assets by private operation, take on internal and external industrial transfer and develop industrial clusters, so as to overcome important structural barriers for the non-public economy for its growth in a wider range.

2.2. The basic strategic targets for the development of non-public economy

The development targets of non-public economy are the integral part of the provincial development strategic goals for the coming decade. To realize the strategic requirements
for the economic growth in Gansu as well as national economic restructuring and transformation, the non-public economy should represent over 60% - 70% of the economic aggregate of Gansu by 2020, an increase of 2-2.5 percentage points compared to the figure of 36.41% in 2006. If there is no particularly good opportunity, this goal is difficult to achieve because of the poor base, many constraints and good momentum of the state-owned economy.

Base on the normal growth of 1 percentage points, the proportion of non-public economy to the economic aggregate is 50% by 2020. Its structure and overall quality will be upgraded significantly, with the medium and large sized enterprises as the backbone and capital and technology intensified sectors making a large portion. Such targets are not difficult to achieve. However, by then, Gansu still has big gap with the national average, let alone the coastal provinces like Jiangsu, Zhejiang and Guangdong in terms of the non-public economy proportion. As a result, the strategic support and promotion to market reform provided by non-public economy in Gansu will be too weak to facilitate the realization of general strategic goals.

Since the 9th FYP, the non-public economy in most provinces has kept a good momentum. According to the analysis and forecast by the Department of National Accounts of National Bureau of Statistics, from early 11th FYP to 2020, the proportion of state-owned economy in Gansu will further drop while that of the non-public economy increases to 57.0%, taking the dominant role in the national economy. According to the data from All-China Federation of Industry and Commerce, in 2005, the non-public economy proportion in such coastal provinces like Zhejiang, Jiangsu, Fujian, Guangdong and Shandong provinces reached 70.9%, 57.8%, 63.8%, 58.0%(2003), 40.9%(2003) respectively, with the former three achieved an annual increase over 3 percentage points in the past decade; that of the middle region, including Shanxi, Henan and Anhui accounted for 52%, 50% and 43% respectively; the western provinces like Guangxi, Chongqing, Shaanxi, Sichuan, Ningxia, Yunnan and Inner Mongolia was 47%, 51.8%, 45%, 46.9% (2006) , 40%, 35%, 34.9% respectively, and the proportion in Gansu was 36.1%.

Since the state-owned and non-public economy are mixed in the form of joint venture, and the government has not published any official statistics of non-public economy proportion, different local governments and departments have varied scope for the non-public economy. The above statistics are just for reference and may not reflect the realities.

To secure the overall strategic target of enriching the people and strengthening the province in Gansu, in the coming decade, we should keep current growth rate of non-public economy, while actively seeking special growth model and speed, so as to make the non-public economy proportion in Gansu increase at or above 2 percentage points annually. It is a challenging, but not an impossible task through hard work and innovation. During the 10th FYP, through SOE restructuring and improvement of local development environment, the annual average growth rate of non-public economy achieved 25.54% and its proportion in economic aggregate increased by over 2.3 percentage points. Therefore, it is possible to maintain the growth rage through more effective policies, new growth opportunities and innovative measures.

Major opportunities and favorable conditions for the growth of non-public economy in Gansu include:

First, as the central government will take a series of further measures to promote coordinated regional development of the region, Gansu can fully leverage on the policies of western development and balanced development to increase investment on infrastructure and soft environment. By doing so, the overall environment, especially the environment for investment is expected to be greatly improved during 2010-2015, so that self-employed economy and foreign investment can be boosted.

Second, through the measures in improving overall environment and supporting the non-public economy, as well as the driving of science & technology (S&T) advancement and market competition, the non-public economy in Gansu will step into a new growth period after 11th FYP, with enterprises upgraded and industrial restructuring accelerated. Thus the development of non-public economy will be expedited.

Third, as the domestic and global industrial structure further advanced, some industries will transfer from foreign countries to China and from the east and middle regions to the western regions in the coming future. Following this trend and relevant national policies, Gansu may increase its attractiveness for investment and benefit from potential cross-national and cross-regional industry shift to accelerate the development of non-public economy.

Fourth, upon corporate reform of SOEs and improved of local capital market, Gansu can facilitate the transfer of state-owned economy into non-public one by selling of state-owned assets on a large scale to change its dominant role rapidly and fundamentally.

2.3. The basic strategic stages for the non-public economy in Gansu
Base on the realities in China and the development of non-public economy and modern market economy since reform and opening up, the national and regional non-public economy has to go through the following three stages: start-up, acceleration and maturity.

The start-up stage is the period of primitive accumulation and scale expansion for non-public economy, with the dominance of small enterprises and labor intensive sectors, large output but low added value. Currently, the non-public economy in most regions, especially in the western region is at this stage.

The acceleration stage is the time for the non-public economy to shift from labor intensive sectors to capita and technology intensive ones, characterized with medium and large size enterprises and technology intensive sectors taking the dominant role and accelerated technology advancement, scale-up and internationalization. At present, the non-public economy in the coastal region is at this stage.

The maturity stage is the period when non-public economy increases its competitiveness in all industry sectors, especially the technology intensive sectors to merge into the national and global integration, characterized by hi-tech enterprises dominating, all sectors highly informationized and light industry playing major role. The non-public economy in the coastal region will step into this stage in about 10 years.

In 2005, the non-public economy proportion in the economic aggregate of Gansu was 36.1% of total economy in Gansu, ranking lowest in China. The average registered capital for the private enterprises was RMB 1.255 million, much lower than that of the east and middle regions (average registered capital in Jiangsu was RMB 1.4257 million, RMB 1.439 million in Zhejiang, RMB 2.0246 million in Fujian, RMB 1.4857 million in Guangdong, RMB 1.3116 million in Shandong, RMB 1.6997 million in Hunan, RMB 1.4955 million in Shanxi, RMB 1.3142 million in Jilin and RMB 1.2726 million in Henan). The private enterprises were mainly concentrated in traditional sectors like supply chain, restaurants, and labor intensive production industry. The capital and technology intensive enterprises account for less than 10%, while self-employed and family owned enterprises took a large proportion. Hence, by the end of 10th FYP and early 11th FYP, the non-public economy in Gansu is still at the start-up stage and may step into the acceleration stage during 12th FYP.

The 11th FYP is a critical time period for the transition of non-public economy in Gansu from the start-up stage to the acceleration stage. The government needs to not only facilitate the development of non-public economy in quantity & economic aggregate, but also its quality by speeding up the upgrade of technology and structure. We should focus on the quality improvement and scale expansion of the key enterprises to help them become the pillar of the non-public economy, while supporting small and medium sized enterprises (SMEs) to bring into full play their potentials.
From 2010 to 2015, the non-public economy in Gansu will step into the acceleration period. While continuously boosting the NPEs in quantity & economic aggregate, we should strategically focus on raising their scale, grouping, capital solicitation and overall quality as well as enhancing the innovativeness of backbone enterprises so as to form pillar industry clusters and key enterprises clusters of each sectors. After 2015, the focus should shift to develop high technologies in the NPEs, achieve technology and structure upgrade, thus shorten the stage transformation process.

2.4. The virtuous circle model for the non-public economy

It is fundamental to facilitate the interaction between the non-public economy and local finance to achieve fast transition of the non-public economy from primitive accumulation and scale expansion to technology and structure upgrading, thus becoming the pillar of provincial economy and major source of fiscal income. The efforts made by the government and all walks of life will finally come into one force to expedite the socio-economic benefits of NPEs in a virtuous cycle of "rapid non-public economy growth----fiscal revenue increase----faster non-public economy growth with higher quality.

2.4.1 Raise socio-economic & social benefits through NPEs

2.4.1.1 Promote the transition from extensive to intensive growth of non-public economy with better quality and benefits. Though at the start-up stage, the non-public organizations in Gansu should adapt to the principle of market competition as “survival of the fittest”, national macro economic regulatory policies and relevant laws and regulations, establish business operation system that reduce resource consumption and generate more benefits, accelerate the transition of growth model and come up with intensive growth. The government should establish a sound market mechanism for fair market competition as well as a macro-economic regulation system favorable for intensive growth, innovate socio-economic management, help enterprises to strengthen development of human resources management, promote clean production so as to push these enterprises on a road of low consumption, high profit, ecology friendly and people oriented progress.

2.4.1.2. Prioritize the support for NPEs with larger scale, higher benefits, strong technology innovation capacity and high level of management, thus making them leading force in the sector to drive the whole industry.

2.4.1.3 Shorten the transition period of non-public economy from the primitive accumulation stage featuring small scale, low end technology, small output, high
consumption and heavy pollution to a new stage with big scale, high technology and output, low consumption and emission or even zero pollution, thus making it the pillar for the regional economy in a short time.

2.4.2. Intensify the support of fiscal and taxation policy to non-public economy

The main functions of government finance include regulating macro economy by fiscal policies and facilitating healthy and balanced development of the economy and society. As far as the non-public sector in Gansu is concerned, the existing finance policy is far from enough for supporting non-public economy and innovative ideas are needed.

2.4.2.1. The provincial, municipal and township governments should actively raise earmarked funds to for non-public economy. The fund allocated by provincial finance should focus on major supporting projects, loan subsidizing for high-tech commercialization program, credit guarantee system and non-public economic zones, with increased amount on a year basis. As for high-risk industries and projects, guarantee funds should be appropriated from fiscal revenue, giving priority for non-governmental capital engaging in such industries and projects. For low-profit public welfare projects, a certain proportion of fund should be invested by the government to attract non-public investment. On the principle of “maximum return from minimum investment” for government investment, we should guide non-governmental capitals in medical care, health, nursing home for the aged, sports and culture, etc.

2.4.2.2. Facilitate combination of governmental finance policies with market mechanism to enable their proper interaction. To support non-public sector through fiscal policies, we should aim at complementing the shortage of the market mechanism, addressing the crucial constraints of SMEs, creating favorable conditions for the market mechanism and tackling the problems difficult to be solved when leaving to the market. We should put more emphasis on creating good environment for the development of NPEs, fortifying investment in infrastructure building, creating better hard and soft conditions to provide sound social services for the non-public organizations. We should increase fund projects that directly serve the non-public organizations in science & technology, talents, education, culture and information, set up more vocational schools, science R&D institutes, special majors in universities and middle schools and incubators and provide free or low-charge trainings for the personnel urgently needed by the non-public sector.

2.4.2.3. Intensify the support from taxation policies. We should carry out uniform and transparent taxation policies and collection measures; offer appropriate financial subsidy or tax exemption for the enterprises to update their technologies, equipments and techniques; offer tax deduction and exemption for enterprises with high investment in science & technology, so as to stimulate their activities in technology innovation; the value added tax levied on high-tech products will be returned to the enterprise through
designated agencies so as to ensure the tax return; offer high tax subsidy for non-public SMEs engaged in R&D; adopt low income tax rate for those enterprises with annual taxable income under the specified amount; apply simplified procedures for value added tax from small tax payers; offer tax reduction or exemption for qualified credit guarantee agencies for SMEs in the specified time period; offer preferential tax policies, such as tax reduction and exemption, for enterprises engaged in the tertiary industry, high-tech industries and those employ certain amount of laid-off workers.

2.4.3. Form virtuous interaction between rapid non-public economy growth and fast fiscal revenue increase

We should strengthen our guidance, support and stimulation for self-development of non-public organizations by taking comprehensive measures in the aspects of corporate system, technology innovation capacity, quality of entrepreneurs, core competitiveness and comprehensive competitiveness. Hence, we can nurture a batch of mature enterprises in market competition, which are top tax payers with high quality, high growth rate and high profit, so that the non-public sector can become a increasing source for fiscal revenue.

We need to focus on the backbone enterprises rather than distributing our strength evenly, thus help setting up pillar industries and backbone enterprises with rapid growth of economic and technological strength to make them main source of fiscal revenue. At the same time, we should also support the other NPEs.

The key approaches for the abovementioned virtuous cycle is to: cultivate a batch of less-developed but promising enterprises to become top tax-payers through fiscal policies; nurture more immature enterprises with the increased tax levied from the top tax-payers to help them become new big tax-payers; then more investment can be made on the potential enterprises and create far more big tax payers, thus we will achieve a spiral development model of “rapid development of non-public economy----fast fiscal revenue increase----more sound non-public sector development”.

Section 3 Improving Social Environment for the Development of Non-public Sector
3.1. Carry out innovations for a better policy system conducive to non-public economy

Taking into account the demands and conditions of socio-economic development in Gansu, the key tasks for boosting non-public economic growth are as follows:

3.1.1. Improve policy system for the non-public sector with focus on policy quality improvement and implementation. We should check, sort out and amend the laws, regulations and policies concerning the non-public sector, abolish the policies against the regulations of the central and the provincial government and formulate new laws, regulations and policies with emphasis on policies on market entry, finance, investment, government finance and science & technology. Detailed and specific polices should be made for the sake of long-term implementation, effectiveness and feasibility.

3.1.2. Formulate new policies to address predominant issues concerning current and future non-public sector growth to facilitate breakthroughs. The key areas for new polices include: (1) deepen reform in monopoly industries such as electric power, telecommunications, railway, civil aviation, petrol and public utilities, infrastructure, social undertakings, financial services, defense science & technology, etc. To effectively help non-public economy enter these areas; (2) deepen reform on SOEs and asset operational management system to facilitate long-term and substantial privatization of state-owned assets in general competitive industries; (3) actively take on industry transferred from both abroad and other regions in China, and attract outside non-public investment program in line with environmental, land, and industrial policies; (4) help science & technological personnel as well as technical and managerial personnel from SOEs establish non-public organizations.

3.1.3. In support of S&T system reform with sound polices on science & technology, encourage and help science and technology personnel set up non-governmental technological enterprises or cooperate with the existing non-governments enterprises, so as to boost the growth of non-public S&T enterprises, especially the hi-tech companies. We should further implement national policies in support of technological enterprises, improve local policies concerning technology innovation of SMEs, and promote coordination between policies for science & technology and for economy. We should encourage non-governmental enterprises to establish R&D institutes and technology transfer agencies together with universities and research institutes. We should help non-public technological enterprises bid for national science& technology projects and national innovation fund for technology-based SMEs. The provincial S&T programs ought to allocate special S&T fund that increase on an annual base to support the development of non-public S&T enterprises. We should further raise the percentage of shares available for science& technology achievement holders, allowing and encouraging
scientific & technological personnel from universities, R&D institutes and SOEs to establish non-public S&T companies in their part-time or after leaving their previous job. We should guide non-public S&T companies to establish a sound IPR management system and enhance production efficiency of S&T achievements and independent R&D capability. Preferential policies on taxations will still be implemented for S&T enterprises. By encouraging development of venture capital and loan subsidizing, we should support technological innovation and commercialization of S&T achievements. We should strengthen the building of technological innovation platform and intermediaries to provide a better environment for the non-public S&T enterprises.

3.1.4. Carry out innovations for better market entry policies and fairer market. In compliance with the principle of “ensuring entry and treatment on an equal footing”, we should expand the areas for market access, regulate government approval procedures to enable full competition in the market, thus creating truly fair and orderly market environment for NPEs. We should “effectively help” non-public economy enter and gain comparatively rapid growth in these “accessible” areas as specified by the State Council, which include electric power, telecommunications, railway, civil aviation, petrol and infrastructure, social undertakings, financial services, defense science& technology, so as to effectively constrain monopoly practices. We should formulate practical market entry policies and their supporting policies, while removing those regulations and practices providing shelters for improper and illegal interest of departments, regions and monopolized entities, as well as their negative impact on non-public sector so as to break down barriers, visible or hidden, direct or indirect, in the procedures of market entry, and ensure fair and open market entry administration with standardized procedures. We should enhance credibility system in our society, effectively regulate economic activities and social security, crack down practices against the principle of fair competition such as counterfeit and shoddy products, industry monopoly and various infringements, redressing wrongdoings such as vicious competition, failure to perform contracts and default on loans and payments, and regulate development of a variety of industrial associations and intermediaries in an improved market environment.

3.1.5. Continue to strive for preferential policies for non-public sector in Gansu and the western regions in the following key areas: increasing fiscal investment for infrastructure, eco-environment treatment and protection as well as public services in Gansu and other western regions; intensifying financial support for education and science & technology with the emphasis on vocational education and technology service agencies directly serving the non-public sector; helping non-public SMEs establish cooperative relationship and alliances with medium and large companies controlled by the central government in Gansu, and improve technological development skills, standardized production and operation as well as incentives and tax preferences; offering preferential policies on land and taxation for Gansu and other western provinces taking on programs transferring from foreign countries and coastal regions.
3.1.6. Update policies for more detailed and specific contents based on the needs of the development of non-public economy. We should carry out study and research on the policy issues and updates based on the changes of socio-economic environment and state policies to come up with new ideas and suggestions to amend and reinforce the existing policy system. We shall have collect ideas and suggestions from non-public business owners and employees according to the principle of “Giving priority to SMEs (of non-public sector)”, so as to ensure timely discovery of policy leakages and the formulation and implementation of polices to the interest of SMEs. The government should address problems resulting from generality of policies, advocating creativity, rewarding those employees bringing forward innovative ideas and stimulating government officials to translate general policies into detailed and region-specific measures to effectively solve their local issues so as to provide NPEs with specialized and individual policy service.

3.1.7. Explore better and innovative ways to implement non-public economy policies, strengthening implementation to bring them into full play. We should create better administration environment by addressing key difficulties in policy implementation, service provision and inefficiency to ensure rapid and full implementation of policies. Administrative authorities should make every effort to encourage and help establishment and development of NPEs, streamline application, administrative and taxation procedures and improve services with lower charge so as to help enterprises reduce operational costs. Focusing on the supervision of policy implementation, government watchdogs should intensify their efforts, organize special examination to study and evaluate the policy effects. We should set up long-standing supervision mechanism for regular self-examination and supervision over policy implementation, enhance democratic appraisal, and improve polices according to the new situations in a timely manner. Competent authorities should strengthen guidance to the enterprises by taking region-specific measures and explore better policies. The government should take the lead in mobilizing the coordination among different departments and non-governmental forces to create a better regional environment for startups and business development.

3.2. Remove system drawbacks hindering non-public economy growth

The root of the slow development of non-public sector in Gansu is the system drawbacks in the enterprises, the government, financial sector, science and technology as well as in the rural areas. The major strategic task of facilitating non-public economy growth in an improved investment environment is to deepen the reform, get rid of system drawbacks and promote system innovations.

3.2.1. We should promote the system reform and restructuring of SOEs and further the privatization of the separated state economy to narrow down the operation range of SOEs and help SOEs withdraw from general competitive industries. For SOEs still under reform & restructuring, we should further the reform and ownership diversification so as
to introduce new NPEs. We should actively encourage, support and guide the NPEs to participate in the reform and restructuring of SOEs and collective-owned enterprises through the market, so as to enhance the NPE strength. The role of shareholding system should be fully mobilized in those newly established NPEs to absorb investment from state-owned, private and joint venture entities in cooperation with predominant enterprises inside or outside our province, thereby diversifying the shareholders. Government policies should be designed to guide system innovation in all types of enterprises including the NPEs, with a view to create new advantages, take an initiative in improving technology innovativeness and business operations in the ever changing market and stop relying on government intervention or their monopoly position. We should encourage self-disciplined operations with their advantages in systems and mechanisms, rapidly increase the intangible assets such as systems, mechanisms, organizational structure, management, technologies, brand, and credibility, thereby strengthening the competitiveness and self-development capacity on a solid basis.

3.2.2. Carry out restructuring of government agencies and enhance the capacity of government at all levels to correctly perform their own duties pursuant to the law. With the efforts to transform into accountability-based and service-oriented governments, the governments should pay more attention to programming, policy guidance, market order maintenance and public service provision and guide the healthy development of NPEs through industrial policies, development planning, benefits attraction and information on market demand. Restrictions should be placed upon allocation of resources by administrative monopoly and rectification is needed for the administrative behaviors detrimental to fair market competition and NPE progress. A macro-administration model where governments have direct control of resources and excessive interference of micro-economy should give way to market-based resource allocation mechanism for management that is conducive to the non-public sector. We should designate a special administrative agency for the coordination of the non-public economy in the province which covers multi-sectors, multi-departments, multi-industries and the urban and rural areas. Service centers for SMEs built in towns, counties and cities will be responsible for providing policy consultation and information to enterprises as well as trainings for local business owners and managerial staff; non-public industry organizations should be set up to guide and coordinate NPE growth, especially the SMEs; training centers for entrepreneurs should be established at universities and vocational schools with curriculums based on the characteristics and demands of the NPEs.

3.2.3. Improve law-based administration to safeguard the legitimate rights of the non-public sector. Vulnerable to external adverse factors, the small and medium NPEs are always squeezed out by the unfair competition from large enterprises. Therefore, relevant laws and regulations favoring the SMEs should be promulgated with regard to restrictions on monopoly, unfair competition, encouraging technology transfer from the large, establishing technology development centers for SMEs and improving the financing system so as to form effective legal system protecting the NPEs. We should
standardize administration practices, law enforcement and administrative charges, and establish sound and effective supervision system for the administrative law-enforcement agencies. In order to protect such legitimate rights of investors as property rights, IPRs, independent operation rights, reputations and personal security. We need to build up complaint centers to handle cases timely and objectively when the NPE legal operation activities are infringed. The judicial branches at all levels should handle the cases and civil lawsuits impartially in accordance with relevant laws, rather than putting off the case or shifting their own responsibilities to others.

3.2.4. Establish board of trade for the non-public economy and improve social service system. In accordance with the Constitution of All-China Federation of Industry & Commerce, government departments at all levels should give support to the operation work of Federation of Industry & Commerce, which is a competent authority governing the business of Board of trade, and promote professional services and intermediaries. The government and the Federation should jointly build the service system for the NPEs, organizing retired engineering experts to offer guidance on startups, policy consultation, on-job training, technology advisory and transfer, equipment installation and testing as well as guidance on popularization of technologies, etc.

3.3. Improve investment and financing system

The sluggish reform on financial system and the resulted universal difficulty in financing are the bottlenecks for NPE growth. To deepen the reform, efforts should be made in the following aspects:

3.3.1. Establish a credit system which effectively facilitates NPE growth and expand its financing channels. We should guide and encourage financial institutions to develop financial products, services and credit system suitable for the SMEs. The banks should change operation concepts and strategies to be more SMEs-oriented when providing loans and other financial services, with a view to expanding into this broad market, optimizing their business structure and achieving sustainable growth. For this purpose, they should establish loans, credit management and risk prevention mechanisms based on the characteristics of SMEs, as well as loan pricing mechanisms in the course of marketization of interest rate. We should establish a sound organizational system for small and medium banks, encourage the building up regional joint-stock banks of small and medium size, as well as non-public financial organizations. Credit cooperatives and local urban commercial banks should further clarify and strengthen their services to the SMEs, improve their system of credit granting and extension, transfer the power of loan approval to lower levels, and relax credit line to SMEs with strong market performance, economic benefits and good reputation. We should set up a financing platform which coordinates banks, enterprises, the government and intermediaries, so as to strengthen mutual trust and cooperation between banks and the government as well as banks and the
enterprises and facilitate regular and diversified joint activities between banks and enterprises.

3.3.2. Improve the multi-level capital market, expand direct financing channels for SMEs and help qualified SMEs list on domestic and international markets. We should develop SMEs sector on the security market on a larger scale, and support more SMEs to enter the capital market. We should speed up the listing of SMEs by establishing a system for meetings on listing issues. We should improve the overall quality of listed SMEs tailored to capital needs of SMEs, especially those engaging in science & technology. In the meantime, we should maintain rigorous supervision to protect legitimate rights of investors and strengthen their confidence.

3.3.3. Efforts should be made to advance the credit system and introduce credit guarantee system for SMEs. We should establish sound and multi-level non-public credit guarantee systems with government as the leading force, enterprises as the mainstay and banks as the core. We should improve industry entry, risk control and compensation mechanisms for credit guarantee. We should strengthen the credit system for SMEs by building up systems for information collection, credit rating and credit-breaking punishment, thus making consultations and services on credit information available for all. We should set up guarantee centers for non-public economic group to carry out credit investigation and evaluation. We need to provide financial aid to the registration, collection, evaluation and release of credit information of SMEs performed by relevant department and intermediaries to build up a sound and accessible database of credit files. In an ongoing SMEs evaluation, enterprises having a good prospect and potential will be given major support and introduced to financial institutions for credit grant. They will also be listed as candidate enterprises for going-public with active prelisting preparations. We should boost the setting up of the guarantee institutions, giving full play to the role of policy-based guarantee as an intermediate and indirect regulating force and improving the re-guarantee system by putting investment on an annual basis. Efforts are needed to carry out fiscal compensation system and risk compensation mechanism with specified compensation ratio for the guarantee institution.

3.3.4. Joint efforts are required between government agencies, NPEs, financial institutions and social intermediaries to address the financing issues of SMEs in the non-public sector. The NPEs should gradually enhance its attractiveness for credit capital through their own efforts on improving operational management, production technology, core competitiveness and sustainable growth capacity. They need to gain trust and support from banks by constantly and honestly providing them with an improved credit and genuine information. Relevant intermediaries should help the SMEs with their difficulties in development. On the basis of local realities, the government ought to perform system and policy innovations by learning the world experience in providing financing support for SMEs.
3.3.5. Promote healthy development of non-governmental financial organizations, and facilitate standardized operation of non-public financial organizations to provide SMEs with competitive financial services. We should encourage the NPEs to invest in reforming credit cooperatives of the urban and rural areas into non-governmental commercial banks. We should support legalization of non-governmental financing means such as direct borrowing, fund raising, loan club, old-style Chinese private banks, pawning and discount of bills, help the development of standardized non-public banks and modern private banks so that non-governmental banks and enterprises can enjoy mutual cooperation and joint development and various financial organizations compete on an equal footing. We should encourage private financial institutions to target on small and medium NPEs and individual business, and develop suitable services based on the understanding of the operation and credit of local enterprises, thus creating more opportunities for non-governmental capital.

3.3.6. Support the development of venture capital. Venture capital (VC) involves high risks with uneven rights and responsibilities. Hence policy support is necessary to cover the deficiency of the market mechanism in allocating VC. Gansu is in urgent need of venture capital for reform, upgrade of traditional industries as well as development of new materials, equipment manufacturing industry and non-public S&T enterprises, while the policy environment for VC, especially for private VC is far from satisfactory. In such an environment, it is difficult for non-public S&T enterprises to get bank loans, not to mention VC. In an attempt to create a more superior and comfort environment, in which non-governmental capital plays a leading role in VC, we should innovate systems and mechanisms, implement central policies and formulate supporting measures and provisions.

3.4. Industrial restructuring

Healthy industrial structure is an important precondition for the rapid development of non-public economy and industrial restructuring may offer more extensive room the NPEs. In 15 years since the 11th FYP, we should gradually restructure and develop the industry with the following characteristics to enable a more rapid development of non-public economy: a modern industrial system with technology-intensive and high-tech based sectors as the dominant force; tertiary industry led by the emerging service sectors; commercialized and informatized agricultural system; an agriculture-production-service coordinated industrial system driven by the production industry; an advantageous industrial cluster which plays a dominant role with “outsourced” resources and market and own IPR to replace the traditional resource-based industries through improving workers’ literacy and entrepreneurship with well-developed technology and education. Specific measures include:

3.4.1. Restructure, develop and innovate the current industrial system to promote the
transformation of traditional industrial system into a modern one with technology-intensive and high-tech sectors playing the leading role, and enable large-scale investment from non-public economy into various industrial sectors and segments of the industrial chain, thus expanding the industrial scale with improved overall industrial capacity. Though there are strategic deficiencies in the current industrial system in Gansu, such as constraint from resources, limited potential, and lack of competitiveness, economic benefits, and favorable conditions for large-scale investment from NPEs, it plays a leading role in supporting a sustainable rapid development of provincial economy in the short and medium-term and is the bridge for the transformation towards the modern industrial system. Therefore, we must restructure, transform, and innovate the current industrial system based on local realities and through innovation, so as to come up with the modern industrial system.

3.4.2. Speed up the agriculture-production-service coordinated industrial system with the production industry as the leading force. Key measures include: boosting development of agriculture, construction industry and the tertiary industry by expanding the demand of the production industry to those industries. Promote close correlation between the agriculture, production and tertiary industry to enhance their support to each other; the production industry shall expand to the rural areas and the agricultural industry by developing non-public processing enterprises using agro-products, encourage industrial enterprises to increase investment in agriculture and the rural areas, transforming agricultural sectors such as planting, breeding, processing, transportation and sale into industrial sectors or their auxiliaries, so as to make agriculture and the rural area new growth point for the NPEs; bring into play the role of production industry in driving the professional and socialized service industries, enhancing the latter's capability of providing the production industry with policy planning, strategic guidance, research and development, data processing, computer programming, engineering design, training and education, talent supply, commercial trade, finance and insurance, logistics, information, telecommunications, accounting and auditing, legal service, advertising and civil utilities so as to form a virtuous circle in which the whole society serve industrial development and the latter in turn facilitates higher level of services.

3.5. Advocate and promote region-wide entrepreneurship

We should create a social climate favorable for the development of non-public economy and a good regional business environment. We should advocate society-wide respect for non-public entrepreneurs, stimulate enthusiasm in starting up business and create a favorable social environment in which all care and support the NPE. We should promote the social status for the NPEs and entrepreneurs, and rewarding those growing rapidly with great contribution the society.

We should strengthen the entrepreneurial spirit, cultivate talents and boost region-wide
entrepreneurship with a stage provided. We should initiate entrepreneurship in the whole society. Officials in government authorities and rural cadres should take the lead and government agencies ought to give their due support in advocating hardworking spirit in starting up business in poor areas, encouraging migrating people to return home for startups, and mobilizing successful entrepreneurs to help with more startups. We should promote conversion of diversified capital into venture capital and raise the capital conversion ratio. All efforts should be made to help start-ups out of trouble for survival. Cities, counties and villages should strive to promote concentration of local enterprises in industry parks, help the extension of industrial chain and industrial coordination so as to form regional economic advantages with one product in each village and region, and several products in one city (county). We should advocate the culture of entrepreneurship, stimulating the people to begin and enlarge their business into strong enterprises, thus making pioneering, innovation and brand building as the spiritual support for the people in Gansu.

Promote education on entrepreneurship. We should include curriculum on entrepreneurship in all kinds of schools, including primary and middle schools, vocational schools and universities. We should establish scholarships for startup pioneering at universities. The government should appropriate special fund for entrepreneurship practice base and summer camps to provide training for students, select outstanding middle school and university students for key training programs and encourage students to start up business after graduation, thereby enhancing entrepreneurial qualities of all people in the province.

Government should provide entrepreneurial services for the whole society through various means. The relevant government departments should publish books and promotional materials on entrepreneurship on a regular basis and disseminate practical, comprehensive and popular knowledge and management experience on startups through the website and other information tools.

3.6. Constantly improve the hard environment for the development of non-public economy

A major reason for the slow growth of non-public economy in Gansu is the poor hard environment, including rigorous natural environment, the deteriorating biological environment, inferior geographic location and undeveloped infrastructure, which need 5 to 10 years of strong investment since 11th FYP to change the current situation into advantages with competitive infrastructure network, municipal cluster and urban system, supporting industries, thereby creating a favorable investment environment with a developed urban system as the main force. We should establish fast and advanced
transportation network by improving highways and railways so as to overcome Gansu's geographic disadvantages. In accordance with the planning of corpus functional areas, we should first build the Gansu section of Longhai and Lanxin railway into industrial clusters for the secondary and tertiary industries with superior investment environment, which will attract internal and external investment and give support to a long-term, sustainable and rapid growth of the production industry as well as regional economy.

During 11th FYP, we should continue to propel transportation construction, including construction on highways in the western region, the northwestern and southwestern corridor---Lanyu railway (Gansu section), highways in rural area and main hubs for passenger-cargo transportation as well as key terminals, thus upgrading the density and role of the overall transportation network. In the field of energy, our focus is on the construction of pillar electric power and key power grid, Longdong large-scale coal base, Longdong petroleum & gas and coal resources exploration and development, integrated energy and coal chemical development in Huating, the coal & electricity base and wind & electricity base in Jiuquan and Jiayuguan, so as to enhance energy supply and export. We should invest more into water conservancy projects for agriculture and forestry, effectively carry out key water conservancy projects, strengthen integrated rehabilitation of small-scale farm irrigation projects and small watershed and keep making new achievements in water resources development and saving as well as biological projects, thus promoting balanced development between ecology, environment protection, resources conservation and socio-economy. We should launch new key infrastructure projects each year to improve the quality and general effects of infrastructures.

Section 4 Strengthening Self-development Capability of Non-public Economy

4.1. Strengthen macro guidance and service-oriented management

The government should constantly innovate their working approaches, strengthen and improve the service-oriented management, supervision and guide for non-public economy, promote the growth model transformation of the NPEs, improve corporate governance, regulate corporate operations, strengthen skill training for employees, which will enable the NPEs to strengthen their management, speed up technological progress, enhance market competitiveness, build harmonious labor relations and establish good social profile.

We should strengthen governmental guidance on the development of NPEs through regional and industrial strategic planning, promote their development in clusters and improve external benefits and group competitiveness. The NPEs should be fully informed of the purposes and contents of governmental planning, leverage on their advantages in
low cost, domestic market, adaptive technologies and products to innovate the corporate system, improve technology, organization, operation & management and corporate culture and prepare itself for market competitions upon the conclusion of WTO transition period.

We should guide, through policies and administration, the non-public SMEs to respond to market changes quickly, adjust investment directions and market targets whenever necessary, maintain flexible corporate management decision-making and offer new and competitive products before their competitors. The government should also help the NPEs to adopt standardized management and improve their management efficiency.

4.2. Help the NPEs improve competitiveness
Market competition upon “entry into the WTO” poses great challenges to the survival and development of NPEs in Gansu. In order to maintain sustainable and rapid development, the non-public sector in Gansu should strengthen its comprehensive market competitiveness, especially the core competitiveness of enterprises and development and application capability of core and critical technologies as well as ability of creating unique operational management.

For a few enterprises with strong self-development capacity, the key for upgrading core competitiveness is to innovating management and building up corporate culture. However, in Gansu, the majority of NPEs are still at the preliminary stages, and technology innovation is the fundamental and dominant factor for them to improve core competitiveness. Therefore, we should guide and help qualified NPEs build their own R&D centers, or set up joint laboratories and post-doctoral research stations in collaboration with academic institutes and universities, thus improving their capacity of independent innovation and re-innovation upon assimilation of imported technologies in a new innovation system with enterprises as the mainstay and the integration of production, education and research. We should strengthen application of modern information technology to facilitate informatization of enterprises. We should give more fiscal support to reduce the startup and innovation risks for SMEs, supporting original innovation at the initial stage of technology development, ensuring the safe, standard and effective use of fiscal investment through performance evaluation and creating favorable social climate that advocates innovation and tolerates failures.

Strengthen construction of and support for NPEs service system. We should cultivate technological service agencies for SMEs in industrial clusters and hi-tech parks, build research platforms for common and key technologies and provide technical support and management consultation to SMEs; provide trainings for employees with SMEs; upgrade the websites of SMEs to expand communication channels, publish supply & demand information and popularize policies & regulations. Service system should be established to follow market operation, i.e. the government entrust the service agencies with relevant tasks and carry out real-time evaluation to the agencies to subsidize or reward those that
meet the criteria.

We should forge ahead the system innovation of NPEs, helping them overcome system deficiency in family-owned mode by adopting modern corporate system with a sound corporate governance structure so as to lay a solid foundation for future improvement in management. Considering the generally low literacy of entrepreneurs and shortage of talents in Gansu, we should focus on training of professional entrepreneurs for the NPEs.

Help non-public organizations to keep abreast with the advanced operation concept and improve overall literacy of operators. We should help NPE operators abandon dated concepts and adopt modern corporate ideas. We should guide them to strengthen democratic awareness, advocate teamwork spirit to care for their employees, keep an equal and harmonious relationship with the employees, recognize the physical benefits of employees, thus strengthening the cohesion of the enterprise. We should encourage cooperation among related companies and the building of common interest entity with consumers. Based on the common interests of the owners and employees, we should advocate new corporate culture that improve products, enlarge enterprises with more investment, profits, tax, employment and social contribution.

Support SMEs to explore new market, cooperate with large enterprises and enter the market by leveraging on the competitiveness of the latter. In accordance with international practice, we should give financial support to the SMEs that explore international market and emerging markets. Pursuant to Law of the PRC on the Promotion of SMEs and Law on Government Procurement, we should formulate policies regarding government procurement in the SMEs to secure their share of government orders through public bidding.

4.3. Strengthen the NPEs capacity of capital formation and accumulation

Generally speaking, the NPEs are small and weak, lacking advanced technologies and competitiveness. They can only grow faster to be qualified market competitors by constantly improving their capacity of capital accumulation and concentration. Guidance and help should be provided from the following aspects:

4.3.1. We should give full play the role of policy measures in stimulating the non-public economy growth. Since the NPEs are always after the maximized profits, we should guide and facilitate capital accumulation and concentration of the NPEs to enable their above-normal growth speed. We should optimize the policy effects on the NPEs, protect their legitimate interests and drive competition while formulating relevant policies so as to bring an integrated social power in attracting NPE investment, concentrating critical elements and propelling NPE growth.
4.3.2. We should help the NPEs advance technologies, improve management and enhance market competitiveness to expand their unique advantages, increase benefits and accelerate accumulation of capital.

4.3.3. We should help the NPEs innovate system, push forward joint-stock reform and improve corporate governance to upgrade capital operation capability, accelerate capital accumulation and develop into large enterprises and corporate groups.

4.3.4. We should help the NPEs improve their investment foresight and strategy. Although non-government fund is increasing annually as a result of economic growth and increase in private income, many capital owners dare not invest in enterprises due to undeveloped market economy and lack of investment information, resulting in limited development of non-public economy. The government should, through policies, help capital owners be well-equipped with investment knowledge and market prospect, get familiar with investment channels, select investment programs with certain strategies and turn experience into theories. Main approaches are as follows: with respect to investors who make tentative investments, government will help them make market forecast, implement prudent selection and investment schemes using opportunity investment strategy to avoid failure, with a view to making their investment a favorable pioneering and demo for success; for those making rapidly increased investment in a certain industry, the government shall help them with strategic decision making, select competitive investment programs to attain high return, thus make the investment profitable; for those investing in investment-saturated industries, we will help them analyze the internal structure changes and forecast market trends in those industries to seek new growth point and select programs with good prospect and innovation, which will guide the upgrade of industry.

Section 5 Optimizing the Internal Structure of NPE & Its Relationship with External Parties

As an important environmental factor for the NPE development, the internal structure of NPE and its relationship with the regional overall economy system should be optimized to improve the environment for NPE in a more direct way, thus strengthening the NPE development capacity. (Graph 6-1)
5.1. Optimization of internal structure of NPE

With respect to the internal structure of NPE, we should give priority to the development of leading enterprises and industries to spur growth of the overall sector in line with the regularities and rules in the formation and change of industrial correlations. Based on the structure characteristics of NPE, and the economic and technical connections between main economic forms such as self-employed and private-owned economy, joint-stock economy, cooperative economy, foreign-funded economy and mixed economy, we should accelerate the growth of self-employed and private-owned economy, joint-stock economy and foreign-funded economy in the future. As the main force of NPE, self-employed and private-owned economy are with wide coverage and huge potential, but are small in scale and weak in comprehensive quality and market competitiveness. As the main direction of NPE development, the joint-stock economy enjoys advantages in investment and financing channels, governance structure and capital operation, but this
form is not popular among many of private enterprise owners. Foreign-funded economy is the weak point in Gansu's non-public sector, but an important force in industrial structure upgrading, having higher requirements for investment climate. We should help those economic forms overcome difficulties to accelerate their development, making full play the advantages of joint-stock and foreign-funded economy in technology, management and corporate scale, so as to build a reasonable and advanced structure for NPE in Gansu in the near future. In compliance with the principle of “supporting competitive and strong enterprises”, we should give priority to the development of large NPEs in qualified regions to drive the growth of SMEs. For example, Jili automobile project in Lanzhou, can not only provide orders to the SMEs producing components, but also expedite the growth of enterprises providing raw materials, energy and services. We should give priority to the development of hi-tech enterprises in the non-public sector to propel the technology upgrade of the NPE.

5.2. Optimization of structural relationship between NPE and state-owned economy

In a sound market economy, the non-public sector and state-owned sector can complement each other, which are witnessed in many regions in China and abroad. Currently, the state-owned economy in Gansu still takes up too large a proportion, monopolizing many industries and curbing a fair and full competition. In an attempt to substantially raise the NPE proportion and growth rate in economic aggregate in the future, we should on the one hand accelerate the growth of NPE aggregate, while deepen the restructuring of state-owned enterprises through major policies on the other. For example, the local government can sell large proportion of state-owned assets to NPEs, so as to facilitate transformation of more state-owned enterprises, which are in the general competition sectors with poor performance, into non-government enterprises. However, we should be full aware of the great advantages of SOEs in overall quality, technology and scale which will remain in a long time to come, which can boost the NPE development. Therefore, we should optimize the relationship between the two sectors for better development from the following aspects.

5.2.1. Deepen restructuring and reorganization of SOEs

During 11th FYP, we should deepen the restructuring and reorganization of SOEs in a greater effort to strengthen the adjustment to the layout and structure of the state-owned sector. We should improve the rational flow of state capital to help it concentrate in the key industries which are crucial to national security and national economy. We should encourage SOEs with advantages to develop into large groups with own IPRs, famous brand and international competitiveness. We should accelerate transformation of large SOEs into joint-stock companies, diversifying investors and ownerships, improve
corporate governance, and introduce strategic investors such as domestic non-governmental capital, non-SOE investors, foundations and foreign investment, so as to transform a larger part of state-owned economy into non-public one. More SOEs in the general competitive industries, especially companies solely funded by the state, should be transformed into joint-stock or non-governmental enterprises through system reform. Some state holding enterprise or groups can be transformed into companies or groups held by NPEs through equity transfer.

5.2.2. Study and deploy “second step reform” of the state sector

After the 11th FYP, we should carry in-depth investigation and research on the systems, mechanisms, operation and market competitiveness of the restructured state-owned and state holding enterprises and adopt "second step" reform based on the result to sell the less competitive SOE assets to the private-owned, self-employed, joint-stock and foreign-funded companies step by step. In particular, we should encourage, support and help extensive public participation in the privatization of state assets, offering various preferential ways for the public to buy state holding shares or other forms of state assets. The government can use the revenues from the sale to invest in projects of more strategic significance, and initiate and press ahead with upgrade of industrial structure, technology and social progress. By furthering privatization of state assets, we can offer more favorable terms for the NPEs and the public to purchase state assets to spur NPE growth and greatly change the proportion of the state-owned and non-public sector.

5.2.3. Push forward reform on monopoly industries

Taking public service and infrastructure industries as new growth point for NPE, we should gradually put an end to monopoly in gas, water and heating, pollutants treatment, railways, postal and telecommunications, finance and insurance to introduce fair competition among diversified economic entities in line with national policies and our WTO commitments. For such industries as electric power, telecommunications and civil aviation that have introduced competition, we should continue to improve reform measures for reform to include new NPEs in the competition. As for other industries such as railways, postal and urban utilities without substantial reform, we should propel reform efforts in separating the government from enterprise, state assets and public institutions to accelerate diversification of investors and create a fair and fully competitive environment in the market. We should implement Anti-monopoly Law being effective since August, 2008 to open the market, introduce competition and increase players in the non-natural monopoly sectors, gradually forming a mechanism with prices determined by the market, and improving efficiency through open and fair competition. For natural monopoly sectors, we should increase their competitiveness and benefits through auction of franchise rights and enhance government supervision in the meantime. The government
should orderly transfer the ownership and management rights in utilities within certain terms to the NPEs, while encouraging them to invest in such industries, so as to gradually enable fair competition in these sectors. The government should monitor on the service quality, price and environment protection offered by NPEs engaging in the public service industries.

During the 11th FYP, the state has speeded up the restructuring of military industrial enterprises, diversifying their ownership, steadily propelling those enterprises to adopt the joint-stock form, and pushing forward reform on the systems and mechanisms of military industrial research institutes. Since there are a lot of military industrial enterprises in Gansu, the government should support those non-dominant sectors separated from such enterprises and research institutes to transform into non-governmental enterprises, encourage such organizations to produce civil products and NPEs & civil enterprises to manufacture military products so as to create NPEs for both military and civil purposes.

5.2.4. Promote alliance and cooperation between state-owned & non-public economy

Leveraging on the strength of state-owned sector, non-public sector in Gansu will gain more rapid growth from a higher starting point. With respect to the projects solely funded, controlled or shared by SOEs, the state shares can be sold wholly or partially to NPEs once the projects gains some competitiveness upon commencement. For example, Jiuquan Iron & Steel Group Co. Ltd (hereinafter referred to as Jiugang) is exploring ways to develop non-steel industries such as power generation, equipment manufacturing, high-tech farming, breeding, processing of agro-products and construction materials, the majority of which should mainly be operated by the NPEs. Those non-steel industries enjoy high starting point in technology, scale, management and human resources, due to fairly strong economic and investment capacity of Jiugang compared to other NPEs, which will undergo long transition period of original accumulation and slow growth before they can gain fairly strong competitiveness. On the other hand, these non-steel industries operated by NPEs will bring quite a few benefits for Jiugang’s own development, including creating job opportunities for the laid offs from restructuring and their children, bringing into play the advantages of Jiugang, especially its advanced technology and reducing strategic risks for single production of iron and steel. Jiugang uses its blast furnace slag to produce construction materials such as cement and concrete. These activities enjoy low cost and reduce environment pollution by turning wastes into valuables. In recent years, medium and large SOEs like Lanzhou Lanshi Ltd. and Tianshui Spark Machine Tool Co., Ltd. have been cultivating non-public supporting enterprises, shifting the manufacture of auxiliary products and parts into those companies. They take advantage of cooperative network and clusters, and gain new experiences for promoting the development of small and medium sized non-public equipment manufacturers.
We should encourage large SOEs to invest in non-public companies, promoting mutual cooperation and introducing a mixed mechanism where both enterprises share benefits and risks, as the favorable growth trend shown in regions like Tianshui by investing into NPEs engaged in agro-products processing.

Medium and large SOEs should develop non-primary products and relevant technologies, and then offer to NPEs to create groups or clusters comprising both state-owned and non-government enterprises, driving concentrated growth of more and more companies.

We should promote a variety of cooperation and alliance between the non-public and state-owned sector to enable complementary and merging growth. We should encourage and support NPEs to participate in the restructuring and reorganization of SOEs to diversify the ownership of the latter. We should encourage and support NPEs to absorb surplus staff from SOEs restructuring, which should shift their products, technologies and professionals to NPEs.

5.3. Optimization of structural relationship between the non-public economy and the current industrial system

Within three industries in Gansu, the secondary industry is weak with over 70% in the heavy industry such as mining and raw materials industries. It is especially weak in the deep processing sector and cannot play a dominant role in the overall economic development of the province, nor drive the primary and tertiary industries, becoming one of the important structural barriers of NPE growth. Therefore, the acceleration of the second industry by enhancing its overall quality and proportion in the economic aggregate will provide wider room for NPEs in all the three industries.

The connection between each industrial sector is crucial for stimulating and initiating NPE development. Generally, heavy industries in the upstream of the industrial chain in Gansu are barely accessible for non-public investment due to high concentration of capital. Efforts should be made to provide NPEs with more opportunities in the downstream processing sectors by increasing processing projects, extending industrial chain and developing the downstream industries. For example, the basic raw materials for petrochemical industries such as polyethylene, polypropylene and synthetic rubber produced by CNPC Lanzhou Chemical Company, are potential products with high added value. By adjusting internal structure of the petrochemical industry, in particular by employing chemical raw materials produced by large scale ethylene project, we can perform downward extension of the industrial chain. In doing so, more than ten large industrial chains can be formed by merely utilizing material products of Lanzhou Petrochemical Company, including "crude oil-petroleum refining-olefin and aromatic", "ethylene and propylene-synthetic resin-agricultural film and tubular products" and
"propylene-acrylic ester-super water absorbable resin, carbon fiber and paint". Thus we can not only engage many NPEs in petrochemical deep processing to create large petrochemical industry clusters, but also substantially improve value creation and profit-making of the industry. The iron, non-ferrous metal and coal industry may also follow this approach to facilitate the NPEs engage in downstream products.

We should make best of the opportunities in the transfer of both domestic and international industries to improve in both scale and efficiency our capacity in attracting investment from the NPEs in other provinces and countries into Gansu. We should study the trend, characteristics and problems in industrial transfer along the costal regions, and then make plans and create various conditions supporting the transfer, so as to establish new industrial parks for large scale introduction of the non-public economy.

Section 6 Industrial and Regional Initiatives on Promoting NPE Development

6.1. Initiatives on development of non-public sector in three levels of industries

6.1.1. Initiatives on the development of NPE in agriculture and rural areas

6.1.1.1. Develop agricultural cooperative organizations. The individual family production in the rural area is a major barrier for the NPE growth. We should upgrade cooperative economic organizations into more specialized enterprises with certain scale by strengthening their construction of structure, innovation in system and technology services. We should advocate and pioneer in letting farmers buy shares with land and other production materials, so as to enable united operations in contiguous stretches or through enterprises and transform the separate household farming into organized economic entities. The cooperative organization where land is pooled as shares is a close-knitted economic organization. The farmers make joint purchase of production and living materials, and jointly sell agricultural products and byproducts. This kind of organization provides low risks, high success rate and great returns, having the basis to transform into enterprises. It can also effectively organize the farmers and form close links with them, which are difficult for the leading enterprises, and change the former model of “enterprises + farmers” into “enterprises + cooperative organizations + peasants”. In the meantime, we should establish organizations providing loan guarantee for those cooperatives to support large technology promotion and production projects.
6.1.1.2. Develop flagship enterprises in agricultural industrialization. As agriculture and rural areas are more suitable for developing NPEs, we should promote various investments in such industries as farming, breeding, processing of agro-products and byproducts as well as marketing and develop agriculture, husbandry, forestry, processing and services in the non-public sector, so as to accelerate agricultural and rural industrialization.

6.1.2. Initiatives on NPE development in industrial fields

6.1.2.1. Making moderate leaps in the course of steady development, we should boost NPE development while propelling upgrade of industrial structure. On the one hand, we should promote full development of all forms of NPEs through various means; on the other hand, we should give special support to technology-intensive, especially high-tech non-public enterprises, export-oriented NPEs, those engaging in emerging industries and those having well-known products, so as to enable them to develop more rapidly and drive industrial structure upgrading.

6.1.2.2. Provide large companies with specialized support. We should give support to qualified large companies to expand their scale, develop serial products and other new business, establish business portfolio and strengthen business expansion capacity. At the same time, we should encourage SMEs to develop businesses supporting the large companies, thus form group or cooperative operation leveraging on the advantages of large companies.

6.1.2.3. Extending the chains of monopoly industries. Though it is not easy change the monopoly of few large enterprises in the pillar industries of Gansu in a short period, the enterprises in the field of energy and raw materials, under market demand and national policies, are attaching more and more importance to the extension of industrial chain and the development of cooperation and alliance in downstream industries. We should encourage the NPEs to invest in the downstream industries of energy and raw materials, establishing more NPE engaged processing and service enterprises by taking the advantages of the monopoly nature of such industries.

6.1.3. Initiatives on the NPE development in the tertiary industry

6.1.3.1 We should prepare development planning for the tertiary industry, issue guidance for its development in the whole province, adjust the relationship between the three industries and clarify key sectors and regions for the tertiary industry. Relevant authorities should correspondingly map out special development planning for circulation of commerce and trade, transportation, information and communications, tourism and real estate. The government at the municipal and prefecture level should make the local
planning for the tertiary industry, guiding the non-public sector in both traditional and emerging service industries, such as commerce and trade, logistics, postal and telecommunications, finance and insurance, tourism, real estate, science and technology, education, health, information consultation, etc.

6.1.3.2 We should combine the efforts in increasing the number of enterprises, expanding their scale and nurturing key enterprises and large groups, encourage investment from collectives, individuals and foreign investors into the tertiary industry via various channels and in various forms such as capital, housing, equipment, technology, information and labor, and thus support the rapid growth of scaled enterprises.

6.1.3.3 We should propel market-oriented reform in the tertiary industry, establish and improve market for labor force, talents, technology, real estate and finance, broaden investment fields in the tertiary industry, bring up diversified players and create conditions for non-governmental and foreign investment in banks, securities, insurance, railways, civil aviation, postal and telecommunications, foreign trade, education and health.

6.2. Regional initiatives on the NPE development

6.2.1. Strengthen the level of urbanization to bring into full play the role of cities

The basic strategy for promoting NPE growth in the next decade is to develop key cities of all levels and all kinds, strengthen urban infrastructure building and improve urban environmental and the layout of urban system. We have to consider the readjustment both to the corpus function areas and distribution of productive forces, and the city-and-town concentrated economic zone along the main axis of Longhai and Lanxin railways when planning major construction of key cities along those railways like Dunhuang, Jiayuguan, Jiuquan, Zhangye, Jinchang, Wuwei, Lanzhou, Baiyin, Dingxi, Longxi, Tianshui and key cities in Longdong, Longnan and Linxia. We need to set up a city-and-town structure in which small, medium and large cities complement each other in a closely connected region, thus providing sound platforms for the rapid development of NPEs.

Continue to strengthen the construction of the capital city Lanzhou, expanding its urban size and concentrating industries in Lanzhou and Lanzhou-Baiyin region. We should give full play the role of Lanzhou as a transportation hub, commercial center and petrochemical base in northwest China and increase its capability of leading the development of information, high-tech development, finance, science and education in the neighboring provinces. Lanzhou should take the initiative in the competition among domestic cities, expand its influence to the neighboring areas and embrace more advanced productive forces and investment both from domestic and foreign investors. To
meet the needs of the new type of industrialization, we should optimize the urban structure of Lanzhou, promoting concentrated development of industries that are service-intensive, knowledge-intensive and technology-intensive in the central districts of the city, including science and technology, education, information, finance, commerce and trade, etc. We should upgrade traditional industries in the city, accelerate development of technology-intensive manufacturing industry and high-tech industries so as to speed up industrial upgrading in the city as well as advance the NPE industrial structure of the province. For Yuzhong, Honggu and Zhongchuan, which locate in the east, west and north of Lanzhou respectively, we should make advanced plans for the building of new urban areas there, develop concentrated light, heavy and hi-tech industries to form industrial parks or clusters with their own characteristic, and boost extension and concentration of industries and relevant supporting industries. We should give priority to building an innovation system in Lanzhou city and facilitating S&T enterprises, universities, R&D and information institutes and hi-tech parks complement each other in an innovation network, which provides innovation platforms for the development of knowledge-based and S&T based non-public economy.

6.2.2. The local governments should develop NPE according to local realities

Development conditions for the non-public sector in counties and cities are generally inferior to that of large cities. However, by leveraging on local basis and special resources of the small and medium cities, they can also strengthen economic concentration, attract external investment and come up with industrial advantages in the non-public sector. Counties and cities with favorable agricultural products and minerals should develop agriculture, husbandry, forestry and mineral resource exploration, and improve their infrastructure, so as to strengthen the attractiveness to investment and develop the non-public sector with its own characteristic. For example, Wuwei enjoys advantages to develop planting and agro-products processing industries with plenty grain, grapes and barley, so do other remote areas and the ethnic group living districts in Gansu with rich livestock. Furthermore, the counties, prefectures and cities can also give support to non-public investment in the catering industry, tourist spots, tourist infrastructure and derived industries, thus accelerating optimization of traditional service industries and development of modern service industries and gradually setting up a modern service system in commerce and trade, logistics, real estate, information, meetings and exhibition, tourism and intermediary services.

6.2.3. Promote formation and upgrade of industrial clusters

The industrial cluster is a major regional organization that ensures the rapid development of the NPEs, especially the SMEs. The cluster advantages have been proven by the miraculous development of the non-public sector in east China. All kinds of cities in Gansu have established their industrial concentrated areas, some of which are similar to industrial clusters, while others have laid solid foundations for growing into large-scale
modern clusters. Since the 11th FYP, we must effectively promote development of industrial clusters in all kinds of economic organizations including the non-governmental enterprises, so as to improve overall economic benefit and industrial competitiveness and accelerate NPE growth. The government should provide sound public services, create a favorable environment for entrepreneurs to start up new businesses and make investment, offer convenience to business activities, thus promoting growth and upgrade of industrial clusters.

6.2.3.1. Efforts should be made to improve traditional industrial concentrated areas, facilitate close-knit and more advanced inter-industrial relations based on in-depth work divisions, and constantly expand the category and coverage of industries.

6.2.3.2. Make full use of the advantages of hi-tech industrial parks in geographical location, human resources, technologies and information, invite more universities, research institutes, suppliers, distributions and intermediaries into the industrial parks, stimulate the enterprises and institutes of the parks to take the initiative in developing economic and technological cooperation and improve the market mechanism and innovation incentives so as to facilitate such parks into industrial clusters with advantages in indigenous innovation.

6.2.3.3. We should develop industry clusters backboned by the large enterprise according to the characteristics of old industrial bases and form an industrial chain structure featured by “from the core to surroundings”.

Sub-report 6

Urbanization Strategy of Gansu

LIU Hui
Abstract

Urbanization is of low level and progressing slowly in Gansu because of poor natural conditions, system obstacles, underdeveloped economy, irrational economic structure and limited education of the population. As a result, many problems have occurred, such as immature urban system, simple city functions and poor infrastructure. To speed up urbanization, this report proposes the strategy of “diverse directions, intensive and coordinated development”, which means that we should apply diverse urbanization modes in light of differences in natural conditions, current urban systems and population structures, and adopt measures to concentrate or scatter the population accordingly; the focus of development lies in city and town clusters of the region and the Lanzhou economic zone should take a lead in the development; enable coordinated development between large, medium, small cities and key towns, between the size of cities and towns and their local resources and environment as well as between urbanization level and socio-economic development. The report has presented some advices on policy making to achieve the urbanization level at 33% in 2010 and 42% in 2020.
Urbanization is a process of migration of rural population into cities and towns and a consistent improvement and development of these cities and towns; it indicates changes in way of production, living, and community structure; it is also an agglomeration of population, wealth, technology and service. Accompanying industrialization, urbanization is a law that cannot be changed by human will. Urbanization rate worldwide increased from 3% to 47.2% between 1800 and 2000 and the urban population soared from 750 million to 2.86 billion between 1950 and 2000.

Gansu Province is less developed with agriculture taking a large proportion of its economy; therefore, urbanization is of great significance for further development. First, urbanization is one of the most effective ways to help Gansu out of backwardness. As the center of regional economic activities, a city is the engine for economic growth of the region. Some experts’ research shows that every percentage point rise of urbanization rate can contribute to 1.5 percentage points increase of GDP. At the same time, urbanization facilitates industrialization, and helps the economy grow in a more efficient way; it is the sustainable driving force for expansion of domestic demand and economies in scale; it is also the guarantee for the sustainable development of social economy. Second, it plays a special role in breaking down the dual economic structure, narrowing the gap between urban and rural areas and achieving a balanced development. Third, it helps to raise farmers’ income, reduce poverty and promote rural economy; it also helps to create more jobs for farmers. At last, it is conducive to the reasonable use of natural and human resources. However, Gansu Province has always experienced a low level and slow increase of urbanization, which in turn becomes a bottleneck for further economic growth and severely restricts regional economic development. Consequently, it is of vital importance to study and overcome the stumbling block in urbanization that hinders the overall economic development of Gansu so as to speed up urbanization and put forward relevant development strategies.

Section 1 Characteristics and Problems of Urbanization

1.1. Low level and slow pace

Since the inception of reform and opening up, the national economy has been growing fast and urbanization expanding steadily. The urbanization rate nationwide rose from 17.92% in 1978 to 43% in 2005, up by average 0.93 percentage points annually. While in 2005, the rate of Gansu was only 30%, which was the lowest in the five provinces in northwest China and 13 percentage points lower than the national average (graph 1). Besides, when the national urbanization rate progressed at 1.15 percentage points annually since 1990, the average of Gansu was only 0.57 percentage points. Its gap with the national average kept widening ever since, from 4.37 percentage points lower in 1990 to 13 percentage points lower in 2005 (graph 2).
1.2. Urban spatial structure is out of proportion with population distribution, and regional disparity of urbanization is apparent.

The urban spatial structure of Gansu is seriously out of step with population distribution. The population is dense in the east, while the cities are mostly in the west. The population in Hexi Corridor area only takes up 18.4% of the total, however, one third of small and medium sized cities are located there. Meanwhile, regional disparity of urbanization is quite obvious. Though urbanization and spatial pattern are closely connected, to analyze the relation of them is of no significance. However, after we studied the link between the two aspects, we can see there is a large regional gap in terms of urbanization (table 1). Generally speaking, except Lanzhou, the urbanization rate is high in the Hexi area, and low in Longdong and Longnan areas, forming a pattern of weak and slow in the east and strong and fast in the west.
1.3. Immature urban system and small cities

In terms of the size and structure of the urban system, the primacy degree of Lanzhou municipality is as high as 5.18. There are no other equivalent city in this province and only three medium-sized cities, namely Tianshui, Baiying and Wuwei, the average population per city is only 273,200. Wuwei was just included on the list of medium-sized cities in 2005. The majority of cities are small and medium ones, and they are mostly less developed in economy. The overall urban system is far from fledged, which is featured by the gap between cities in terms of sizes and structures, especially the gulf between municipalities and medium-sized cites. Among 65 counties, 37 have population of less than 30,000, and 20 of less than 20,000. In short, there are too few big cities in Gansu, and the small cities there are too weak (table 6-2 and Figure 6-3).

### Table 6-2 Size and structure of urban system in Gansu (2005)

<table>
<thead>
<tr>
<th>Size</th>
<th>Number</th>
<th>Average population</th>
<th>Cities and Towns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipality</td>
<td>1</td>
<td>161.96</td>
<td>Lanzhou (non-agricultural population in urban areas)</td>
</tr>
<tr>
<td>Large city</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium-sized city</td>
<td>3</td>
<td>27.32</td>
<td>Tianshui (31.28) , Baiying (29.95) , Wuwei (20.74)</td>
</tr>
<tr>
<td>Small city</td>
<td>12</td>
<td>10.8</td>
<td>Jiayuguan, Jinchang, Zhangye, Pingliang, Jiuquan, Qingyang Dingxi, Longnan, Linxia, Hezuo, Yumen, Dunhuang</td>
</tr>
</tbody>
</table>

1.4. Government and industry are the major forces behind urbanization; the functions of many small and medium sized cities are too simple.

Usually, there are two inherent driving forces for urbanization, one is the spur from big cities, and the other is the push from rural areas. Due to Gansu’s geographical locations and natural environment, its agriculture is less than developed, and the development of rural areas is mainly pulled by cities. Therefore, the province is characterized by a top-down industrial urbanization.

Urbanization in Gansu prospered with positive national industrial policies, or withered with relevant adjustments. Urbanization process is subject to administrative orders and government organs. For instance, during the 1st Five-Year-Plan Period (FYP), Gansu was an important inland industrial base, incorporating industrial cities like Tianshui, Pingliang, Baiyin, Jiuquan and Yumen (besides Lanzhou). From 1961 to 1973, some cities were removed from the list because of changes in economic policies, including Pingliang, Baiyin, Zhangye, Jiuquan and Linxia. After reform and opening up, Wuwei was upgraded
from a district to a prefecture-level city in 2001, and so were Zhangye, Jiuquan, Pingliang and Qingyang in 2002. All these urbanization processes were fueled by government policies.

Under the guidance of building industrial cities, top priority was given to heavy industry, so the proportion of secondary industry in cities increased significantly with heavy industry as the mainstay (table 6-4). The tertiary industry is underdeveloped in most of the cities. The majority of small and medium-sized cities are abundant in resources, especially mineral resources. As a result, the function of cities is not diversified, and the spill-over effect is limited such as in Jinchang, Jiayuguan, Baiyin and Yumen.

| Table 6-4 Industrial structure in cities of Gansu (%) |
|---------------------------------|---------------------------------|---------------------------------|
| Percentage of primary industry in GDP | Percentage of secondary industry in GDP | Percentage of tertiary industry in GDP |
| Nation                          | 4.35                            | 53.09                           | 42.54                           |
| Gansu                           | 8.58                            | 53.81                           | 37.60                           |
| Lanzhou                         | 2.03                            | 54.61                           | 43.36                           |
| Jiayuguan                       | 2.25                            | 84.88                           | 12.87                           |
| Jinchang                        | 2.53                            | 86.43                           | 11.04                           |
| Baiying                         | 3.6                             | 67.26                           | 29.14                           |
| Tianshui                        | 8.99                            | 47.41                           | 43.60                           |
| Wuwei                           | 28.67                           | 32.34                           | 38.99                           |
| Zhangye                         | 31.83                           | 32.79                           | 35.38                           |
| Pingliang                       | 11.34                           | 42.41                           | 46.25                           |
| Jiuquan                         | 26.29                           | 27.37                           | 46.34                           |
| Qingyang                        | 16.82                           | 52.61                           | 30.57                           |
| Dingxi                          | 34.55                           | 27.44                           | 38.01                           |
| Longnan                         | 35.14                           | 19.09                           | 45.77                           |

Source: *China City Statistics Yearbook 2005*

1.5. Low quality urbanization with spatial extension as the major form

The urbanization process includes economic development, improvement in infrastructure and education. The comparison between Gansu Province and the nation as a whole indicates that Gansu is lagging far behind in terms of economy and infrastructure (table 5). Meanwhile, while the sizes of cities have been expanding, the population in cities has not. Many local officials think that bigger size means urbanization, but that in fact is an extension of cities and towns. An examination of newly built areas of prefectures and cities and the population increase shows that the expansion of cities and towns is much
faster than that of population (table 6). The area of Gansu Province rose from 438 km$^2$ in 2005 to 469 km$^2$ in 2005. However, the population density decreased from 94 people/km$^2$ to 90 people/km$^2$.

Table 6-5 Comparison between Gansu and the nation in terms of modernization in cities

<table>
<thead>
<tr>
<th></th>
<th>Gansu</th>
<th>Nation</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP per capita (yuan)</td>
<td>12239.71</td>
<td>26138.96</td>
<td>-13899.25</td>
</tr>
<tr>
<td>The jobs provided by tertiary industry (%)</td>
<td>49.53</td>
<td>49.90</td>
<td>-0.37</td>
</tr>
<tr>
<td>Average disposable income per capita in cities and towns (yuan)</td>
<td>8086.8</td>
<td>10493</td>
<td>-2406.2</td>
</tr>
<tr>
<td>Average salary (yuan)</td>
<td>13215.53</td>
<td>18928.14</td>
<td>-5712.61</td>
</tr>
<tr>
<td>Number of doctors for every 1,000 people (person)</td>
<td>26.23</td>
<td>25.01</td>
<td>+1.22</td>
</tr>
<tr>
<td>Rate of illiterate and semiliterate (%)</td>
<td>5.63</td>
<td>4.81</td>
<td>+0.82</td>
</tr>
</tbody>
</table>

Source: *China City Statistics Yearbook 2005*

Table 6-6 Growth of cities and population during urbanization in Gansu Province

<table>
<thead>
<tr>
<th>City</th>
<th>urban area (km$^2$)</th>
<th>Population in urban area (10 thousand)</th>
<th>Increase (2000-2005, %)</th>
<th>Urban area Population in urban area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanzhou</td>
<td>130</td>
<td>198.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baiying</td>
<td>28.47</td>
<td>18</td>
<td>40.5%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Dingxi(Anding District)</td>
<td>11</td>
<td>13</td>
<td>36.4%</td>
<td>30%</td>
</tr>
<tr>
<td>Wuwei</td>
<td>16</td>
<td>15.7</td>
<td>83.4%</td>
<td>64.7%</td>
</tr>
<tr>
<td>Jiuquan (Suzhou District)</td>
<td>25</td>
<td>17</td>
<td>16%</td>
<td>17.64%</td>
</tr>
<tr>
<td>Tianshui (urban area)</td>
<td>32</td>
<td>34</td>
<td>43.75%</td>
<td>26.8%</td>
</tr>
</tbody>
</table>

Source: survey statistics
1.6. Short of funds in urban construction, lack of diverse financing channels & underdeveloped infrastructure

Lack of funds is the outstanding issue impeding infrastructure building in the urban areas. The average maintenance and construction expense per person nationwide was 1540 yuan in 2005, while it was only 428 yuan in Gansu, 27.8% of the nation’s average. The situation of all other cities in the province is much worse (graph 3).

![Graph 6-4 Comparison of city maintenance and construction expense per capita between Gansu and the whole country](image)

(Sources: *Gansu City Statistics Yearbook 2004*)

The underdeveloped economy and meager local fiscal revenue mean that the city construction in recent years has been supported by loans from national development banks, funds from treasury bonds, maintenance and construction taxes, allocated fees for infrastructure and part of the revenues generated by the returns of land transfer.

70% of the construction funds in the province are powered by treasury bonds and loans of national development banks, with little private funds. Since 2004, infrastructure investment in Lanzhou has amounted to RMB11.8 billion, mostly coming from treasury bonds (0.8%), loans from development banks (54.2%), and yen loans (1.3%), funds raised from fiscal revenues, social funds (1.3%), allocated fees from governments and funds raised by enterprises (table 7). Take Tianshui City as an example, since 2003, RMB800 million of loans granted by the China Development Bank were invested in construction, while construction taxes were only RMB40 million in 2005, most of the capital depended on loans from commercial banks. Though the construction market in cities has become open in recent years, the returns on investment are not satisfying.
The shortage of funds has led to arrears for infrastructure projects. The increase of infrastructure facilities per person is much slower than the rise of the total facilities and social demand. The indices of important facilities are lower than national average, including the number of buses every 1,000 people, gas popularization rate, popularization rate of tap water, average road areas per capita and drainage pipeline density, etc. (table 8).

Table 6-8 Comparison between Gansu and the whole nation in terms of infrastructure

<table>
<thead>
<tr>
<th>Housing area per person (M²)</th>
<th>Water popularization rate (%)</th>
<th>Gas popularization rate(5)</th>
<th>Number of buses per 1,000 people</th>
<th>Road areas per person (M²)</th>
<th>Drainage pipeline density (KM/KM²)</th>
<th>Number of public toilets per 1,000 people</th>
</tr>
</thead>
</table>
1.7. Incompatible education infrastructure

Though urban population is increasing, it is not the case with the number of schools and teachers, especially in prefecture-level cities and counties which suffer from shortage of schools and small schools (less than about 6-7 acres) and outnumbered classes (far more than national standard). And those issues are more pronounced during compulsory education periods, namely in primary and middle schools.

The average number per class of primary students in urban areas in Wuyi City is 70-80 (the national standard is less than 50); in county primary schools, the number is 60-70. In some primary schools, 40% of the students are from the rural area. The area of schools in Tianshui City in 2005 was 2.5 million m², 1 million m² short compared with the national yardstick. There is no single up-to-level playground in schools in urban areas. The number of students per class in the city is over 80, and the number is 100 in the counties.

Section 2 Major Negative Factors in Urbanization

2.1. Blocks in polices and systems

System barriers are the fundamental reasons for the underdeveloped urbanization in Gansu Province. The restrictions of traditional system and organization are manifested by the policies under the dual population registration system, including segregation between urban and rural areas, employment system, social security regime and land system. The current population registration system or Hukou system impedes the free flow of labor from rural to urban areas. The core of urbanization is the migration of rural population to towns and cities. However, Hukou system sets up a stumbling block in between, making urban Hukou unavailable to rural surplus labors. For instance, the threshold for urban Hukou is the legal residence and a stable job or income at the same time. Hukou system imposes unfair treatment on farmers in terms of employment, education for their children, medical care, unemployment insurance and pension. No doubt all these pose great pressure on farmers; as a result, it will degrade or even block urbanization. At the same time, the inadequate social security system cannot persuade farmers to give up their rights to contract land, while the original land policy cannot satisfy the need of market economy. These combining factors contribute to unstable labor flow into cities and towns. Even in cities, farmers often encounter discrimination at job interviews or at work, and they
cannot find schools for their children or afford houses for their family.

2.2. Underdeveloped economy, emphasis on heavy industry, and lack of internal impetus for urban development

The underdeveloped economy can only provide limited job opportunities. Experiences at home and abroad show that economic development is one of the driving forces for urbanization. Gansu’s urbanization has developed in parallel with economic growth and per capita GDP (graph 5 and graph 6). However, the hard truth is that both the aggregate and per capita economic size in the province are among the worst in the whole nation, hence, no capital for city construction. The over 9% economic growth rate in the last ten years is impressive; however, it is still slower than that of provinces and cities in east and west China. Gansu’s GDP increased by 11.7% in 2005, ranking only 19th nationwide. These are all negative forces in the way of the province’s urbanization.

![Figure 6-6 Relation between social development and urbanization](image1)

![Figure 6-7 Relations between per capita GDP and urbanization](image2)
Gansu was the key area according to the 1st and 2nd FTP and “three-line” construction project. The foundation of the secondary industry was built and then consolidated during those periods. Heavy and chemical industries which are capital intensive dominate the overall industry. However, those industries are “enclave economy”, which means most of the jobs are taken by the enterprises in other places, the rest are just manual jobs. Consequently, development of industry does not lead to more jobs, and it is not easy for labor force from the primary industry to transfer. Therefore, at the very beginning of urbanization in Gansu, the conditions do not allow synchronized development of urbanization and industrialization.

Over emphasis on the heavy industry still takes its toll on urbanization. The SOE reform focused on the large state-owned enterprises whose laid-off workers then sought employment in society. Without new economic growth sources, the underdeveloped tertiary industry cannot absorb surplus labor from rural areas, besides laid-off workers and newly added labor force in cities. The difficult labor transfer from rural areas to urban areas has directly hindered urbanization.

In addition, among 15 small and medium sized cities, 4 are resources-dependent, which is a quarter of the total. The development of these cities is closely related to the exploitation scale, resources reserve, the position of resource-oriented industry in the economic structure and the market competitiveness of resource enterprises. The development cycle of a city overlaps with the amount of resources reserves. In most cases, the follow-up industries have not been set up when resources dry up or the exploitation almost reaches the end. As a result, unemployment cannot be addressed, neither the sizes of towns and cities be enlarged. The major industries in some cities—Baiyin, Jinchang, Yumen and Jiayuguan— are experiencing low profits with further economic growth, because their development is fueled by resources-dependent industries—raw material products and processing. This will hold back sustainable development of those cites, for some vital mineral resources have been drained. What’s worse is that the development strategy skews in favor of resources-dependent industries, leading to imbalanced industrial structure and a difficult situation in which any adjustment is difficult. In Jiayuguan, Jinchang and Yumen, industrial added value takes up over 60% of GDP, while the tertiary industry only occupies less than 20%, which means though heavy industry is in a good shape, the market economy has not prospered, and cities can not develop in a sustainable manner.

The twisted industrial structure and too much emphasis on heavy industry in particular, have blocked further urbanization. From 1990 to 2005, though the proportion of secondary industry in Gansu was up from 40.5% to 43.36%, the number of labor force in the industry remained almost unchanged (from 14.42% to 14.66%). The year 2000, in particular, saw a consistent rise of the proportion of the secondary industry, but a decline of the overall number and percentage of labor force (graph 7 and graph 8). This indicates that with the problematic industrial structure, though the aggregate size of non-agricultural economy has grown, there are no more jobs created, which hardly helps lead rural population into towns and cities, neither to boost urbanization.
2.3. Immature market lacking driving forces

The government has played a leading role in Gansu’s urbanization, while market forces including domestic and foreign investments have been weak. Historical background and resources exert great influences on the industrial structure, the factor market and the labor market. This has made the government the dominant factor in urbanization, and marginalized the role of the market. There are still many obstacles in the flow of factors like labor, land, human resources and capital, which means that the market has not played a vital role in resources allocation and the government had adopted many administrative measures in economic macro regulation.

In addition, the SOEs take up a large share of industrial enterprises in Gansu. The total industrial value of SOEs and state-run enterprises was 69.4% of the total in 2005, up by 7.4 percentage points than the figure of 62% in 2000. At the same time, the proportions of non-state owned collective enterprises and private enterprises have fallen respectively (table 9). Non-state-run small and medium-sized enterprises (SMEs) are less than developed, creating very few jobs. Many township enterprises are scattered around,
attracting rural population and economic factors which used to concentrate in cities. As a result, there are no towns or cities in a real sense because the components have sprinkled around.

**Table 6-9 Rates of total industrial output of different types (2000-2005) %**

<table>
<thead>
<tr>
<th>Year</th>
<th>SOEs and state-controlled enterprises</th>
<th>Collective industry</th>
<th>Private industry</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>62.01</td>
<td>18.40</td>
<td>14.85</td>
<td>4.74</td>
</tr>
<tr>
<td>2001</td>
<td>66.34</td>
<td>13.23</td>
<td>14.94</td>
<td>5.48</td>
</tr>
<tr>
<td>2002</td>
<td>61.32</td>
<td>15.13</td>
<td>17.14</td>
<td>6.41</td>
</tr>
<tr>
<td>2003</td>
<td>65.11</td>
<td>10.16</td>
<td>18.46</td>
<td>6.26</td>
</tr>
<tr>
<td>2004</td>
<td>66.87</td>
<td>9.99</td>
<td>15.09</td>
<td>8.05</td>
</tr>
<tr>
<td>2005</td>
<td>69.37</td>
<td>8.46</td>
<td>13.00</td>
<td>9.39</td>
</tr>
</tbody>
</table>

Source: Calculated based on data of *Gansu Yearbook 2006*

2.4. Rural labor forces with little education and difficulty in transfer for the lack of incentives

Another factor dragging urbanization is the lack of support from the rural areas. Rural labor forces are not highly educated, which holds them back from transferring to cities and towns. According to the census in 2000, the average school years of employees in the province were 6.52 years, 1.46 years less than that of the nation. Among them, rural population only received 5.64 years of education on average. A sample survey shows that the employees who have received technical training only accounted for 7.07% of the whole labor force. In 2005, the rate of illiterate and semi-literate above 15 years old reached 20.83%, nearly two times of the national average (11.04%). The lack of basic non-agricultural skills and higher demands on techniques in a competitive market have made it difficult for farmers to find a job in cities, so they have no choice but stay in the countryside.

Though Gansu possesses abundant cheap labor, its productivity remains low. This makes it hard to attract foreign investment, retain capital in the province and further impedes the development of the labor-intensive industry. In 2005, agricultural productivity in Gansu was RMB 6,800 per capita, only 52% of the national average and the lowest in the whole northwestern areas; its overall productivity was RMB 14,400 per capita, only 59% of the national average. A low productivity stops labor-intensive industry from transferring to Gansu and hinders the fast growth of all industries in the cities.
2.5. Limits of natural conditions and pressures on eco-environment

The graphical features limited urban spatial arrangement. In addition, water shortage curbs the expansion of urbanization, especially in Hexi and Longzhong areas. The average water resource per capita is only 1/3 of the national average. Since water has a direct bearing on the population, its shortage constitutes another obstacle for urbanization.

In addition, the majority of Gansu areas are confronted with the fragile environment, and the prominent problems of desertification and soil erosion. Fragile environment is closely related to poverty, which plagues large areas of the province. The poor areas mainly refer to mountainous areas and plateaus with harsh natural conditions and fragile ecology. Undeveloped economy, coupled with irrational utilization of resources makes the environment even weaker, and the ecological system prone to degenerate. Therefore, it is impossible to launch large scale construction projects in cities and towns.

Section 3 Geographical Layout of Urbanization

3.1. Develop multi-tier central cities & establish different regional centers as geographically defined

3.1.1. Principles and methods to define central cities

3.1.1.1. Principle

3.1.1.1.1. Comparability --- per capita and comparative indicators

3.1.1.1.2. Accessibility --- the chosen indicators can be accessed or be accessible through calculation. The indicator shall be eliminated from the indicator system if neither the existing database nor experiments guarantee its quantification, even if being theoretically believed as rational and necessary.

3.1.1.1.3. Center area principle --- to more authentically reflect the conglomeration and proliferation of central cities so that more accurate choices of central cities can be made. Indicators targeted on urban districts or developed district shall be chosen, instead of the whole city, in order to avoid a failure of choice resulted from broad scope.

3.1.1.2. Method: deciding the indicator system. Based on 81 county-level units (including the combined urban districts), the tier of central city shall be decided by
9 indicators in four aspects including economic strength (GDP, per capita GDP, per capita local fiscal income), economic development vitality (GDP growth rate, new fixed asset investment), urban comprehensive service capability (rate of the tertiary industry, wholesale and retail volume) and urban social development (urban population, urbanization ratio).

When the indicators are decided, we shall measure how important the indicators at different levels are in the classification of central cities. First, in order to get the weight coefficient of the indicators for evaluation (table 10), the AHP model shall be used to calculate the index weights at different levels and the entropy technology will be used to fix the calculated indicators at levels. After that, a multi-level multi-objective abstract comprehensive measure model shall be used to calculate the abstract comprehensive judge index (table 11) to decide the city level. Then cluster analysis shall be adopted to get an initial plan for the central city classification of Gansu.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Name of Indicator</th>
<th>Unit</th>
<th>Weights coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economic Strength</strong> (0.362372)</td>
<td>GDP</td>
<td>RMB10,000</td>
<td>0.15361</td>
</tr>
<tr>
<td></td>
<td>Per capita GDP</td>
<td>Yuan/person</td>
<td>0.07582</td>
</tr>
<tr>
<td></td>
<td>Per capita local</td>
<td>RMB10,000</td>
<td>0.13293</td>
</tr>
<tr>
<td></td>
<td>fiscal income</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Economic development vitality</strong></td>
<td>GDP growth rate</td>
<td>%</td>
<td>0.00008</td>
</tr>
<tr>
<td>(0.163091)</td>
<td>New fixed asset</td>
<td>RMB10,000</td>
<td>0.16300</td>
</tr>
<tr>
<td></td>
<td>investment</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Urban comprehensive service</strong></td>
<td>Tertiary Industry</td>
<td>%</td>
<td>0.00395</td>
</tr>
<tr>
<td>capability** (0.240472)</td>
<td>Rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wholesale and</td>
<td>RMB10,000</td>
<td>0.23615</td>
</tr>
<tr>
<td></td>
<td>retail volume</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social development of city</strong></td>
<td>Urban population</td>
<td>10,000 people</td>
<td>0.18050</td>
</tr>
<tr>
<td>(0.234065)</td>
<td>Urbanization rate</td>
<td>%</td>
<td>0.05356</td>
</tr>
<tr>
<td>Region</td>
<td>Comprehensive evaluation index</td>
<td>Region</td>
<td>Comprehensive evaluation index</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------------------</td>
<td>---------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Lanzhou City</td>
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<td>Pingliang City</td>
<td>13.44</td>
</tr>
<tr>
<td>Yongdeng County</td>
<td>8.54</td>
<td>Jinchuan County</td>
<td>3.49</td>
</tr>
<tr>
<td>Gaolan County</td>
<td>4.96</td>
<td>Lingtai (Wudu City)</td>
<td>2.50 District</td>
</tr>
<tr>
<td>Yuzhong County</td>
<td>5.11</td>
<td>Chongxin County</td>
<td>2.58</td>
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<td>Jiayuguan City</td>
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<td>Huating County</td>
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<td>Yongchang County</td>
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<td>Jingning County</td>
<td>3.18</td>
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<td>Baiyin City</td>
<td>24.57</td>
<td>Jinta County</td>
<td>4.32</td>
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<td>Yingyuan County</td>
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<td>Anxi County</td>
<td>5.09</td>
</tr>
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<td>Huining County</td>
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<td>Linxia</td>
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<td>Tianshui County</td>
<td>25.20</td>
<td>Yumen City</td>
<td>2.44</td>
</tr>
<tr>
<td>Qingshui County</td>
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<td>10.30 City</td>
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</tr>
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<td>Tai’an County</td>
<td>6.16</td>
<td>Dunhuang</td>
<td>5.96</td>
</tr>
</tbody>
</table>
### Central city hierarchic structure

The city classification plan can be attained through cluster analysis based on the above comprehensive evaluation index and taking into account of the radiation sphere of the central cities. Cities and towns in Gansu can be classified into five tiers by functions and radiation spheres: provincial central city, provincial sub-central city, regional central city, county central city and central town. (table 12, graph 9).

Provincial central city refers to national, provincial city or city of provincial influence; provincial sub-central city refers to cities of Gansu with cross-regional comprehensive
influence; regional central city shall have cross-county comprehensive influence, with radiating effect over the local city and more than two other counties; county central city is generally a county-level center of politics, economy or culture, and shall have comprehensive county-level influence, with radiating effect limited to the local area; central town refers to the promising town with geological advantage, great strength, strong attraction to and influence over surrounding countryside, villages and towns.

<table>
<thead>
<tr>
<th>Tier of cities</th>
<th>Regional hierarchy</th>
<th>Comprehensive evaluation index</th>
<th>Number</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Provincial central city</td>
<td>&gt; 100</td>
<td>1</td>
<td>Lanzhou</td>
</tr>
<tr>
<td>II</td>
<td>Provincial sub-central city</td>
<td>25-100</td>
<td>2</td>
<td>Tianshui City, Jiuquan-Jiayuguan</td>
</tr>
<tr>
<td>III</td>
<td>Regional central city</td>
<td>5-25 (and the gap with local area less than 10%)</td>
<td>13</td>
<td>Baiyin, Wuwei, Jinchang, Zhangye, Pingliang, Qingyang, Dingxi, Longnan (Wudu District), Linxia, Hezuo, Longxi, Cheng County, Dunhuang</td>
</tr>
<tr>
<td>IV</td>
<td>County central city</td>
<td>&lt; 5 (or the gap with local area more than 10%)</td>
<td>64</td>
<td>Yumen, all the counties</td>
</tr>
<tr>
<td>V</td>
<td>Central town</td>
<td></td>
<td></td>
<td>Central towns given priorities for development below county-level</td>
</tr>
</tbody>
</table>

1 Despite low comprehensive evaluation index, Gansu will be elevated to a regional central city, considering future developing prospectives and the potential for tourist cooperation with surrounding counties.
Comprehensive evaluation index shows: developing level of central cities, especially regional central city and central city at county level are quite different. Some county-level central cities have higher comprehensive developing indexes than other regional central cities. Central cities in Hexi area enjoy relatively higher development level, while those in the middle-east area of the province lag behind.

3.2. Establishing Three City Clusters (belts) to improve the Function of Central Cities

Based on regional central cities and the intensity of connection between inter-city “streams” (railway and highway passenger or cargo streams, telecommunication streams), interaction between cities shall be analyzed to form a geographical development outlay with organizing priorities given to city clusters (belts).

Breaking-point theory and model will be used in this section as a fundamental basis for city cluster classification. Breaking-point theory is about the interaction between cities and regions. The theory believes that central city has profound influence over the development in the adjacent regions. However, because the cities are different in size and influence scope, the impact over the sub-regions is gradually diminishing, and is
eventually replaced by other surrounding cities. In other words, the irradiation of cities over the surrounding regions decreases as the distance goes. By that rule, the irradiation of two cities will reach a balance, forming a balance point, which is the breaking-point.

Table 13 shows the distance between breaking-points of Lanzhou and other cities and adjacent counties as well as the field strength of the breaking-points, which are calculated according to the breaking-point model. Table 6-11 or Table 6-13 shows that Lanzhou has the strongest influence over counties within its administrative region; the second is Baiyin city and the counties under its jurisdiction, counties in Linxia city, major counties in Dingxi city, Tianzhu County and Xining city. The field strength between Lanzhou and Yinchuan is quite weak, which is only 0.09. Therefore, Lanzhou and its surrounding areas (including Xining) have initially formed urban economic zones which are closely connected.

Table 14 shows the distance between breaking-points of adjacent cities and counties under their jurisdictions, as well as the field strength at the breaking-point. Table 13 shows that in terms of the field strength at breaking-point, the data between Jiayuguan and Jiuquan is the largest (23.12), much larger than that between other cities, meanwhile its field strength with Yumen is also strong; the field strength between Wuwei and Jinchang is more than 1, with some radiation effect over the counties under its jurisdiction; the field strength between Zhangye and its adjacent cities is less than 0.5, with some radiation only over its own counties; the field strength between Dunhuang and its surrounding counties is less than 0.3; the data for Longnan (Wudu district) or Hezuo are less than 0.5; Liangping and Qingyang have rather weak radiation effect on each other, with field strength at 0.39 and some radiation over very few counties under their own jurisdiction. Tianshui enjoys broad radiation sphere, with strong irradiation over its own counties as well as to Li County, Xihe, Cheng County of Longnan. What's more, its field strength with Baoji is as high as 1.15.

Radiation radius reflects the size of surrounding areas under the influence of city radiation. We choose the field strength at the Lanzhou-Baiyin breaking-point to calculate radiation radius, because the one-hour drive from Lanzhou to Baiyin follows the basic rule of one-hour economic circle. Besides, both cities are of large scope. The radiation radius which is calculated by the boundary field strength has a strong economic significance. Table 14 lists the calculated radiation radius of the main cities.

<table>
<thead>
<tr>
<th>Table 6-13 Breaking-points between Lanzhou and other cities &amp; adjacent counties, and the field strength at the breaking-points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance from Lanzhou to other cities(KM)</td>
</tr>
<tr>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Lanzhou City</td>
</tr>
<tr>
<td>99</td>
</tr>
<tr>
<td>City</td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>Gaolan County</td>
</tr>
<tr>
<td>Yuzhong County</td>
</tr>
<tr>
<td>Jiayuguan City</td>
</tr>
<tr>
<td>Jinchang City</td>
</tr>
<tr>
<td>Baiyin City</td>
</tr>
<tr>
<td>Jingyuan County</td>
</tr>
<tr>
<td>Huining County</td>
</tr>
<tr>
<td>Jingtai County</td>
</tr>
<tr>
<td>Tianshui City</td>
</tr>
<tr>
<td>Wuwei City</td>
</tr>
<tr>
<td>Tianzhu County</td>
</tr>
<tr>
<td>Zhangye City</td>
</tr>
<tr>
<td>Pingliang City</td>
</tr>
<tr>
<td>Jiuquan City</td>
</tr>
<tr>
<td>Qingyang City</td>
</tr>
<tr>
<td>Dingxi City</td>
</tr>
<tr>
<td>Tongwei County</td>
</tr>
<tr>
<td>Longxi County</td>
</tr>
<tr>
<td>Weiyuan County</td>
</tr>
<tr>
<td>Lintao County</td>
</tr>
<tr>
<td>Zhang County</td>
</tr>
<tr>
<td>Min County</td>
</tr>
<tr>
<td>Longnan City</td>
</tr>
<tr>
<td>Linxia City</td>
</tr>
<tr>
<td>Linxia County</td>
</tr>
<tr>
<td>Kangle County</td>
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<tr>
<td>Yongjing County</td>
</tr>
<tr>
<td>Guanghe County</td>
</tr>
<tr>
<td>Hezheng County</td>
</tr>
<tr>
<td>Dongxiang County</td>
</tr>
<tr>
<td>Jishishan County</td>
</tr>
<tr>
<td>Xining</td>
</tr>
<tr>
<td>Yinchuan</td>
</tr>
</tbody>
</table>

Table 6-14 Distance between breaking-points of adjacent cities and counties under their jurisdictions, and the field strength at the breaking-points
<table>
<thead>
<tr>
<th>City</th>
<th>Distance from Jiuquan to other cities (KM)</th>
<th>Distance between Jiuquan and breaking-points of other cities (KM)</th>
<th>Field strength of Jiuquan at breaking-points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jiuquan City</td>
<td>22</td>
<td>12.33</td>
<td>23.12</td>
</tr>
<tr>
<td>Jinta County</td>
<td>82</td>
<td>57.03</td>
<td>1.08</td>
</tr>
<tr>
<td>Anxi County</td>
<td>188</td>
<td>134.46</td>
<td>0.19</td>
</tr>
<tr>
<td>Subei County</td>
<td>490</td>
<td>411.93</td>
<td>0.02</td>
</tr>
<tr>
<td>Akesai County</td>
<td>462</td>
<td>391.79</td>
<td>0.02</td>
</tr>
<tr>
<td>Yumen City</td>
<td>68.7</td>
<td>38.58</td>
<td>2.36</td>
</tr>
<tr>
<td>Dunhuang City</td>
<td>374</td>
<td>248.18</td>
<td>0.06</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>City</th>
<th>Distance from Jiayuguan to cities (KM)</th>
<th>Distance between Jiayuguan and other breaking-points of cities (KM)</th>
<th>Field strength of Jiayuguan at breaking-points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jiayuguan City</td>
<td>22</td>
<td>9.67</td>
<td>23.12</td>
</tr>
<tr>
<td>Jinta County</td>
<td>52</td>
<td>33.36</td>
<td>1.94</td>
</tr>
<tr>
<td>Anxi County</td>
<td>210</td>
<td>139.26</td>
<td>0.11</td>
</tr>
<tr>
<td>Subei County</td>
<td>512</td>
<td>412.32</td>
<td>0.01</td>
</tr>
<tr>
<td>Akesai County</td>
<td>482</td>
<td>392.32</td>
<td>0.01</td>
</tr>
<tr>
<td>Yumen City</td>
<td>90.7</td>
<td>45.45</td>
<td>1.05</td>
</tr>
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<td>Dunhuang City</td>
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<td>0.04</td>
</tr>
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</table>

<table>
<thead>
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<th>Distance between Zhangye and other breaking-points of cities (KM)</th>
<th>Field strength of Zhangye at breaking-points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zhangye City</td>
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<td>75.29</td>
</tr>
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<td></td>
<td>Minle County</td>
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<td>46.17</td>
</tr>
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<td></td>
<td>Linze County</td>
<td>40</td>
<td>28.02</td>
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<td>Gaotai County</td>
<td>78</td>
<td>54.31</td>
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<td></td>
<td>Shandan County</td>
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<td>42.93</td>
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</tr>
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<td></td>
<td>Jinchang City</td>
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<td>98.06</td>
</tr>
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<td></td>
<td>Wuwei City</td>
<td>238</td>
<td>107.34</td>
</tr>
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<td></td>
<td>Jiuquan City</td>
<td>287</td>
<td>155.22</td>
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</table>

Distance from Wuwei City between Wuwei and other cities (KM) Field strength of Wuwei at breaking-points
<table>
<thead>
<tr>
<th>Location</th>
<th>Distance from Dunhuang to other cities (KM)</th>
<th>Distance between Dunhuang and other breaking-points of other Dunhuang at breaking-points</th>
<th>Field strength of Dunhuang at breaking-points</th>
</tr>
</thead>
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<tr>
<td>Anxi County</td>
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<td>64.97</td>
<td>0.21</td>
</tr>
<tr>
<td>Subei County</td>
<td>116</td>
<td>84.44</td>
<td>0.13</td>
</tr>
<tr>
<td>Akesai County</td>
<td>86</td>
<td>63.54</td>
<td>0.22</td>
</tr>
<tr>
<td>Yumen City</td>
<td>305</td>
<td>120.09</td>
<td>0.06</td>
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<table>
<thead>
<tr>
<th>Location</th>
<th>Distance from Tianshui to adjacent cities (KM)</th>
<th>Distance between Tianshui and other breaking-points of Tianshui at breaking-points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qingshui</td>
<td>50</td>
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<table>
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<th>Distance from Pingliang to other cities (KM)</th>
<th>Distance between Pingliang and other breaking-points of Pingliang at breaking-points</th>
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<table>
<thead>
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<th>Location</th>
<th>Distance from Qingyang to other cities (KM)</th>
<th>Distance between Qingyang and other breaking-points of Qingyang at breaking-points</th>
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<td>Cities (KM)</td>
<td>Breaking-points of other cities (KM)</td>
<td>Distance from Pingliang Field strength of other and breaking-points of Pingliang at breaking-points</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Qingcheng County</td>
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<td>42.74</td>
</tr>
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<td>83.46</td>
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<td>Heshui County</td>
<td>80</td>
<td>56.69</td>
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<td>Zhengning County</td>
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<td>66.87</td>
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<td>Ning County</td>
<td>60</td>
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<td>Pingliang City</td>
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<td>70.03</td>
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<td>Lingtai County</td>
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<td>Chongxin County</td>
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<td>69.19</td>
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<td>Huating County</td>
<td>45</td>
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<tr>
<td>Zhuanglang County</td>
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<td>82.66</td>
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<td>Jingning County</td>
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<td>Qingyang City</td>
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<td>Dangchang County</td>
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</tr>
<tr>
<td>Cheng County</td>
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<td>74.52</td>
</tr>
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<td>Kang County</td>
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<td>76.68</td>
</tr>
<tr>
<td>Wen County</td>
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<td>75.14</td>
</tr>
<tr>
<td>Xihe County</td>
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<td>108.53</td>
</tr>
<tr>
<td>Li County</td>
<td>160</td>
<td>98.82</td>
</tr>
<tr>
<td>Liangdong County</td>
<td>293</td>
<td>219.00</td>
</tr>
<tr>
<td>Hui County</td>
<td>216</td>
<td>128.54</td>
</tr>
</tbody>
</table>

Distance from Hezuo

Distance between Hezuo Field strength of

to other cities (KM) and breaking-points of Hezuo at
Other cities (KM) breaking-points

<table>
<thead>
<tr>
<th>City</th>
<th>Radius (km)</th>
<th>GDP (RMB10,000)</th>
<th>Non-agricultural population (10,000 persons, 2005)</th>
<th>City Scope</th>
<th>Radiation Radius (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lintan County</td>
<td>73</td>
<td>44.97</td>
<td>0.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zhuoni County</td>
<td>100</td>
<td>63.12</td>
<td>0.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zhouqu County</td>
<td>350</td>
<td>212.81</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diebu County</td>
<td>244</td>
<td>153.67</td>
<td>0.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maqu County</td>
<td>237</td>
<td>150.55</td>
<td>0.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luqu County</td>
<td>84</td>
<td>59.71</td>
<td>0.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xiahe County</td>
<td>67</td>
<td>41.18</td>
<td>0.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linxia Conty</td>
<td>84</td>
<td>32.82</td>
<td>0.48</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6-15: Radiation radius of major cities in Gansu

Through the above analysis, Gansu province can establish three large city clusters based on the intensity of connection and radiation radius between cities: Lanzhou-Xining city economic zone, Hexi Corridor city belt, and Guanzhong-Tianshui city belt (graph 10). Hezuo, Pingliang, and Qingyang can only be developed into spot development district, due to their limited radiation sphere and little connection with surrounding cities.
3.2.1. Lanzhou-Xining City Economic Zone --- taking Lanzhou city as the core, it includes Lanzhou (the whole city), Xining, Baiyin (the whole city), Dingxi (part of it: Lintao, Dingxi, Weiyuan, Tongwei and Longxi), Linxia (the whole city) and Tianzhu. It is the priority area of Gansu's urbanization and the focus is on Lanzhou, Baiyin, Dingxi, Lintao and Linxia.

Graph 11 compares the passenger traffic of railway and highways between Lanzhou and its surrounding cities. It also shows the intensity of connection between Lanzhou and the surrounding cities. Lanzhou is most closely connected with Linxia, Kangle and Baiyin in the province, and its connection with Xining is absolutely closer than any other cities out of Gansu.
To establish a closely connected city economic zone, key traffic lines will be taken as links to connect towns along the lines, with the focus on industrial association. In this process, comparative advantage of Lanzhou in science and technology, business and trade, finance and information shall be utilized; the flow of capital, technology, talents and information shall exert an intensified radiating and driving effect over the surrounding areas; regional resources shall be integrated for a regional coordination framework. A characteristic city zone shall be developed gradually with the cities complementing each other, interaction between urban and rural areas, smooth connection, taking the hi-tech industry, featured petrochemicals and non-ferrous metallurgy industry as the main body and with integration of characteristic agro-product production and processing with folk culture. In this way, the overall strength and competitiveness of the Lanzhou city economic zone shall be enhanced.

Efforts should be made to strengthen the economic and trade connection and cooperation between Lanzhou and Xining to increase the radiation effect over Xining. We should seize the opportunity of the opening Qinghai-Tibet railway, and attach importance to the material exchanges with Tibet, with a view to making Lanzhou an inland base for production, living and circulation of consumer goods for Lhasa, Tibet.

Lanzhou: an important center for trade and logistics in northwest China, the “gateway” city in Gansu province. It is also the provincial center of politics, economy, science and technology, culture, communications, information, trade and innovation, with prominent comprehensive functions. Priorities will be given to trade, logistics and hi-tech industry, and the position of Lanzhou as the trade and business center in northwest China shall be intensified; Lanzhou’s geographical advantage as the traffic hub shall be utilized to develop its function as a logistics center. Based on the original development, the secondary industry such as petrochemical industry and electro-mechanical industries in the city shall be developed properly.

Baiyin: an important city for the industrial transfer from Lanzhou, the future key industrial area in Gansu. The economic coordination and complementary advantages of Baiyin and Lanzhou shall be intensified. Priority will be given to the secondary industry (non-ferrous metal, coal, petrochemical, building materials, etc.) by relying on the hi-tech
industrial park of the Chinese Academy of Sciences (CAS), to make it an important component of Lanzhou city’s economic zone. Compared with Lanzhou, Baiyin enjoys an advantage in land resources, for the land price equals to one tenth of that in Lanzhou; it also has lots of experienced workers and the platform of the CAS hi-tech industrial park.

Dingxi: regional business and trade center, political, economic and cultural center in Dingxi city. Priority is given to agro-product, byproduct and TCM processing, and business and business services will be developed vigorously. Comprehensive services of the city will be enhanced.

Lintao: backyard garden of Lanzhou, and an important recreational service area in Lanzhou. The development priorities are recreational city tourism, business services and real estate.

Linxia: regional business and trade center, important pivot for Lanzhou logistics radiation.

3.2.2. Hexi corridor city belt — relatively independent oasis city belt, and city economic belt with several concentrated city clusters which are separated from each other, including Jiuquan-Jiayuguan city cluster, Zhangye city cluster, Wuwei-Jinchang city cluster and Dunhuang city cluster.

Jiuquan-Jiayuguan city cluster: including Jiuquan, Jiayuguan, Yumen and Jinta, with priorities on Jiuquan and Jiayuguan. The two cities are no more than 20 kilometers from each other, with strong economic complementarities. The integrated development of the two cities can lead to the most important regional economic growth pole and regional economic center in the west of Gansu, as well as a cosmopolitan and an important pivot along the Lanzhou-Urumqi section of Longhai Railway.

Jiuquan: regional traffic hub, comprehensive regional central city integrating industry, trade, tourism and services.

Jiayuguan: key industrial area and economic center on the Jiugang-Jiayuguan city belt, based on Jiugang, and with priority to the steel-focused secondary industry. The city development targets at realizing complementary city functions and utility sharing with Jiuquan.

Zhangye city cluster: including Linze and Gaotai. It is an important belt-like city cluster and economic growth pole in Hexi Corridor along the traffic line. Zhangye city is the focus of its development.

Zhangye: renowned national historical and cultural city. It is the trade center in the middle of the Hexi Corridor and a regional comprehensive central city. Priorities are given to green food processing, tourism and services.

Wuwei-Jinchang city belt: including Yongchang and Gulang. Its development priorities are Wuwei and Jinchang.

Wuwei: renowned national historical and cultural city. Important trade center and traffic
hinge along the Hexi Corridor. Rich tourist resources shall be tapped for tourism and the service sector; its position as a trade center and traffic hinge shall be intensified; agro-product and byproduct processing and logistics shall be further developed. It is an important comprehensive city along the Hexi Corridor.

**Jinchang**: the nickel capital and refining center of platinum group metal in China; an industrial city mainly developing mining industry, non-ferrous metallurgy and building materials. Through integrated development, Jinchang can complementarily develop with Wuwei in terms of city functions and production factors.

**Dunhuang city cluster**: because the field strength on the breaking-point between Dunhuang and surrounding counties are less than 0.3, the current radiation effect of Dunhuang on surrounding counties is very weak, so is their connection. In a short time, a Dunhuang-centered city cluster can hardly be developed. However, in the long run, when developing Dunhuang as a priority, a city cluster shall be developed including Subei, Akesai and Guazhou, taking tourism integration as a driving force. Dunhuang is the development priority of the cluster.

**Dunhuang**: renowned national historical and cultural city; internationally renowned tourist city. In the target of internationally renowned modern tourist city, tourism and servicing sector shall be vigorously developed by integrating surrounding tourist resources.

### 3.2.3. Guanzhong-Tianshui city belt
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Cross the provincial boundary, integrate in Guanzhong industrial belt, to enhance its strength and extend its radiation to Longnan. The belt covers Tianshui, Longnan, Boaji, Xianyang and Xi’an, Tianshui, Longnan (Wudu area) and Chengxian are priorities in Gansu province.

| Table 6-16 2005 regional distribution of passenger and cargo transport volume of Tianshui |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
|                                | Passenger flow (10,000 persons) | Passenger Turnover (10,000 person-kilometers) | Cargo flow (10,000 tons) | Cargo Turnover (10,000 ton-kilometers) | Total number | Percentage % |
| Total number                   | 1402                            |                                  | 1422                            |                                  | 10036              | 7                 |
| In areas under its jurisdiction | 1199                            |                                  | 34591.8                          |                                  | 10200              | 8                 |
In areas beyond its jurisdiction

<table>
<thead>
<tr>
<th>Region</th>
<th>North (Pingliang, Qingyang, Ningxia, etc.)</th>
<th>South (Longnan, Sichuan, etc.)</th>
<th>East (Baoji, Xi’an, etc.)</th>
<th>West (Lanzhou, Qinghai, Gannan, Dingxi, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>24.36 12 3654 9.2 63.09 5.9 4410 4.9</td>
<td>52.2 25.7 5272.2 13.3 315.45 29.7 22052 24.5</td>
<td>29 14.3 7250 18.4 493.99 46.5 51405 57</td>
<td>97.44 48 23280 59 189.27 17.8 12302 13.6</td>
</tr>
</tbody>
</table>

Source: field study

Table 15 shows that due to the administrative division, Tianshui has much closer economic contact (cargo transport) with Baoji and Xi’an than with Lanzhou, although the personal contact between Tianshui and Lanzhou is the closest. The cargo turnover accounts for over 57% of the total for the area beyond its jurisdiction. The connection of Tianshui with Longnan is much stronger than that with other regions. Therefore, the urban development of Tianshui shall be taken as part of the Guanzhong city belt (cluster), integrating with the Guanzhong economic circle, and with priority to eastward development. By the end of the 11th FYP, the establishment and running of Tianbao Highway (138 km) will strengthen the connection between Tianshui and the Guanzhong industrial belt.

Guanzhong-Tianshui city belt, composed of Xi’an, Xianyang, Baoji, Tianshui and other cities, priority should be given to new and high technologies, mechanical manufacturing, equipment industry, aeronautical & astronautic industry, featured tourism and modern hi-tech agriculture, so as to gradually establish a cross-provincial Baoji-Tianshui hi-tech
industrialization and technological innovation city belt. Priorities are given to Tianshui, Longnan and Cheng County.

**Tianshui City:** renowned national historical and cultural city; provincial sub-central city; “gateway city” in the east part of Gansu; an important hub for Gansu to connect with the central and eastern part of China; political, economic and cultural center and traffic hub in southeast Gansu; one of the important centers for mechanical processing and electronics manufacturing, logistics, and tourism industries, providing comprehensive services to the city.

**Longnan (Wudu area):** political and business service center in Longnan. Focused on agro-product, byproduct and TCM processing, business services and modern logistics shall be developed.

**Cheng County:** important economic center in Longnan. Priorities are given to non-ferrous metal metallurgy, ecological tourism, and business service industries for the surrounding area.

### 3.3. Forming a “one circle, two belts & three spots” city development outlay

Based on the city cluster development, a “one circle, two belts & three spots” city development outlay is gradually developed (graph 12). “One circle”: the Lanzhou city economic circle which is the Gansu part in the Lanzhou-Xining city economic zone, covering 27 counties and districts. It is the priority and key area in urbanization of Gansu. “Two belts”: key belt for urbanization, including (1) key developing belt for the urbanization of the Hexi Corridor; (2) key developing belt for the urbanization of southeastern Gansu, along the Longhai Railway and centered by Tianshui. Priority is given to regional central cities, with the focus on developing city cluster. “Three spots”: eastern Gansu which is centered at Qingyang and Pingliang, and southern Gansu centered at Hezuo. That area is still in a scattered state without order. A strong radiation circle and city belt is yet to form. Scale urbanization is not suitable for the place in the future. Priorities are given to Qingyang, Pingliang and Hezuo.

**Qingyang:** regional (border area among Shaanxi, Gansu and Ningxia) economic and trade center; comprehensive central city in the region.

**Pingliang:** regional economic and trade center; important city of industry, trade and tourism in the border area among Shaanxi, Gansu and Ningxia; traffic hub and central city in eastern Gansu; comprehensive central city in the region.

**Hezuo:** one of the central cities in the southern Gansu; the most important folk product distributing center along the border area of Gansu, Qinghai and Sichuan; regional trade center. Priority is given to folk cultural tourism.
Section 4 Urbanization Models of Different Corpus Function Areas

The 11th Five-year Plan has divided the national land into four functional categories, namely prioritized development area, key development area, restricted development area, and prohibited development prohibition area. These divisions are based on resources capacity, development density and potentials and they set the general guideline for future development directions, timeframe and intensity. By development, it means the production and construction activities promoting industrialization and urbanization. The categorization presents the idea of differentiated development. The focus of development, development impetuses and the role of urbanization are different in the four distinctive zones, hence different models of urbanization.

Based on the natural resources of the province and the role they can play in land resources development in the nation, in general, Gansu can see the co-existence of restricted development zones and some key development zones. There are very few prioritized and prohibited development zones. This is mainly because the adverse natural conditions and fragile environment are not suitable for large-scale and high-density economic development, as a result, only some areas can be grouped into key development zones. We are certainly not opposed to the mix-up of these zones, for
example, some restricted or even prohibited development zones can be embedded in key development zones.

4.1. Prioritized development zones

Prioritized development zones refer to areas with intensive development and reduced environment bearing capacity. In Lanzhou-Xining core economic zone, which includes Chengguan, Qilihe, Xigu and An’ning districts in the urban area of Lanzhou, future development priority is to improve the overall competitiveness through industrial restructuring. The emphasis of urbanization there is to improve city functions so as to upgrade the influence of those areas. First, we should adjust the design and layout of old urban areas by highlighting their features and functions. Second, we should boost urban economy by forming clusters of hi-tech industry and a regional innovation center and reinforce economic cooperation and division of industry with Baiyin so as to enable complementary advantages between the two, and promote the building of industrial clusters and science parks and information-based activities.

4.2. Key development zones

Key development zones refer to areas with focus on industrialization and urbanization. These areas still have resources capacity for further development and more population. They mainly refer to the western Longhai-Lanxin economic belt in Gansu with abundant resources, including the surrounding areas of Lanzhou-Xining economic zone (Honggu District, Baiying, the urban area of Dingxi, Lintao, Dingxi, Weiyuan, Tongwei, Longxi, Linxia and Tianzhu), jurisdiction of Tianshui, Qingshui, Qing’an, Gangu, Wushan, Zhang County, Wuwei—Jinchang cluster, Zhangye cluster, Jiayuguan—Jiuquan cluster, Guazhou and Dunhuang.

The key development zones are the major areas in the urbanization drive. According to the differences in the process of urbanization, these zones can be again divided into two groups: areas surrounding key development zones and areas along major transportation lines.

4.2.1. Areas surrounding key development zones

Those areas are highly dependent on the economy of big cities. The key areas of urbanization are **counties and towns with distinctive features**. The priorities are to take on the industrial transfers from optimized integration areas, strengthen the supporting industries to achieve complementary economic development with core urban areas; develop recreation facilities and service industry in counties and towns with distinctive features and improve local infrastructure. The competitive relations between urban and rural areas should be turned into cooperative partnership. Residential areas with multi-centers shall be established (house prices in suburbs and counties are lower than
those in Lanzhou) for the prosperity of small and medium sized cities and towns. However, the precondition is mature public transportation system linking cities, towns and new residential areas.

4.2.2. Areas along major transportation lines

The key step of urbanization in those areas is to form new growth poles. **Regional urban centers and counties** should develop first. Efforts should be made to enhance those centers’ capacity and spill-over effects, since they are the major migration destinations for restricted and prohibited development zones, and will gradually become the new economic centers with a large population.

The key development zones in Hexi Corridor are vast in space with low population density. Efforts should be made to further the comprehensive functions and economic strength of central cities as well as the "network support" so as to attract foreign investment and promote domestic enterprises, including comprehensive services—vocational education and technical service. While developing the central cities, the government should develop industries in counties to attract more labor force, magnifying the size of regional central cities and counties. The population of Wuwei City increased by 196,200 from 2000 to 2005, 10,700 of which (55% of newly added urban population) are concentrated in Liangzhou District, while Minqin, Guliang and Tianzhu Districts only took up 11.6%, 23.6% and 10% respectively. It shows that among the same type of city groups, prefecture-level cities are the main appeals to labor forces.

The key development belts in Longdong and Longnan area with Tianshui City as the center enjoy high densities of cities, towns and population. The small cities and towns have developed well there. Urban areas and counties of Tianshui should take the lead in development, and then comes the key towns in a bid to set up city-town system. Tianshui will develop further with improved city functions and impact over surrounding areas. The economy of counties will further grow with clusters of competitive industries and more job opportunities. We should develop key towns selectively by controlling the number and form a multi-layered urban network.

4.3. Restricted development zone

Restricted development zones are districts with little resources and fragile environment which are unsuitable for large-scale industrial development and gathering of large population. These soil erosion areas include hills and ravine areas on the Loess Plateau, natural forest protection areas, water resources protection areas, grasslands suffering from desertification, basification and drought, areas with water shortages and frequent natural disasters. These places include Qingyang, Pingliang, hills and ravine areas on the Loess Plateau in Tianshui (some counties) and mountainous areas in Longnan and Gannan.
In restricted development areas, the government should protect priority projects, develop appropriately with influence over nearby areas, and promote featured industries within the capacity of environment so as to avoid pell-mell industrialization and urbanization. The major task is to provide public facilities and jobs, and improve the blueprint for cities and towns. It’s not advisable to build up concentrated large and medium sized cities, but preferably scatter the key towns so as to serve the development of rural areas.

Gannan and Longnan areas are far away from big cities, but it does not mean that small and medium sized cities and towns are not positioned to enjoy further growth, even small cities and towns in remote places. The key task is to improve the comprehensive services of counties and key towns during the set-in of urbanization. At the same time, small urban places can develop distinctive tourism industry to push forward overall development. Given factors like landform and transportation, the development of central towns is of special significance. Deprived of links with central cities, rural areas can benefit from facilities provided by the cities and towns. This in turn will consolidate the existing pattern and cultural landscape.

Despite the fact that Qingyang and Pingliang belong to restricted development zones, they possess high population density and need to perfect city town system so as to facilitate co-development with clear division of labor among small and medium sized cities and towns. Those two prefecture-level cities should not seek pell-mell expansion; rather, they should upgrade comprehensive services and optimize their industrial structures. Efforts should be made to advance featured industries like tourism and processing of agro-products. The development of counties will bring about more employment, making them important carriers of rural surplus labor force and engines for economic growth, serving as bridges between cities and townships. At the same time, the government should step up efforts to enhance infrastructures in key towns with geographical advantages, promote agro-products processing to increase magnet for migration and reduce the pressure on prefecture-level cities resulted from too many transfers of population from the rural area.

4.4. Prohibited development zones

Prohibition development zones are nature conservation areas designated according to the law, including water conservation districts, biodiversity protection areas and wetland protection areas. At present, the number of nature conservation areas is amounts to in Gansu, with a total area of 9.88 million hectares, or 23% of the province. 13 of them are of national level and 42 at the provincial level. This kind of development zone is embedded in the above-mentioned zones. It is no place for urbanization because cities and towns are not allowed here. At the same time, population in the core areas of these zones have to migrate to other places step by step. Therefore, prohibited development zones shall be avoided in urbanization drive in any other three zones.
Section 5 Suggestions on Strategies & Policies of Urbanization

It is vital important to adopt the right strategies of urbanization so as to step up the socio-economic development in Gansu.

5.1. Prediction on urbanization level

Grey system theory, correlation analysis and regression analysis have been adopted to predict the urbanization progress in 2010 and 2020 in scenarios of fast, moderate and slow.

5.1.1. Regression analysis on time sequence

Original data show that there is an orderly change in population percentage in cities and towns of Gansu. A simulation analysis on time sequence can be conducted to predict the future. We come up with a simulation formula based on data since 1979 (graph 13):

\[ Y = 6E - 159X^{48.362} \quad (R^2 = 0.9464) \]

In the formula: \( Y \) stands for population percentage, \( X \) for year

![Graph showing predictions on urbanization rate (1979-2020)](image)

It’s predicted that by 20101, the urbanization rate in Gansu will reach 33.68%, and 42.81% in 2020.

5.1.2. Correlation analysis

Both domestic and foreign researches show that among all the factors affecting urbanization, economic development is the most decisive one. Therefore, we made the correlation analysis on per capita GDP, a comprehensive index, and population ratio in
cities and towns.

Since GDPs along the years are not comparable in terms of prices, we have first adjusted GDPs according to the GDP indices throughout the years, so that those GDPs can be compared. We have conducted correlation analysis on per capita GDP and the population ratio in cities and towns.

\[ Y = 2.5205X^{0.3121} \quad R^2 = 0.9514 \]

In the formula: \( Y \) stands for population percentage, \( X \) for per capita GDP (graph 13)

We have predicted the situation on three hypotheses according to the above formulas. We have assumed the following scenarios, taking into consideration of the average growth rate of GDP during the 9th and 10th FYP and targets set in the Outline of 11th Five Year Plan of Socio-economic Development in Gansu: before 2010, the annual per capita GDP growth rates are 10%, 9.5% and 9% in the scenarios of fast, moderate and slow; between 2010 and 2020, the figures are 9.5%, 9% and 8.5%. We can get the results according to the hypotheses (table 16).

If we look at the moderate scenario according to the result, urbanization rate in this province will be 34% and 44.5% in 2010 and 2020 respectively.

### Table 6-17 Predictions on urbanization rate in different timeframes in Gansu

<table>
<thead>
<tr>
<th>Scenario</th>
<th>GDP growth rate (%)</th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast</td>
<td>10 9.5</td>
<td>4244.9 34.18</td>
<td>10519.8 45.45</td>
</tr>
<tr>
<td>Moderate</td>
<td>9.5 9</td>
<td>4149.3 33.75</td>
<td>9822.9 44.49</td>
</tr>
<tr>
<td>Slow</td>
<td>9 8.5</td>
<td>4055.4 32.23</td>
<td>9169.2 43.54</td>
</tr>
</tbody>
</table>
5.1.3. Grey system theory

To eliminate the fluctuation of original series and reduce random original numerical value, the accumulated value of series can replace original series for prediction analysis using the grey system, and then the results can be restored into original series. Often, accumulation series are nonlinearity.

Grey system simulation can be set up according to the population ratio in cities and towns of Gansu from 1990 to 2005, to come up with the following formula:

$$Y_{(t+1)} = 1068.24e^{0.0197424t} - 1046.23$$

In the formula: the year is 1990 when $t = 0$, and so on.

We can get predictions for different years with this formula. Based on the grey prediction model, urbanization rate in Gansu can reach 31% and 38% in 2010 and 2020 respectively.

<table>
<thead>
<tr>
<th>Year</th>
<th>Original value</th>
<th>Predicted accumulated value$(Y)$</th>
<th>Simulated prediction value</th>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>22.01</td>
<td>22.01</td>
<td>22.01</td>
<td>0</td>
</tr>
<tr>
<td>1991</td>
<td>22.26</td>
<td>43.31</td>
<td>21.30</td>
<td>-0.96</td>
</tr>
<tr>
<td>1992</td>
<td>22.54</td>
<td>65.03</td>
<td>21.72</td>
<td>-0.82</td>
</tr>
<tr>
<td>1993</td>
<td>22.71</td>
<td>87.19</td>
<td>22.16</td>
<td>-0.55</td>
</tr>
<tr>
<td>1994</td>
<td>22.96</td>
<td>109.79</td>
<td>22.60</td>
<td>-0.36</td>
</tr>
</tbody>
</table>
5.1.4. Comprehensive predictions

The results of the three different models are very similar (table 18), but there are still some discrepancies. If we compare the results of grey system with the real figure in recent years, the former is over one percentage point lower than the latter, mainly because urbanization efforts have been accelerated by the local government since 2002 to promote prefectures into prefecture-level cities and townships into towns. In 2002 alone, Pingliang, Jiuquan, Zhangye and Qingyang were upgraded to cities and 130 townships became towns. The governments’ moves helped to achieve leapfrogging development in urbanization. The urbanization rate was up by 1.45 percentage points in 2002 over 2001, 1.42 percentage points in 2003 over 2002, 1.3 percentage points in 2004 over 2003, and 1.4 percentage points in 2005 over 2004. The growth has maintained about 1.4 percentage points for four consecutive years, which is quite abnormal because it runs against the law of development, and has been pushed by man. Therefore, we estimate that the real urbanization rate in Gansu was around 28% in 2005, not the original 30%.

The overestimated urbanization rates since 2002 have lead to high values in time sequence simulation and correlation analysis. Therefore, we can take the average out of the three results.

**Urbanization rate might reach 33% in 2010 and 42% in 2020.**

<table>
<thead>
<tr>
<th>Method</th>
<th>Year 2010</th>
<th>Year 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time sequence</td>
<td>33.68</td>
<td>42.8</td>
</tr>
<tr>
<td>Correlation analysis</td>
<td>33.75</td>
<td>44.5</td>
</tr>
</tbody>
</table>
5.2. Urbanization Paths

Multiple factors—few cities or towns enjoying high primacy degree, long, narrow and diverse geographical features and a large amount of rural surplus labor forces with little education—have determined the way to urbanization should be characterized by diverse directions, intensive and coordinated development. Diverse directions mean that there are different models of urbanization in response to natural environment, existing city and town network and population distribution. Intensive development indicates that improved efficiency of cities should be based on water and soil conservation and should highlight the development of regional city groups. Coordinated development means the balanced development among all the cities and towns, big or small, and also the size of cities and towns should be compatible with local resources capacity.

5.2.1. Highlighting the development of city clusters. The cluster should be the core, cities as the backbone, counties and key towns as the foundation, and they develop in a coordinated way. Priority should be given to Lanzhou’s economic development, emphasizing its leading position in city town network. Development of sub-centers like Tianshui and Jiuquan-Jiayuguan should be accelerated, with the focus on building Tianshui-Guanzhong city cluster and Jiuquan—Jiayuguan cluster.

5.2.2. Development pattern featuring “one circle, two belts and three spots”. The multi-layered development structure works with Lanzhou economic circle as the core, urban areas in Hexi Corridor and Longdong and Longnan areas surrounding Tianshui as the focus, the spots districts as the basis (Qingyang, Pingliang and Hezuo) and regional centers, counties and key town as supporting areas.

5.2.3. Developing urbanization in diverse areas. Efforts should be made to combine centralized and decentralized developments. In vast areas with sparse population like Hexi, priority is to develop regional central cities and enhance the strength and influence of small and medium-sized cities. In Longnan and Gannan, counties should develop first and then come the key towns. In Longdong area with a large population and little land, each county should have three to five key towns apart from developing prefecture-level cities and counties there.

5.2.4. Conserving water and soil to expedite urbanization in a sustainable manner.

Urbanization efforts can be divided into two phases:

2007-2010: Develop Lanzhou-Xining urban economic area, upgrade industrial restructuring and transportation facilities, have clear division of industries so as to build
an efficient and prosperous economic zone.

2011-2020: Develop Tianshui—Baoji city belt, blending industries in Tianshui into the economic group in Guanzhong. Promote the integration of Jiuquan-Jiayuguan; facilitate the building of Wuwei—Jinchang city group, Zhangye city and town cluster and Dunhuang city cluster and nurture a batch of big and medium-sized cities along the west Longhai-Lanxin development axis.

5.3. Advice for policy making

5.3.1. Promoting secondary and tertiary industries to create more jobs in urban areas

Economic progress is the spring for urbanization. Based on the existing industrial foundation, efforts should be made to by relying on science and technology to develop new products, combine information with industrialization so as to upgrade Gansu’s equipment industry and strengthen the interaction between information and industrialization. At the same time, efforts should be made to advance the market-based development of private companies, and facilitate the forming and growth of industrial clusters.

The tertiary industry is a sustainable engine for city development. We should develop business and trade, tourism, transportation and catering and other traditional services to boost the labor market. More attention should be given to information services, financial and insurance services in a bid to improve the configuration of tertiary industry and meet the demand of industrial upgrade. Community service can be another source for new job opportunities.

To boost economic development of key towns, comprehensive services and agricultural industrialization are the important tasks, and as well as the promotion of non-agricultural industry in rural areas.

Gansu Province has a large population and many surplus labor forces from the countryside, however, without pillars of industries in cities and towns, it is very difficult to attract them to work in the urban area, and they might return homes once they lose jobs even if they have made their ways into urban areas. Therefore, cities and towns should build up their current industrial advantages to develop labor-intensive industries in different fields so as to provide more employment in the urban area.

5.3.2. Deepening reforms of Hukou system, social security system and land use system

System innovation is the fundamental guarantee for urbanization in Gansu.

Deepen the reform of Hukou system by easing the control over migration of rural population into cities and towns and creating more realistic conditions for farmers to settle down once they migrate. We should allow the change of registration if farmers have met certain requirements and lower or even eliminate the threshold of migration. We should gradually set up a registration system by which urban and rural population are
divided by their residence, agricultural population and non-agricultural population by their occupations so that we can realize uniform management of rural and urban Hukou and create conditions for migration.

Strengthen reforms of property system and land use system in rural areas. We should put in place effective land use transfer system to achieve the separation of land ownership, right of contract and use. We should encourage farmers settled down in cities to transfer contract right with compensation, and allow them to enjoy their rights by holding some shares, or it can be linked with social security system so that farmers feel more secured. Farmers working in secondary or tertiary industries with urban Hukou should be allowed be transfer their contracted land and reservation land so that large scale operation of land can be facilitated.

Improve reforms on housing, employment and social security systems. Promote reforms of housing system in cities by building more cheap-rent houses and low-budget houses that farmers can afford. Farmers who voluntarily give up land contract right after migrating can enjoy equal substance allowances with urban citizens. Farmers can set personal pension account referring to pensions for private business owners. We will gradually set up a social security system mainly supported by individuals with the subsidies from state and collectives to care for the old, unemployed and sick and extend the system to small cities and towns.

Establish and improve a uniform labor market in urban and rural areas to realize reasonable flow and allocation of labor. We should guide rural workers into cities and towns in an orderly way to compete on a leveling playing field.

We should establish a market operation mechanism that is conducive to fund-raising to expand investment channels and increase input on urbanization. Urban constructions are often short of funds in Gansu. Therefore, we should set up and improve investment mechanism with multiple options since this is the material foundation of urbanization. First, we should take advantage of the opportunity presented by the Western Development Program to seek projects supported by the central government or fiscal budget. At the same time, we should mobilize private capital and foreign money to take part in the drive to break down monopoly by pushing infrastructure projects into the market. Projects with good economic returns should be subject to the market with the principle of “who invests, who benefits”, and the management should be oriented towards the market. Some projects related to public interests cannot have completely market-based prices, such as tap water, gas and sewage disposal. They should enjoy investment from governments and favorable investment policies.

5.3.3. Upgrading literacy of rural population and accelerating migration of surplus labor forces from restricted development zones.

Restricted development zones have vast areas with high population density. Therefore, it is difficult for the surplus labor to find jobs within the same areas. The transfer of such labor to other areas will reduce local population, thus advance urbanization of local cities and towns.
We should step up the efforts on nine-year compulsory education to improve the literacy of farmers. In the short term, vocational education can yield quick returns. Farmers can learn practical non-agricultural skills through attending night schools or training classes. Meanwhile, we should conduct more training courses and organized more intermediary organizations to facilitate the transfer of surplus farmers.

5.3.4. Enhancing the functions of cities like Lanzhou and speeding up the transformation of resource-rich cities

We will reinforce Lanzhou’s position as a regional center by improving its comprehensive functions and spill-over effect. Through the building of the Lanzhou city economic circle, we will expand the influence of Lanzhou over the surrounding rural areas. In addition, it is advisable to speed up the transformation of resources-rich cities, accelerate industrial restructuring, develop alternative industries and improve city functions so that comprehensive services can be achieved. At the same time, we should be creative in exploiting resources and avoid repeating the blind development of mineral sources in the urbanization drive.

5.3.5. Maintaining reasonable pace of urbanization

The urbanization process in Gansu was quite slow in the 1990s, but it has gained momentum with an annual growth of 1.3—1.4 percentage points since entering the new Millennium, especially after year 2002. However, we must see that the growth was pushed by the government. Therefore, we should transform the way urbanization is done by breaking down the government’s methodology of enlarging the urban areas and administrative monopoly, so that urbanization can be in line with social and economic development. Meanwhile, a faster speed of urbanization is not necessarily a blessing. An appropriate pace and speed is conducive to curbing disorderly expansion and cooling the rivalry between governments in blind pursuit of urbanization speed.

5.3.6. Adjusting administrative division and integrating resources of cities

Jiuquan borders with the Jiayuguan district and their economies and functions complement each other with similar histories and culture. We should make use of these advantages, overcome the administrative divisions to effectively organize production factors, make full use of social and economic resources, avoid industrial homogeneity and disorderly competition, achieve sharing of technology, information, talents and capital, services and improve the efficiency of resources development and utilization in a bid for building of regional economic centers in west Gansu. However, though direct links of buses and taxies have been realized, there are still random competition and repetitive constructions in Gansu. Jiayuguan’s only economic pillar is Jiuquan Iron and Steel Co., Ltd. and Jiuquan’s economic driving forces lie in agriculture and tertiary industry without secondary industry. Therefore, the integration of the resources on both sides can not only make them complementary to each other, but also help to build a central city between Lanzhou and Urumqi. Therefore, it is preferable to combine Jiuquan and Jiayuguan into a single administrative district with jurisdiction over Yumen City and Jinta County, so as to effectively allocate resources. In order to realize the goal, we
should make practical plans to strengthen infrastructures and public service facilities, develop industries and make labor divisions according to local realities, thus improving the city functions.

Since Dunhuang enjoys international reputation in terms of tourism, we suggest promote it to prefecture-level city with jurisdictions over Guazhou, Subei and Akesai counties. However, the population size should be controlled because of limited water resources.
Reference:


Study on Human Resources Strategy in Gansu

LI Hanlin
Abstract

The slow development of Gansu Province is partly attributed to inadequate development of human resources (HR). This sub-report mainly touches upon the following aspects: Gansu Province’s HR volume and structure, basic conditions and ability of HR development, basic ideas, strategies, policies, forms and effects concerning HR development as well as future prospects, strategic choices, solutions and project design of the province’s HR development. At a stage of structural adjustment, Gansu should develop HR from three perspectives with a focus on human capital cultivation:

1. Making the most of the current human resources with emphasis on improving HR qualities and skills via education and training.

2. Targeting at cultivating future HR ability with emphasis on improving technical skills of young and middle-aged people through education, training and exercise.

3. Tapping HR potentials by providing specialized training for well-educated personnel so as to turn a number of HR resources into talent resources.
Gansu has been rather slow in socio-economic growth, largely due to the inadequate human resources development known for limited investment, restricted mobility of labor force, incompetence of adapting to job market and shortage of high-level talents. The HR inadequacy has posed challenges for Gansu, which is encountering continuous growth of population, redundancy of HR and shortage of skilled professionals in the mid-to-long run. We, therefore, need to embrace HR development as an emphasis of the strategy, especially public education, professional training, mobility of labor force, and inadequacy of skilled professionals with a view to breaking grounds in improving skills, enhancing employment, fostering talents, training skills and transferring rural labor force.

Section I: HR Status Quo and Potentials

Gansu, the seventh largest province with 430,000 sq. km and the second most populous one in northwest China with over 26.40 million people, is one of the under-developed areas in west China. In recent years, Gansu has seen a smaller number of top-notch professionals and redundant incompetent labor force.

1.1 HR quantum and structure

1.1.1 Change of HR quantum

From 1990 to 2005, Gansu eases its momentum of population growth from 14.48‰ to 6.02‰, with birthrate decreasing from 20.68‰ to 12.59‰, keeping the same pace with the national statistics—birthrate 12.40‰, natural growth rate 5.89‰. The natural population growth in the 1980s surpasses 600,000, which was lowered to 500,000 in the 1990s and 300,000 after 2000. With regard to employment, the annual increase was 100,000 in 1990s, 120,000 in 2005 and 160,000 in 2006.

| Table 7-1: Growth of human resources in Gansu |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| year            | year-end population | newborn | birthrate | death population | death rate | natural increase rate |
| unit            | 10,000 person      | %       | person    | %                | %          | %                    |
1.1.2 Population structure and urbanization

There are slight changes of population structure from 1990 to 2005. The sex ratio in Gansu was 104.46 in 1990, 107.60 in 2000 and 105.93 in 2005, a little bit lower than the national average of 106.18. Gansu keeps a slow pace in urbanization, with the urban population increasing by 0.5% from 1980 to 2005, lower than the national average of 1%.

Table 7-2: 2005 HR status quo in 14 cities

<table>
<thead>
<tr>
<th>regions</th>
<th>year-end population</th>
<th>rural population</th>
<th>non-rural area population</th>
<th>year-end households</th>
<th>natural increase rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10,000 persons</td>
<td>10,000 persons</td>
<td>10,000 persons</td>
<td>10,000 households</td>
<td>%</td>
</tr>
<tr>
<td>Lanzhou</td>
<td>314.96</td>
<td>131.03</td>
<td>183.93</td>
<td>89.99</td>
<td>4.73</td>
</tr>
<tr>
<td>Jiayuguan</td>
<td>18.43</td>
<td>3.22</td>
<td>15.21</td>
<td>5.39</td>
<td>6.44</td>
</tr>
<tr>
<td>Jinchang</td>
<td>46.42</td>
<td>25.31</td>
<td>21.11</td>
<td>13.93</td>
<td>5.53</td>
</tr>
<tr>
<td>Baiyin</td>
<td>174.55</td>
<td>132.94</td>
<td>41.61</td>
<td>46.63</td>
<td>6.29</td>
</tr>
</tbody>
</table>

Sources: (1) Gansu Yearbook 2006 and China Statistics Yearbook 2006
(2) Statistics was collected in 2005
### 1.2 Professional skills of human resources

#### 1.2.1 The overall professional skills of human resources are rather low.

Gansu is rather backward in education, with school life expectancy (SLE) around seven years, ranking the 27th among all the provinces in 2005, three years shorter than that in Beijing. With regard to the proportion of educated population in 2005, college graduates accounted for 4.4% of the population above six years old, an increase of 3.3% from 1990; graduates from senior high schools, junior high schools and elementary schools accounted for 12.5%, 29.8% and 35.9% respectively, increasing by 4.7%, 12.9% and 6.8% from 1990. Despite the increase, the proportion of college graduates ranked the 26th, 1.1% lower than the national average; that of senior high school graduates ranked the 21st, 0.9% lower than the national average; the proportion of junior high school graduates was the 27th, 8.2% lower than the national average; the proportion of elementary graduates ranked the 10th, 2.5% higher than the national level. The percentage of illiterate and semi-illiterate population ranked the 4th, 7.7% higher than the national level.

#### Table 7-3: School life expectancy

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tianshui</td>
<td>340.46</td>
<td>252.39</td>
<td>88.07</td>
<td>87.37</td>
<td>6.43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wuwei</td>
<td>189.38</td>
<td>159.16</td>
<td>30.22</td>
<td>49.38</td>
<td>5.81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zhangye</td>
<td>126.97</td>
<td>95.71</td>
<td>31.26</td>
<td>37.47</td>
<td>4.91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pingliang</td>
<td>218.51</td>
<td>186.34</td>
<td>32.17</td>
<td>57.86</td>
<td>5.54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jiuquan</td>
<td>97.76</td>
<td>63.85</td>
<td>33.91</td>
<td>29.53</td>
<td>5.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qingyang</td>
<td>251.42</td>
<td>221.57</td>
<td>29.85</td>
<td>64.55</td>
<td>7.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dingxi</td>
<td>294.41</td>
<td>266.41</td>
<td>28.00</td>
<td>72.72</td>
<td>5.82</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longnan</td>
<td>260.89</td>
<td>224.34</td>
<td>36.55</td>
<td>67.54</td>
<td>5.76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linxia</td>
<td>192.69</td>
<td>169.97</td>
<td>22.72</td>
<td>43.68</td>
<td>7.35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gannan</td>
<td>67.50</td>
<td>54.66</td>
<td>12.84</td>
<td>16.75</td>
<td>7.41</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: *Gansu Yearbook 2006*
<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>6.42</td>
<td>6.55</td>
<td>6.88</td>
<td>6.72</td>
<td>6.78</td>
<td>6.80</td>
<td>7.62</td>
<td>7.43</td>
</tr>
<tr>
<td>Gansu</td>
<td>5.73</td>
<td>5.83</td>
<td>6.17</td>
<td>6.01</td>
<td>6.03</td>
<td>6.05</td>
<td>6.61</td>
<td>6.83</td>
</tr>
</tbody>
</table>

Sources: *Gansu Yearbook* and *China Statistics Yearbook*

### 1.2.2 The proportion of illiteracy and semi-illiteracy is rather high.

Gansu has a rather high illiteracy and semi-illiteracy rate. It is especially so among women in impoverished areas and ethnic groups. In 2005, the national illiterate population above 15 years old was 116.684 million, 11.63% of the population above that age, whereas Gansu had 4.1396 million, 21.11% of its population, with the local illiteracy rate 9.47% higher than the national one. The illiteracy rate of youth reached 12.32% that year. The sex structure of human resources is quite imbalanced, with the female illiteracy and semi-illiteracy population doubling that of male. In the middle area of Gansu, 91.5% of rural women receive education no further than junior middle schools, with only 8.5% going to senior middle schools and higher-education institutions; whereas their husbands are, on the contrary, 76.6% and 21.7% respectively. The illiteracy and semi-illiteracy rate among women was 23.5%, four times that of their husbands.

![Figure 7-1: 2005 educated population per 100,000 people in Gansu](image)
1.3 Human resources development evaluation

1.3.1 Economy, education, science and technology couldn’t underpin HR development

The economic aggregate and fiscal revenue of Gansu are below the national average, with the per capita GDP ranking last but one among all the provinces. Gansu is the 25th in the country with regard to the number of technical professionals per 10 thousand people, which is about the 10th in 1980. Gansu has seen an increasing number of school age kids, due to the large population and high percentage of youth. In the 10th Five Year, Gansu keeps the economic growth at 10.74% and increase of higher education institutions at 22.95%. In a word, the economic and educational status quo couldn’t keep up with the demand of HR development.

Table 7-4: Economy, Education, Science and Technology Support HR Development
### 1.3.2 Status quo of HR development

This sub-report adopts a general methodology in analyzing regional HR development, though the indicators fail in precision. There is a great gap between Gansu and the

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>0.1 billion Yuan</td>
<td>242.80</td>
<td>557.76</td>
<td>1052.88</td>
<td>1688.49</td>
<td>1933.98</td>
</tr>
<tr>
<td>Fiscal revenue</td>
<td>0.1 billion Yuan</td>
<td>34.21</td>
<td>68.41</td>
<td>108.38</td>
<td>215.86</td>
<td>254.57</td>
</tr>
<tr>
<td>Per capita GDP</td>
<td>Yuan</td>
<td>1099.00</td>
<td>2316.00</td>
<td>4129.00</td>
<td>6566.00</td>
<td>7477.00</td>
</tr>
<tr>
<td>Disposable income for urban residents</td>
<td>Yuan</td>
<td>1196.72</td>
<td>3152.52</td>
<td>4916.25</td>
<td>7376.74</td>
<td>8086.82</td>
</tr>
<tr>
<td>Per capita net income of rural households</td>
<td>Yuan</td>
<td>430.99</td>
<td>880.34</td>
<td>1428.70</td>
<td>1852.00</td>
<td>1980.00</td>
</tr>
<tr>
<td>Student enrollment</td>
<td>10,000 persons</td>
<td>351.04</td>
<td>382.30</td>
<td>513.39</td>
<td>572.82</td>
<td>590.97</td>
</tr>
<tr>
<td>Universities</td>
<td>10,000 persons</td>
<td>3.39</td>
<td>4.55</td>
<td>8.17</td>
<td>20.03</td>
<td>22.97</td>
</tr>
<tr>
<td>Polytechnic schools</td>
<td>10,000 persons</td>
<td>4.97</td>
<td>5.80</td>
<td>8.23</td>
<td>10.60</td>
<td>10.37</td>
</tr>
<tr>
<td>Middle schools</td>
<td>10,000 persons</td>
<td>96.49</td>
<td>91.53</td>
<td>131.47</td>
<td>184.44</td>
<td>194.38</td>
</tr>
<tr>
<td>Elementary schools</td>
<td>10,000 persons</td>
<td>241.69</td>
<td>273.71</td>
<td>316.46</td>
<td>315.55</td>
<td>303.58</td>
</tr>
<tr>
<td>Education expenses of local finance</td>
<td>10,000 Yuan</td>
<td>67358.00</td>
<td>146778.00</td>
<td>311489.00</td>
<td>597768.00</td>
<td>752150.00</td>
</tr>
<tr>
<td>Research institutes above county level</td>
<td>number of institutes</td>
<td>116</td>
<td>140</td>
<td>138</td>
<td>112</td>
<td>107</td>
</tr>
<tr>
<td>Technical professionals</td>
<td>10,000 persons</td>
<td>31.24</td>
<td>34.64</td>
<td>40.44</td>
<td>44.02</td>
<td>46.61</td>
</tr>
</tbody>
</table>

Source: *Gansu Yearbook 2006*
national average according to the eight indicators shown as follows, for example the salary is RMB 4,192 Yuan lower than the national level, disposable income for urban residents RMB 2,406 Yuan lower and per capita net income of rural households RMB 1,275 Yuan lower.

Table 7-5: Gansu per-capita economic indicators

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Per capita GDP</td>
<td>RMB Yuan</td>
<td>1099</td>
<td>2316</td>
<td>4129</td>
<td>6566</td>
<td>7477</td>
<td>14040</td>
</tr>
<tr>
<td>Labor productivity</td>
<td>RMB Yuan/person</td>
<td>1879</td>
<td>3760</td>
<td>7131</td>
<td>11105</td>
<td>13900</td>
<td>24246</td>
</tr>
<tr>
<td>Per capita arable land</td>
<td>hectare</td>
<td>0.16</td>
<td>0.15</td>
<td>0.14</td>
<td>0.13</td>
<td>0.13</td>
<td>0.11</td>
</tr>
<tr>
<td>Per capita yield of grain</td>
<td>kilogram</td>
<td>1004.80</td>
<td>939.07</td>
<td>1022.87</td>
<td>1055.80</td>
<td>1099.19</td>
<td>1598</td>
</tr>
<tr>
<td>Persons supported by each employee</td>
<td>person</td>
<td>0.74</td>
<td>0.64</td>
<td>0.73</td>
<td>0.72</td>
<td>0.86</td>
<td>0.72</td>
</tr>
<tr>
<td>Average salary</td>
<td>RMB Yuan</td>
<td>2407</td>
<td>5493</td>
<td>7913</td>
<td>12711</td>
<td>14172</td>
<td>16024</td>
</tr>
<tr>
<td>Disposable income for urban residents</td>
<td>RMB Yuan</td>
<td>1196.72</td>
<td>3152.52</td>
<td>4916.25</td>
<td>7376.74</td>
<td>8086.82</td>
<td>10493</td>
</tr>
<tr>
<td>Per capita net income of rural households</td>
<td>RMB Yuan</td>
<td>430.99</td>
<td>880.34</td>
<td>1428.70</td>
<td>1852.00</td>
<td>1980.00</td>
<td>3255</td>
</tr>
</tbody>
</table>

Sources: *Gansu Yearbook 2006* and *China Statistics Yearbook 2006*

Gansu is a large agriculture province, with most of its workforce engaged in the agriculture sector. In 1990, the employees in Gansu reached 12.924 million, with primary, secondary and tertiary sectors accounting for 69.58, 14.42 and 15.99
respectively. The number jumped to 13.9136 million in 2005, with a proportion of 63.67, 14.66 and 21.67. The statistics shows merely a slight change of secondary industry, reduction of the primary industry and increase of the tertiary sector. In comparison with the national statistics in 2005, Gansu is 19% higher in the primary sector, 9% and 10% lower in the secondary and tertiary industries. The urban unemployment rate has been kept between 3.1%-3.4%, standing at 3.26% in 2005, a bit lower than the national rate of 4.20%. Gansu owes its low unemployment rate to the strategies of creating jobs, training personnel and transferring labor.

Table 7-6: Gansu’s employment circumstance and structure

<table>
<thead>
<tr>
<th>Year</th>
<th>Employment</th>
<th>Employees</th>
<th>Proportion of employment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Primary industry</td>
<td>Secondary Industry</td>
</tr>
<tr>
<td>1990</td>
<td>1292.40</td>
<td>899.40</td>
<td>186.30</td>
</tr>
<tr>
<td>1995</td>
<td>1483.32</td>
<td>942.30</td>
<td>281.50</td>
</tr>
<tr>
<td>2000</td>
<td>1476.45</td>
<td>880.56</td>
<td>279.78</td>
</tr>
<tr>
<td>2001</td>
<td>1488.93</td>
<td>886.66</td>
<td>274.85</td>
</tr>
<tr>
<td>2002</td>
<td>1500.59</td>
<td>888.80</td>
<td>278.36</td>
</tr>
<tr>
<td>2003</td>
<td>1510.85</td>
<td>890.04</td>
<td>282.23</td>
</tr>
<tr>
<td>2004</td>
<td>1520.46</td>
<td>890.61</td>
<td>284.63</td>
</tr>
<tr>
<td>2005</td>
<td>1391.36</td>
<td>885.82</td>
<td>203.96</td>
</tr>
<tr>
<td>China</td>
<td>75825</td>
<td>33970</td>
<td>18084</td>
</tr>
</tbody>
</table>

(1) Sources: *Gansu Yearbook 2006* and *China Statistics Yearbook 2006*
(2) Statistics was collected in 2005

1.3.3 HR development lags behind.

Gansu has 1.3 million professionals, only 410,000 of whom obtain technical skills, about one professional out of every 22 persons. Today Gansu has many problems in HR development.

1.3.3.1 Unbalanced distribution of high-level professionals.
In Gansu, 46.23% of college graduates gather in Lanzhou City, far ahead Tianshui City which ranks the second with 7.40%. Only 4% work in Dingxi, though it has similar population to Lanzhou.

1.3.3.2 Concentration of senior professionals
In Gansu, 88% of the senior technical professionals are concentrated in Lanzhou City.

1.3.3.3 High-level professionals mainly work in non-economic sectors. 46.62% of college graduates serve sectors such as education, culture, arts, mass media, governmental agencies, party groups and associations, whereas 13.53% work for agriculture, health, sports, social welfare, finance, insurance, and real estate.

1.3.3.4 Serious brain drain
Only 40% of the Gansu locals return to hometown after graduating somewhere else. 80% of postgraduates choose to leave after being educated in Gansu.
Gansu has the lowest number of technical professionals per 10,000 people among the five provinces in northwest China, with the efficiency of HR ranking last but one among the five. The education expenditure as percentage of GDP in 2005 is 5.52% in Gansu, 6.32% in Ningxia, and 5.62% in Shaanxi. Gansu has the lowest educational expenditure in northwest China with only RMB 230 Yuan, lower than RMB 411 Yuan in Xinjiang, RMB 335 Yuan in Ningxia, RMB 315 Yuan in Qinghai and RMB 283 Yuan in Shaanxi.

### Table 7-7: 2005 technical professionals of state-owned entities

<table>
<thead>
<tr>
<th>Areas</th>
<th>Gross and proportion</th>
<th>Engineering technology</th>
<th>Agricultural technology</th>
<th>Scientific research</th>
<th>Health technology</th>
<th>Teaching staff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross</td>
<td>Proportion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>21978684</td>
<td>1.60</td>
<td>4791227</td>
<td>705720</td>
<td>311166</td>
<td>3581181</td>
</tr>
<tr>
<td>Beijing</td>
<td>339209</td>
<td>2.21</td>
<td>95517</td>
<td>5323</td>
<td>4832</td>
<td>73343</td>
</tr>
<tr>
<td>Shanghai</td>
<td>333321</td>
<td>8.40</td>
<td>96815</td>
<td>2834</td>
<td>6140</td>
<td>79626</td>
</tr>
<tr>
<td>Shandong</td>
<td>1504722</td>
<td>1.62</td>
<td>228141</td>
<td>49307</td>
<td>13484</td>
<td>270674</td>
</tr>
<tr>
<td>Guangdong</td>
<td>1193149</td>
<td>1.31</td>
<td>138132</td>
<td>17126</td>
<td>5400</td>
<td>242881</td>
</tr>
<tr>
<td>Henan</td>
<td>1209542</td>
<td>1.28</td>
<td>120339</td>
<td>27869</td>
<td>4978</td>
<td>172439</td>
</tr>
</tbody>
</table>

| Unit: person, % |
Section 2: On-going HR Strategy and its Achievements

Since the initiative of West China Development, the importance and urgency of HR development have been realized in Gansu. HR development starts to be taken as a big industry in strategic decision making. A series of measures have been taken, which enhance the skills of labor force and accelerate transfer of redundant labor force.

2.1 Strategies and policies on HR development

2.1.1 Explicit road map

Gansu tries to break grounds in key areas to promote HR development. First, education is put high on the agenda of character building through programs such as, “Nine-year Compulsory Education”, anti-illiteracy education and technique training. Second, we concentrate on the transfer of rural population from impoverished and ethnic areas. Third, we make input to scientific and technological progress through HR development. Fourth, we increase job opportunities through industrial projects.

2.1.2 Down-to-earth manner

In order to promote HR development, Gansu starts to develop education, cultivate talents, expand employment, improve medical conditions, transfer labor and encourage migration from the eighth Five-year Plan. These strategies are directly incorporated into the socio-economic development plans, some of which are carried out as binding resolutions, for example, the regulations on introducing high-level talents and

---

**Table:**

<table>
<thead>
<tr>
<th>Region</th>
<th>Population</th>
<th>Urbanization Rate</th>
<th>Population Urban</th>
<th>Birth Rate</th>
<th>Death Rate</th>
<th>Population Increase</th>
<th>Population Decline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sichuan</td>
<td>983303</td>
<td>1.20</td>
<td>115058</td>
<td>49240</td>
<td>5515</td>
<td>163317</td>
<td>650173</td>
</tr>
<tr>
<td>Qinghai</td>
<td>97080</td>
<td>1.79</td>
<td>12832</td>
<td>7964</td>
<td>694</td>
<td>18477</td>
<td>57113</td>
</tr>
<tr>
<td>Gansu</td>
<td>410195</td>
<td>1.58</td>
<td>57693</td>
<td>22161</td>
<td>5907</td>
<td>56119</td>
<td>268315</td>
</tr>
</tbody>
</table>

(1) Sources: *Gansu Yearbook 2006* and *China Statistics Yearbook 2006*

(2) Statistics was collected in 2005
improving skills of rural workers.

2.1.3 Government highlights policy making

Gansu has exerted much effort in policy making to ensure the smooth implementation of HR initiatives. Provincial CPC committee and government have promulgated policies such as “Suggestions on Encouraging Graduates from Higher Learning Institutions to Serve in Grass-roots Units”, “Interim Procedures on Introduction of High-level Talents”, “Opinions on Enhancing Skills of Rural Talents”, “Opinions on Developing Highly-skilled Professionals”, and “Regulations on Gansu HR Market”. Policies have also been made on labor training in rural areas, further education of employees, rural education, and labor transfer. Governments at municipal and county levels have also formulated related policies and regulations.

2.2 Principal forms of HR development

2.2.1 Skill training for farmers

Gansu has a work force of 12 million in rural areas; therefore the skill training geared-towards farmers is extremely important for local HR development. The national and provincial poverty alleviation departments alone allocate a training fund of RMB 70 million Yuan from 2004 to 2006, with an annual sum of RMB 23 million Yuan and per-capita investment of RMB 1000 Yuan. Peasant training fund raised through various channels stands at RMB 100 million Yuan in Gansu. The training program covers 76 counties of the 14 cities and involves ten key industries such as hospitality industry, sewing industry, household management service, security service, construction and manufacture. Up to 200,000 peasant workers receive the training and are successfully employed afterwards in other provinces. In 2005, twenty provincial labor transfer and training bases are set up in poor areas and 44 city and county training centers are recognized, making input to the national network. The training is carried out for specialized professions or disabled people supported by “talent cultivation project” or World Bank loans.
2.2.2 Increasing job opportunity

Apart from larger investment, new enterprises and projects, Gansu province adopts other effective measures. For instance, according to “Interim Procedures on Employment Funding Management”, individuals and relevant entities who provide jobs may enjoy seven types of subsidies such as social security subsidy, professional skill subsidy and social service subsidy. We will carry out programs like “Job Introduction Campaign”, “Underground Family Reservoir Program” “Mother Health Express” and employment promotion experiment program in rural China. In addition, internship center is established in the capital city, Lanzhou to train new graduates and improve their capacity. From 2003 to 2006, the annual average job increase is 130 thousand with more than 160 thousand in 2006 alone.

2.2.3 HR development

Today Gansu has 1.3 million talents in various trades. Since the initiative of West China Development, the CPC committees and governments at all levels have attached great importance to HR cultivation, placing talent strategy at the core of the regional development. The focus is put on talent cultivation, deployment and introduction. The provincial government has promulgated policies and regulations to ensure smooth proceeding of talent cultivation. To ease the severe shortage of talents in rural areas, the provincial government tries to enhance their social status and grant professional titles to technicians and gardeners.

2.2.4 Rural labor transfer

Gansu has six billion redundant workers, more than five million of whom are farmers. In recent years, Gansu steps up transfer of rural labor. According to statistics by relevant departments in Gansu, annual labor transfer exceeds two million, which has been on the rise since 2000. In 2000, the number was 2.51 million, jumping to 5.04 million in 2006, 60% of which are organized transfer. In 2000, the transfer of labor generates income of RMB 2.8 billion Yuan, which soars to RMB 10.08 billion Yuan in 2005 with per-capita income standing at RMB 4000 Yuan.
Table 7-8: Transfer of rural labor and income fluctuation in Gansu

<table>
<thead>
<tr>
<th>Year</th>
<th>Transfer of labor (ten thousand people)</th>
<th>year-on-year increase (%)</th>
<th>gross labor income (100 million Yuan)</th>
<th>year-on-year increase (%)</th>
<th>Per-capita labor income (Yuan)</th>
<th>year-on-year increase (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>210.80</td>
<td>2.43</td>
<td>23.90</td>
<td>11.68</td>
<td>1134</td>
<td>8.93</td>
</tr>
<tr>
<td>1999</td>
<td>229.07</td>
<td>9.04</td>
<td>27.50</td>
<td>15.06</td>
<td>1200</td>
<td>5.82</td>
</tr>
<tr>
<td>2000</td>
<td>230.00</td>
<td>0.43</td>
<td>28.00</td>
<td>1.82</td>
<td>1217</td>
<td>1.42</td>
</tr>
<tr>
<td>2001</td>
<td>251.87</td>
<td>9.13</td>
<td>37.82</td>
<td>35.00</td>
<td>1502</td>
<td>23.42</td>
</tr>
<tr>
<td>2002</td>
<td>266.78</td>
<td>5.97</td>
<td>40.02</td>
<td>5.80</td>
<td>1500</td>
<td>-0.13</td>
</tr>
<tr>
<td>2003</td>
<td>286.16</td>
<td>7.51</td>
<td>51.51</td>
<td>28.71</td>
<td>1800</td>
<td>20.00</td>
</tr>
<tr>
<td>2004</td>
<td>324.25</td>
<td>13.28</td>
<td>64.40</td>
<td>13.31</td>
<td>1986</td>
<td>10.00</td>
</tr>
<tr>
<td>2005</td>
<td>409.83</td>
<td>26.23</td>
<td>100.82</td>
<td>56.55</td>
<td>2460</td>
<td>23.87</td>
</tr>
</tbody>
</table>

Source: statistics from Gansu provincial departments

2.2.5 Migration and relocation

Migration settlement is mainly geared towards redundant labor in rural areas. Large-scale migration in Gansu started from 1983, principally in the form of project migration, ecological migration, calamity migration, and relocation. From 1983 to 2006, 200 thousand rural residents in Gansu migrate to other localities. Since 2006, there has been a shift of focus to labor transfer through ecological migration, calamity migration and relocation.

2.2.6 Development of market mechanism

In order to promote HR development, Gansu attaches more importance to market mechanism, having formed a rather integrated labor and HR market at county and municipal levels. In the market mechanism, HR market propels the flow and allocation of talents. The job market provides a platform for job applicants. The part-time job market, though not well-regulated, helps peasant workers with temporary jobs. The market mechanism, despite its limited function, has already played an active role in HR
deployment. 1629 job fairs of different scales have been held, helping 152,000 applicants find ideal jobs.

2.3 Effects of HR development

2.3.1 Rapid progress of basic education enhances HR competence.

In recent years, we have made great progress in basic education and HR development, with senior high school education and higher education expanding rapidly. In 2002, 59 counties meet goals pertaining to basic education and HR character building, climbing up to 68 counties in 2005. Benefited people grow from 72.94% to 83.04% of the population. The enrollment rate of elementary schools increases from 98.55% to 98.87% and that of junior high schools from 73.24% to 83.39%. Youth illiteracy drops to 8.5%. Educated population at the level of senior high schools climbs from 516 thousand to 786 thousand, an increase of 52.33%, with enrollment rate rising from 30% to 45%. The enrollment of senior high schools jumps from 346 thousand to 566 thousand by 63.58%. The enrollment of vocational schools rises from 170 thousand to 220 thousand, a growth of 29.41%. Higher learning institutions have 380 thousand students, with the enrollment rate soaring from 9% to 15%, marking the popularization of higher education. The number of undergraduate schools rises from 25 to 33 with freshmen mounting from 53 thousand to 84 thousand by 58.49%. The enrollment of undergraduate schools leaps from 143 thousand to 230 thousand by 60.84%. The newly enrolled postgraduate students increase from 2700 to 6400 by 137%, with the enrollment boosting from 6400 to 14900 by 133%.

2.3.2 HR transfer speeds up labor-intensive economy.

From 2002 to 2005, employment in Gansu triggered by the transfer of labor increases from 2.67 million to 4.1 million by 53.6%. The income jumps from RMB 4 billion Yuan to RMB 10 billion Yuan by 15.5%. In 2005, service revenue accounts for 16% of farmer’s per-capita net income. In areas booming with labor-intensive businesses, this proportion has lifted up to 40% or 50%. From January to July 2006, 4.3632 million redundant workers are transferred, 87.26% of the 5 million goal. Among them 1.5274
Case 1: Training of farmers in Qingcheng County

The training aims to equip farmers with techniques, helping them find blue-collar jobs and shift between rural farming and urban businesses according to the change of farming seasons.

Firstly, science and technology boost economic growth. For instance, to increase the production of vegetables and sweet water melons in Xuanma village, eight training classes and three field visits were organized. Two professionals were invited to help farmers throughout the process. The annual production is expected to exceed RMB 2 million Yuan.

Secondly, local farmers are employed for blue-collar jobs. For instance, the 300 workers in Qingxian Nut Company were all farmers who now become blue-collar workers, with a monthly income higher than RMB 800 Yuan. There are 300 private enterprises engaged in agro-product processing and sales in Qingcheng county, which employ 260 thousand local farmers and provide them with an annual income of RMB 84 million Yuan.

Thirdly, farmers could choose to work in cities in slack seasons and come back to rural lands in busy farming seasons.

2.3.3 HR training enhances competence of the work force.

Training programs are available for all the workers, with practical techniques training for migrant workers, skill training for professionals and character building for civil servants. First, more funding is provided for training. Second, building of training bases is accelerated, with much improvement in skill training. Third, 140 brands of service have been developed, involving 1.14 million workers. Tianshui municipal government has registered brands at the State Administration for Industry and Commerce such as “Baiwawa Waitress”, “Nuwa Household Service”, and “Xihuang Construction Workers”. Li County in Longnan has registered “Lixian Girls”, “Lixian Wives” and “Lixian Scaffolder”. “Classic Architecture” from Yongjing county, “Hezhou Carpenter”, “Dongxiang boiled mutton”, “Linxia brick sculpture” from
Linxia have attained good reputation in the market and some of them have become famous in the northwest region and even across China. Fourth, a working mechanism that integrates training resources has been improved. According to a survey, labor and social security agencies that offer migrant workers and laid-off workers training have already been established in fourteen cities and 86 counties in Gansu.

<table>
<thead>
<tr>
<th>Case 2: Companies provide free training for farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over the past few years, some large enterprises provide farmers with free technical training. For instance, Jinchuan Group establishes a training base for migrant workers, with an annual investment of RMB 4 million Yuan focusing on young and middle-aged farmers. The company aims to train 5000 young and middle-aged technicians for free by the end of 2010. So far, 1000 migrant workers have been employed by the company and more than 400 farmers have been employed by such companies as Qingdao Shuangxing Group and Changzhou Guantian Clothing Company.</td>
</tr>
</tbody>
</table>

### 2.3.4 HR develops hand in hand with talent strategy.

To boost socio-economic development in Gansu, CPC committees and governments at all levels adopt a series of measures, which contribute to HR development in various fields, such as politics, business management, and techniques.

First, the gross number of talents in Gansu increases from 1.055 million at the end of the Ninth Five-year Plan to 1.3185 million in 2005 with an average growth of 5%. The number of talents climbs up from 415 to 494 per ten thousand people. Talents as percentage of employees grow from 7.09% to 8.51%.

Second, the talent distribution among primary, secondary and tertiary industries shifts from 4.27%, 31.66% and 64.07% in the past to today’s 3.11%, 23.76% and 73.13%. Talents serving in the tertiary industry increase substantially, with those working in non-public sectors nearly doubling from 119,600 to 205,000.
Third, talents are better educated. The percentage of college graduates jumps from 41.67% to 61.27%. Average age of the talent group drops from 36.59 to 34.77. The proportion of senior, intermediary and junior talents was 3.19%, 27.13% and 60.50% in the past and now stands at 5.12%, 31.05% and 53.99%. The group of expertise grows, with a large number of talented young people making their way.

Fourth, HR status quo is improved with a batch of professionals playing an important role in various fields at county and village levels.

Case 3: Employment policies well implemented in Wuwei city

Wuwei municipal government stipulates reemployment subsidy standards on job introduction, training, social security, professional qualification, deducting interest for little sum of credit loan, reemployment salary standard, and labor market. In 2005, RMB 22.43 million Yuan is allocated to Wuwei City as reemployment subsidy, of which RMB 21.83 million Yuan comes from provincial finance and RMB 0.6 million Yuan from local budget. From 2001 to 2005, 41,200 job opportunities are created, with 19,015 laid-off workers reemployed.

2.3.5 Employment and reemployment change for the better, with aid program for “zero employment household” in the city.

In 2005, the total employment in Gansu is 15.2941 million, an increase of 529,600 on 2000 by 0.71% annually. Urban employment is 3.4563 million, a growth of 254,400 on 2000, with an annual increase of 1.54%. Rural employment is 11.8378 million, 275,200 more than 2000, with an annual increase of 0.47%. In 2006, 160,000 people are employed and 47,000 laid-off workers are reemployed. In July 2006, we launch the aid program for “zero employment household”. The 55,000 thousand people in 21,000 zero employment households are enjoying better job opportunities.

Column 4: “Green Certificate Project” in Qingshui County

At present, 1200 farmers in Qingshui county hold “Green Certificates” for their mastery of technologies. Qingshui county stipulates eight preferential policies for those who hold “Green Certificate”. For example, “Green
Certificate” holders enjoy priority when signing technical contracts with manufacturers and utilizing state-subsidized agricultural materials. Besides they are more likely to be elected as village leaders. In recent years, agricultural departments have signed contracts with “Green Certificate” holders concerning 117 technical programs such as film-covered planting, sunlight greenhouse, greenhouse breeding and so on. The Project boosts farmers’ enthusiasm to learn, utilize and rely on technology. Those entitled farmers create sales of RMB 11 million Yuan in the fields of planting, breeding, processing and shipping, accumulating a net income of RMB 6 million Yuan. 75% of the annual income is generated by technology.

2.3.6 We have increased farmers’ income and facilitated economic growth in poor areas.

In recent years, the transfer of rural labor has contributed to the growth of rural income, especially those who bring back attractive income for picking cotton in Xinjiang. Each year about 350 thousand Gansu farmers pick cotton in Xinjiang, with 300,000 in 2005, 160 thousand of whom are organized. On average, each farmer earns at least 1400 Yuan for picking 2.5 tons of cotton. All together, they make an income of 420 million Yuan. According to the prediction by Lanzhou Railway Bureau, each year there are about 160 thousand Gansu cotton-pickers going to Xinjiang by train. The HR Development Sector under the Gansu Labor Office foresees that in 2006, 360,000 cotton-pickers will go to Xinjiang and each individual might earn about RMB 3000 Yuan. They will make at least RMB one billion Yuan from Xinjiang. From January to October, 2006, a total of 5.34 million redundant workers are transferred whose income totals RMB 11.9 billion Yuan.

Case 5: Education migration in Gansu’s poor arid areas

From 1977 to 2005,68,284 college students and 41,489 technical secondary school students, totaling 109,773 in Gansu come from Huining, Jingtai, Minqin and Anding. However, the proportion of the graduates who return to their hometowns is merely 40.9%. This figure is rising though in recent years,
46.1% from 2001 to 2004 and 47.9% from 2003 to 2004. Education migration is therefore proposed as an important migration strategy in western areas, which could support the development of poor rural areas. Education is not only a principal form of HR development but also a major form of migration.

Section 3: Current Features of HR Development and Corresponding Measures

The HR development has come to the stage of structural adjustment in Gansu. Population increase has been effectively controlled with family planning policy. A rather mature mechanism is established for labor flow. However, problems still exist, such as the imbalance between quality and quantity of work force, unstable transfer of labor, and inadequate development of labor-intensive industry. In the middle and long-run, there will be a severe talent shortage. These problems ought to be given full account of in the future HR strategy.

3.1 Current features and problems of HR development

3.1.1 Current features of HR development

HR development in Gansu is still at a low level. There is much room for improvement in HR quantity control and quality improvement, HR flow and structural distribution.

Firstly, we pay much attention to HR advantages rather than disadvantages. As a matter of fact, in less developed areas, HR affluence and redundancy exist side by side. Secondly, we focus on providing employment through HR transfer, without giving enough attention to technical training, which leads to low competence of the HR. Thirdly, without effective policies and measures to support, the strategic importance of HR development hasn’t been fully recognized yet. Fourthly, government still plays a dominant role, whereas market and social mechanism hasn’t been given a full play. Fifthly, HR development has inadequate investment and no earmarked funds at all.
3.1.2 Challenges to HR development

3.1.2.1 Technical training
First, farmers could access training on practical technology but not management. Second, there is no special fund or budget for training. Third, training doesn’t serve the transfer of labor. Fourth, few departments involve in training for farmers apart from poverty relief agencies in the government.

3.1.2.2 Problems related to employment expansion
First, we couldn’t create enough job opportunities. The annual increase of 150,000 new jobs still falls short of workforce increase of 180,000. Second, there is a big issue of personnel flow, because transferred labor tends not to settle down in the new place where they are employed. Third, labor-intensive industries are not fully developed, with industrial and labor structure not fully matched. Fourth, the small scale and slow pace of non-public sectors prevent the transfer of redundant labor to SMEs. In 2006, the non-public sectors generate only 36% of the economic benefits in Gansu.

3.1.2.3 Problems related to talent development
First, the number of talents couldn’t meet the demand. It is predicted that by 2010, the talent demand will reach 1.7 million in Gansu, which is beyond the present ability of talent cultivation. Second, the key issue is the shortage of high-caliber talents, who account for only 0.07% of the population in Gansu in 2005. Third, there is severe shortage of practical talents in the countryside. 97% of practical talents in rural areas receive education no further than senior high schools. In poor areas, ethnic minority areas, and remote areas, the proportion of talents is even lower. Fifth, talents are not given a full play. In 2005, the number of talents involved in generating GDP of RMB one million Yuan is 8.3 in Gansu whereas the national average is 6.5. Sixth, brain drain remains unsolved, with talents flowing out more easily than the other way round.

3.1.2.4 Problems related to labor transfer
First, there is a large proportion of redundant labor in the countryside. Therefore, labor transfer remains a big challenge. Second, there is lack of agencies and funds for labor
transfer. Third, transferred workers are not equipped with skills, with technical training lagging behind. Fourth, there is more aimless transfer of labor than organized one. Fifth, the brain drain in the rural has led to many social issues. Sixth, urbanization is at a low level and small towns lag behind in terms of development, which prevent rural labor from being transferred to cities and towns.

3.2 Prediction of HR development in the future

According to related prediction and analysis, HR development will remain a tense situation in the next few years in Gansu. First, the shortage of high-level talents is unlikely to be solved substantially. Second, HR volume will keep expanding, placing greater strain on employment situation. Third, incompetence of HR poses a challenge for rural labor transfer. These questions will be the focus of future HR development.

3.2.1 Pressure of HR increase

According to CPPS system developed by State Population Committee, Gansu enters a period of low birth rate from 2001 to 2005. Population growth will encounter a long “bonus period” because the population burden index is low. There will be another baby booming around 2034, after which population will grow at a rather low speed. Annual population increase will be around 300,000, with labor force increasing by 250,000 each year.

Birth rate will fluctuate to a certain degree, but generally speaking it will be on the decline. From 2005 to 2050, natural population growth rate will decline except for particular years. Under the influence of birth rate rise, natural population growth rate in Gansu will grow slightly from 2005 to 2012. However, after that there will be a more obvious declining tendency. The climax of population is predicted to reach 31.175 million, with a zero increase emerging around 2039. At the end of 2005, labor force stands at 18.2 million in Gansu, which will climb up by 1.3 million between 2006 and 2010 and reach 19.5 million in 2010, a 7.14% increase on 2005 at an annual rate of 14%. Among the labor force, 14.41 million are from rural areas and 5.06 million from urban areas. 330,000 graduates from colleges, 150,000 from technical secondary schools, 120,000 from vocational secondary schools total at 600,000. Proportion of
people reaching working age will increase from 71.30% in 2005 to 72.83% in 2010, and decline to 68.62% in 2020.

3.2.2 Employment and reemployment remain a tough issue.

Statistics show that during the Tenth Five Year (2001-2005), labor force increases by 535.4 thousand, with an annual increase of 107,000 at a growth rate of 0.73%. In the Eleventh Five Year, suppose economic increase rate is 10%, employment increase rate is 0.73% and employment elastic coefficient is 0.073, the employment will increase from 15.20 million to 15.86 million, with an annual increase of 113,300 at a rate of 3.7%.

During the Eleventh Five Year (2006-2010), college graduates amount to 330,000 in Gansu, enjoying an employment rate of 80%. From 2005 to 2010, the annual increase of employment will exceed 120,000, accumulating to 600,000 in five years. The registered urban unemployment rate will be controlled within 5%. By 2010, urban employment in Gansu will exceed 4 million. The transfer of labor reaches 3.5 million person times in 2005, which is expected to climb up by 10% each year, reaching 5.6 million person times in 2010. The transfer of labor involves 2.8 million persons, which we hope to expand to 3 million. Organized transfer will be enhanced to 50% of labor transfer, contributing to economic revenue of RMB 17 billion Yuan, with annual per-capita income soaring from RMB 4,000 Yuan in 2005 to RMB 6,000 Yuan. The labor service will generate 40% of farmers’ income. In 2010, school life expectancy of employees in Gansu will be expanded to nine years (junior middle school level), close to the predicted national average of 9.6 years. In 2020, school life expectancy will reach 11 years (senior high school level), the same as the national level.

3.2.3 Prediction of HR supply and demand

According to prediction, the supply and demand of low-level HR is kept in balance. However, there is a shortage of rural and high-caliber talents, especially those that could serve emerging industries. Suppose GDP keeps a growth rate of 9%, college graduates could reach 1.5 million in Gansu in 2010, namely 5,500 every 100,000
people, which is 70% of the national average of 7,700. In 2020, college graduates could reach 3.15 million, namely 11,250 every 100,000 people, which is 85% of the national average of 13000. Generally speaking, the supply and demand of basic talents is in good balance.

From the prediction, we note that the period from 2006 to 2020 is an important phase, during which Gansu talents will increase rapidly. Supply and demand of vocational and senior high school graduates are in balance, especially in the fields of education, law and insurance. There will be a shortage in the following categories: first, finance and capital market operation management. There will be at least a shortage of 60%; second, there will be at least a 40% shortage of high-tech industry developing talents; third, the shortage gap for talents specializing in further produce processing will be 50%; fourth, rural economic management talents will be short as well.

3.3 Basic thoughts and goals of HR development

3.3.1 Priority is given to HR development strategy.

HR development, especially human capital development, contributes to regional economic prosperity and social progress at home and abroad. Professor Niu Wenyuan, a renowned Chinese demographer, has conducted in-depth research on input and output of HR at different levels. He concludes that the proportion of social investments in character building, namely in areas of physical training, technical skills and intelligence is 1:3:9, whereas the contribution proportion is 1:10:100. This study also demonstrates the significance of HR in future development of Gansu. Experts in Gansu have also conducted research and released prediction of several important parameters. Every 1% increase of college graduates will upgrade GDP by 2.25%. The same increase of scientific personnel, scientific investment and education expenditure could trigger GDP growth by 4.89%, 1.3% and 0.36% respectively.

We must identify the significance of HR development as a leading strategy. When

drafting regional development plan, we should elaborate on HR development. We should also ensure funding in the provincial budget and encourage People’s Congress and provincial government to issue new policies on talent cultivation and employment. We will continue the family planning policy so as to keep the low birth rate and ease the pressure of employment.

3.3.2 Human capital development identified as a strategic issue

In the broad sense, HR development consists of three logical levels: first, general HR development such as labor force distribution, flow, training and employment, which deal with the most basic questions; second, HC development such as education, improvement and skill, which focus on labor force’s intelligence, skills and capability; three, talent development, which is the advanced form of HR development. In the long run, there are problems such as the low competence of HR, inability to cope with market change and severe talent shortage. Therefore, it’s time for Gansu to restructure HR, highlight quality of HR and efficiency of HR distribution. In another word, HR development should pave its way towards HC development.

Gansu has well addressed issues like basic education, transfer of labor, and employment. At present, employment situation is rather stable in Gansu, with huge labor export and rapid progress of basic education. We suggest that future HR development, which centers on HC development, be conducted at three levels. First, we should make the most of existing HR with focus on skill training. Second, we should enable young and middle-aged people with techniques and skills so that they could play an underpinning role in the future. Third, we should explore potentials of HR, especially those with higher education backgrounds, so that we could have more talent resources.

3.3.3 Prediction on HR development.

Based on recent population growth and HR change in Gansu, we make predictions on HR development for the decade (2006-2015) to help the government with decision making.
3.3.3.1 Education goals
Nine-year compulsory education is available everywhere. More than 98% of school-age children are enrolled in elementary schools. 70% of junior high school graduates move on to senior high schools and college entrance rate reaches 25%.

3.3.3.2 Training goals
We offer training to 400,000 farmers every year so that two million young and middle-aged farmers that need training could attend different programs in five years. The training requires an investment of RMB 200 Million Yuan.

3.3.3.3 Goals for labor transfer
Six million redundant rural workers need to be transferred, whose per-capita income could be enhanced to RMB 6,000 Yuan, totaling at RMB 24 billion Yuan. In the meantime, migrant workers are encouraged to settle down in the place where they are employed and start up their own businesses.

3.3.3.4 Employment goals
Natural population growth rate is controlled at about 7‰, with the annual increase below 300,000. Each year, we strive to create 180,000 new jobs.

3.3.3.5 Talents goals
Talents of all trades will reach 1.8 million in 2015, 600,000 of whom will be technical professionals. Cultivation of practical talents will move on a standardized track.

Section 4: Strategies and Measures to Promote HR Development

Gansu should keep its focus on basic education and training, improving the efficiency of talent deployment and stepping up efforts to train practical talents. With regard to the labor transfer, training and character building should be emphasized, taking distribution and transfer of urban and rural labor into consideration.
4.1 Continue basic education and character building

4.1.1 Consolidate and adjust primary and secondary education

On the basis of primary school and junior high school education, we strive to elevate senior high school enrollment rate to 50%. In this way, most students, especially graduates from junior high school in the countryside, could go to senior high schools, completing the twelve-year standard education and taking the college entrance examination. We propose government enlarge investment to build a number of high-quality senior high schools in rural areas; pay textbooks to relieve families’ burden; eradicate miscellaneous fees in Gansu and other less developed provinces in West China. The central government will fill in the gap of finance. In addition, we increase the number of students who enjoy the eradication of school fees and governmental subsidy in ethnic and extremely poor areas.

4.1.2 Expand and restructure higher education

In view of Gansu’s insufficient resources of higher education and low college enrollment rate, we recommend a strategy for higher education that stresses restructuring and extension. We also suggest increase investment so as to bring college enrollment rate up to 25%. We will optimize the educational structure, abolish unqualified institutions, enlarge the scale of postgraduate education, nurture more high-caliber talents, cultivate higher education brands with Gansu characteristics, and synergize higher education resources.

4.1.3 Support private and ethnic minority education

We will expand ethnic program in senior high schools and accelerate secondary vocational education with ethnic characteristics. We will support higher education for minority groups, and enlarge the scale of ethnic minority class. We will bring in incentive mechanism for education, facilitating the development of private education and community colleges, and encouraging self-education programs. We will support
private senior high schools and vocational schools as an important supplement to public education.

4.1.4 Develop vocational education as a new education industry

As a new type of education, vocational education is an effective form to conduct training, improve skills and enhance abilities. Therefore, we suggest taking local vocational schools as training bases for transfer of rural labor. We will integrate agriculture with technology and education, so as to boost economic progress in rural areas and increase farmers’ income. We will optimize professional qualification and certificate system, step up training of talents in short supply, raise fund for training from the government, enterprises, schools and training agencies. Procurement of facilities in training bases should follow the principle of frugality and practicality to underpin vocational education in Gansu.

4.2 Strengthen Farmers’ Employment Ability by Training and Skill Improvement

4.2.1 Establish standard investment channels for peasant training

According to calculation and prediction, there are nearly 10 million rural laborers, more than half of them are between 20 and 40 years old. If we deduct those who are already trained and have been transferred smoothly, there are still 2.5 million left that need training. Suppose each person receives 30 days of training with a total cost of RMB1000 Yuan, this program requires a total of RMB2.5 billion Yuan. If the training program finishes in five years with 500 thousand trainees per year, the total expense will amount to RMB500 million Yuan. However, present training funds in Gansu province can only reach RMB80 million Yuan. There’s still a huge gap. So we suggest including peasant training into local financial budget and try to get special fund from the central government.
4.2.2 Diversify training measures

Peasant training should take a variety of forms: strengthening basic education and vocational education to improve the quality and effect of training; promoting labor transfer training project and combining the establishment of peasant training base with labor employment base; and creating a platform for peasants to start their own businesses. In this regard, high-level training should be provided to those farmers who are interested in establishing rural enterprises. Our advice is not to give one-size-fits-all training. The content of training can include enterprise management, marketing, capital market and brand operation, etc.

4.2.3 Help farmers expand employment channels in labor-intensive industries

We will combine labor export with local employment, and improve farmers’ chances of getting employed. Bearing in mind the development of local pillar industries, we should guide and help farmers choose suitable income-generation projects according to local conditions and their own strength so as to ensure that every rural household has stable income source. Efforts should also be made to increase farmers’ self-development ability and bring agriculture development onto the track of improving labor quality. We should speed up the development of specified rural cooperation organizations, promote organized and scale agricultural production on the basis of household contract responsibility system, and better link agricultural production with the market. In addition, we will carry out comprehensive agricultural development projects, pay special attention to the construction of agricultural water-conservation demonstration programs, and strengthen irrigation projects and the repairing of water-destroyed infrastructure in the hope that we might improve the comprehensive agricultural production ability. Last but not least, we will improve farmers’ living and working conditions by enhancing infrastructure building such as country roads, power grids, communication, radio and television, water safety, environment protection, agricultural produce market etc.
4.2.4 Establish and improve a united labor force market

We will step up efforts to integrate the current labor market resources and expand the services of all the 557 job agencies in the province to cover transferred rural labor force. Special help desks for rural labors will be set up in various job agencies to provide services such as information, guidance, introduction and follow-up management. We strive to form a province-wide labor market that covers both urban and rural laborers. Labor and social security authorities and job introduction agencies within the province should expand their information channels and deepen cooperation with other local authorities such as family planning and agriculture so as to better exchange information regarding the total volume of rural labor force, its structure and direction of outflow. We should bring rural surplus labor transference into line with social and economic development plans of the government, and handle the question of urban and rural employment comprehensively through cultivating market, regulating employment, strengthening management, etc.

4.3 Carry out Employment and Reemployment Project to Realize the Fundamental Goal of Improving People’s Livelihood

4.3.1 Enhance macro-regulation on employment and reemployment

Starting from 2006, the annual employment and reemployment objective of Gansu is: creating 130 to 150 thousand new jobs for new labor force in urban areas; helping 50 thousand laid-off workers get reemployed, among which 15 thousand formerly have difficulties in finding jobs; and keeping registered urban unemployment rate within 5%. To realize them, we should continue to reinforce the accountability system especially among leading officials who are in charge of employment and reemployment work. We should strengthen institutional building and adjust employment policies according to changing situations. Under the guidance of the Scientific Outlook on Development and the objective to build a harmonious society, we must have an overall consideration of both urban and rural employment issue, reversing the phenomenon of laying more emphasis on urban employment and less on rural employment. Now we must give top
priority to rural labor transference in impoverished areas, ethnic minority areas, and ecologically fragile areas. While formulating specific policy papers according to the reality, we will strive to bring out a smooth transition from old to new policy package as soon as possible, and ensure that our new employment policies to play a greater role in the eleventh “five-year-plan” period. We will also earnestly implement various preferential policies to create a sound environment for laid-off workers to get reemployed.

4.3.2 Increase various employment channels

We should actively promote the development of private sector and help laid-off workers change their employment mindset to start their own business and become self-employed. We encourage private business and individual business owners to give employment priority to laid-off workers. In the meantime, we support the growth of private village and township specialized economy and guide laid-off workers to work in these economic organizations. Besides, laid-off workers can also be diverted to rural areas to develop uncultivated land and deserted shoal on contract and engage in agriculture, forestation, animal husbandry and fishery. We encourage the development of tertiary industry and community service, and support laid-off workers to work in the service industry, such as opening fast food restaurants, snack shops and teahouse in communities, engaging in hairdressing, household appliance repair and domestic service, starting trust businesses such as entrusted purchase, sales, storage and transportation, and leasing transportation vehicles, household appliances, and entertainment and sport facilities.

4.3.3 Government departments concerned should actively introduce job opportunities to the unemployed.

We should strengthen cooperation with sectors such as social security, planning, commerce and trade, supervision, finance, education, civil administration, construction, sanitation, public security, taxation, pricing, trade union, banking, etc., establish
information notification system, fully fulfill everyone’s responsibility and make joint
efforts to facilitate reemployment. We encourage individual laborer association and
private enterprise societies to assist and cooperate with relevant government
departments in the following tasks: to organize laid-off workers to participate in
reemployment training, to invite those that are successful in individual businesses to
share their experience with laid-off workers so as to enhance their professional skills
and working ability. Furthermore, we encourage laid-off workers to take advantage of
various job fairs in order to keep the door open and finally secure jobs. Meanwhile, we
will set up “credit system” project and “brand strategy” project, striving to build up
more enterprises with high credit and good reputation. This, as a consequence, will
help enhance the overall reputation of Gansu’s enterprises, enlarge market share,
increase profit, and reduce the number of the unemployed.

4.3.4 We need to have trainings on self-employment and give more policy support to
self-employment endeavors.

By in-depth analysis, we may note that a great number of development projects in
Gansu are in the scope of self-employment; however, there is a general incompetence
in self-employment. To encourage self-employment, we need to have a clear
understanding of the focus of local economic development. First, we should accelerate
education in self-employment; that is to say, for the general human resources in urban
and rural areas, both basic competence education and self-employment education are
necessary. Second, we need to formulate some regulations and policies to support
self-employment; for instance, the government provides preferential policies to
investment, enterprises, talents, financing, technology, trade and other sectors so long
as they are in the scope of self-employment. Third, we will try to improve economic
environment for economic development so as to guarantee self-employers an external
environment and reduce cost for self-employment. Fourth, as for projects that have a
significant bearing on Gansu’s development, the provincial government should take
some responsibility in sharing the risk by setting up a cooperation mechanism with
proprietors.
4.4 Concentrate on increasing badly-needed professionals and tackle talent shortage

According to Gansu’s eleventh five-year-plan, by 2010, 12 thousand more technicians and senior technicians will have been cultivated. The total number of technicians shall reach 20 thousand, accounting for 2% of all the technical workers in the province. High-level technical talents will account for 20% of the total technical laborers. Every effort should be made to make the above figures approach or reach the national average level in the same period by 2020. In order to achieve this ambition, we must work harder on the cultivation of strategic talents, high-tech talents, primary talents and local talents.

4.4.1 Measures to cultivate enterprise management talents

First, we should accelerate the process to cultivate excellent enterprisers. Based on the development laws of enterprisers, we should try to create sound market environment as well as policy and social environment which are conducive to the growth of enterprisers, and attempt to establish an enterpriser market. Besides, we should strengthen the construction of the management team of SOEs and gradually form a high-quality management talent ladder that is market-oriented and well familiar with domestic and international economic activities. We should also accelerate the cultivation of business administration talents in non-public sectors and treat them with fair HR policies.

4.4.2 Strategies to cultivate technical professionals

We will launch a far-reaching project for the cultivation of technical talents. Besides training brilliant technical talents in key industries, trades and technological programs, we need to employ different patterns including “government think-tank”, “idea base” and “expert consultancy team” to elevate the social status of high level technical talents. We encourage cooperation and cross-development between natural science talents and social science talents and attach importance to both sides. We should continue to implement policies concerning technical professionals, break lifetime system and encourage brilliant talents to compete with and surpass their fellows. Besides, we
encourage enterprises to become the main body for absorbing innovative technical talents and establish a technology innovation system based on the integration of production, study and research. We also encourage technical talents to work in the front line of production and bring their potentials into full play.

### 4.4.3 Strategies to cultivate high-level technical talents

We will reorganize talent resources, further broaden channels to foster high-level technical talents, and set up a high-level talent cultivation system with enterprise and industry as main body, vocational schools as basis, cooperation between school and enterprise as bridge, government promotion, social support and enterprise participation as backup. We will also strengthen the construction of high-level technical talent training center, actively encourage workers to learn new knowledge and technology, and participate in technology revolution and key problems solution. Judging talents according to their ability and performance, we will perfect high-level technical talents’ appraisal, selection, and exchange system, and set up a platform for such talents to communicate with one another. With the assistance of public job agencies and talent exchange organizations, we will hold various activities for high-level talents and create conditions for them to participate in high-tech development, exchange of technological information, and new technology display. Last but not least, we will establish a diversified investment mechanism and strengthen investment in cultivating advanced talents, especially daily fund and policy support for the setting up of science and technology businesses.

### 4.4.4 Strategies to cultivate rural practical talents

We need to set up training bases to cultivate practical rural talents so as not to be solely dependent on agricultural schools for the training of rural talents. Other schools also need to involve themselves in the training and cultivation of rural talents. We will continue to implement the "green certificate" project, enhance professional title assessment of rural practical talents and bring cultivation, development and administration of rural talents into the scope of professional technical talents administration. We will establish a new countryside modernization mechanism with
rural practical talents as impetus, industrialization of agriculture as main battlefield, and agricultural technology progress as the objective. Governments at county and village levels should stipulate specific encouragement policies and regulations for those rural practical talents who start up enterprises, take charge of projects and provide consultation. We will also establish a mechanism for the exchange between rural practical talents and urban technological talents. In this way, more and more rural talents can work and study in the relevant units in cities. And this will for certain improve their professional competence.

4.4.5 Improve environment for talents to grow up

We need to create a pleasant and harmonious environment for talents. Through publicizing, commending and encouraging measures we can gradually create a social environment that is favorable for talents to grow up. We need to strengthen ability cultivation of talent resources and improve higher education. In particular, postgraduate education should grow moderately ahead, which will do well to cultivating more high-level talents. We also need to perfect lifetime education system and provide further education opportunities for technical professionals. In addition, we will make innovations in the appraisal mechanism of talents and make evaluation on their work performance mainly according to their actual innovation results. Meanwhile, we will offer as much convenience as possible to talents in terms of professional title assessment, reward allocation, work conditions, wellbeing and other aspects. We should change the current incentive policy for talents that make outstanding contributions. To realize such goals, we will increase the number of people rewarded and enhance the prize. We should not only employ high-caliber talents in big cities and government departments, but also in small and medium-sized enterprises, countryside at grass roots level.
4.5 Take employment structure adjustment as an opportunity to enhance labor transfer and employment

4.5.1 Take rural economic and social development strategy into comprehensive consideration

We will actively boost the process of urbanization so that the thriving urban economy can create employment opportunities for surplus rural laborers. Besides, we will vigorously promote the process of urban and rural industrialization and foster the development of leading industrialized agricultural enterprises. We encourage capable people from the countryside to set up small workshops, stores, firms and enterprises, and support the development of private and labor-intensive small-and-medium-sized enterprises with a view to creating new advantages of township enterprises and assist local labor flow. Agriculture will continue to play its “reservoir” role in rural labor employment. Facing two resources and markets, we will promote the strategic restructure of agriculture and rural economy, boost the development of foreign exchange generating agriculture and enhance the development of efficient agriculture, especially labor-intensive industries such as stock-raising on a large scale, and the construction of feature produce bases. We will make labor export one of the important channels to transfer rural surplus labor and actively promote the national strategy of "going out"

4.5.2 Absorb rural labor by developing an in-depth agriculture

We will try to develop an in-depth agriculture so as to absorb more rural laborers within agriculture itself. The use of state-owned and collectively-owned land should be liberalized so that we can attract individuals, private and foreign investors to invest in large scale development and operation. The investment can take different forms including public bidding and contracting, lease, auction, stock cooperation, et cetera. Besides, we will facilitate such investment with favorable tax and loan policies. We will strengthen infrastructure construction such as rural road, water conservancy, power and telecommunication in order to improve the fundamental external conditions of comprehensive agricultural development. The government should give more backup
and investment regarding seedling, technology and information. We will encourage agriculture technology popularization units to invest and operate on rural land, conduct comprehensive agricultural development, improve the technical level of mountain land and paddy field development. In this way, they can set up an example for others to follow. We will boost the development of livestock husbandry and promote multi-layer growth of agricultural produce for the purpose of building up a three-dimensional agriculture. Via promoting cubic agriculture growth and raising pattern and establishing auxiliary feeding material bases, we can elevate multi-layer growth agriculture level, enhance productivity of land and absorb more laborers.

4.5.3 Promote the development of township enterprises and service industry

We should accelerate reforming the present rural collectively –owned enterprises, standardize their market operation mechanism and boost their economic vitality. We should also provide follow-up instruction and service for those already reformed enterprises, guide these enterprises to genuinely transform their operation mechanism and establish modern enterprise system. We need to guide and back up township enterprises in terms of application of modern information technology, elevate product structure and status in work allocation to enhance their competitiveness. Township enterprises should be treated as key service targets. We should provide service for them in terms of raw material organization, product sales, technology introduction, labor employment et cetera, and guide them to pay more attention to the application of information technology. Township-enterprise-intensive areas should be given priority in terms of information infrastructure construction. More financial support ought to be given to back up township enterprises regarding the development of modern production pattern including e-commerce. We will assist these enterprises to cultivate and attract talents, constitute related regulations to encourage management talents and professionals to serve in township enterprises. If possible, we could channel a certain proportion of tax paid by township enterprises to set up a special fund for talents training and introduction projects
4.5.4 Improve small towns’ capability to absorb surplus labor

We need to promote the construction of small towns with appropriate mapping and scientific planning. These towns should be moderate in size with practical functions and clear characteristics. We need to perfect their functions to attract population. They are supposed to play a core role in rural regional economic development. Gradually, an appropriate township system characterized by the following features will emerge: first, high standard planning and steady progression; second, prosperity through industrial development and strong economic foundation. In order to build up the basis for the economic foundation of small towns, we will integrate the development of small towns with the development of industrialized agriculture, township enterprises, rural tertiary industry and non-public-owned economies; third, by laying down favorable policies both domestic and foreign investors will be attracted to invest in the construction of small towns including water supply, drainage, power supply, environmental sanitation, education, medical care, sports, and cultural facilities, Market mechanism ought to be employed in the construction of public facilities such as road building, gardening and tree planting; fourth, the reform on management system should be well implemented. We must have the courage to innovate in regulatory systems pertaining to land use, household registration, and financial management, make full use of special beneficial policies to develop small towns and attract economic force and population to small towns.

4.5.5 Organize the transfer of redundant rural labor

We will organize surplus rural laborers to medium-and-large-sized cities and developed coastal areas, and encourage exportation of rural labor to foreign countries. We will strengthen professional training for rural laborers and actively adopt an “order style” training with the purpose of improve the relevance and effectiveness of such training. We will also establish rural labor society for instructing outgoing rural laborers to regulate and protect them, standardize employment behavior and build up a good reputation for such laborers. We will also set up registration system for the outgoing rural laborers to keep informed of their whereabouts and occupations, help cooperate with related departments in the labor import place on the implementation of family planning policy, supervision on work safety as well as education on discipline
and laws. We will simplify examination and approval procedures for labor export and make it easy for peasants to work abroad.

### 4.5.6 Initiate and carry out the “Return Project”

We should set the concept and target of “Labor export and productivity return”. We suggest provincial departments starting up “Return Project” by taking advantage of export laborers’ experience, information and connection. We suggest informing those export laborers of their hometown’s investment attraction, and economic development policies through letters, meetings, et cetera. We encourage exported laborers to bring back capital and technology to develop their hometown. Meanwhile, industry and commerce, tax, technology and construction departments will adopt favorable policies to provide convenience for returned peasant workers. In the regard of license granting, stall rent, land use, power and water supply, loan and tax, we will give them the utmost support to reduce the production and operation cost and creates a perfect investment and business environment.

### 4.6 Proposals on HR development policies in Gansu

In view of current socio-economic development demand and long-term development need in Gansu, we advise government departments at all levels and all the decision-makers attach great importance to HR development. When making HR development decisions, we must adhere to the scientific outlook on development, center upon enhancing labor quality and increase employment opportunities so as to adapt to the tendency of industrialization and urbanization. In addition, we need to pay more attention to HR cultivation, utilization, introduction and transfer, take a comprehensive view of HR demand of all kinds and at all levels, give prominence to key issues, provide instruction according to individual circumstances, promote HR development as a whole, and speed up the effort of building up a well-structured high quality work force that fits the economic and social development in Gansu.

4.6.1 We need to free our mind and be fully aware of the importance and urgency of HR development. Governments at all levels should attach strategic importance to
developing primary education, creating job opportunities, promoting HR development and accelerating labor output so as to reduce the redundancy of rural population, improve farmers’ living standard and their quality as well. It’s necessary to understand the key concept of HR and talent, improve the sense of urgency, responsibility and initiative in HR development and place HR development at a genuinely important strategic position. Besides, the government should fully play a regulating role, strive to build up a learning-oriented society and elevate people’s self-education awareness and ability. Efforts should also be made to boost education and training of various forms and improve the quality of diploma education, continuing education and life-long education. What should be kept in mind is that Gansu is to thrive with the development of HR and science and technology, and thus we need to have more content on HR development in our mid- and long-term planning, key strategies and policies on development and construction.

4.6.2 We need to ensure the investment in HR development with institutions. In this regard, what can be taken into consideration are as follows: first, special fund for HR development is to be set aside in the government fiscal budget at provincial, municipal and county levels respectively, with the specific amount set based on local fiscal conditions; second, we suggest that the provincial government report to the central government the rather backward reality in Gansu through certain channels, applying for more exclusive funds such as “exclusive HR development fund for poor areas”, “exclusive fund for HR development in ethnic minority areas” and “exclusive fund for labor training in less developed rural areas”, in addition to the current ones allocated to the backward areas; third, we can try to allocate part of the sponsored and welfare fund to labor training programs. Regarding the above suggestions, we need to formulate some legally binding institutions to enhance authority and binding force.

4.6.3 We need to accelerate the development of education and lay a solid foundation for HR development. Education should be given priority with character building as the orientation, and more efforts are needed to strengthen and improve the elementary education, popularize nine-year compulsory education, actively promote senior high school education, and develop vocational education. The quality of higher education is still to be improved, and we need to speed up the adjustment of educational structure, keep educational development in line with economic and social development so as to
lay a solid foundation for HR development. In addition, we ought to optimize and restructure all kinds of educational and training resources, encourage various organizations, government departments and residential communities to be learning-oriented, and facilitate the building of a learning-oriented society in which all citizens are involved in life-long learning. We aim to gradually create a social atmosphere in which every individual and organization takes the initiative to carry out HR development, bring the potentials of companies, social and civil organizations, NGOs, international organizations and residential communities into full play, and increase the input into HR development by all means. Meanwhile, we need to boost the active involvement of families and individuals in education and training and help them be more capable in self-teaching and improvement.

4.6.4 We need to maximize the synergy of the current training fund and resources, and try to enlarge the scale of HR development. In compliance with the demand of rural socio-economic development and the harmonious development of urban and rural areas, training programs of practical techniques and general training for farmers should be carried out in full swing at county and village levels based on the principles of pragmatism and effectiveness. At the county level, we ought to maximize the synergy of special training funds such as “Sunshine Project” training, technology training, poverty relief training, education training, employment training, etc., take all factors into consideration and make corresponding arrangement, and special account can be set for HR development. If possible, some counties can build certain well-known brands in labor training. We should improve the assessment work in the professional qualification test for farmers as well as “green certificate” training, and really have those farmers competent in agricultural technology take the lead in the popularization of agricultural technology and industrialized agricultural operation.

4.6.5 We need to enhance the scale and systematic level of labor transfer and continue to perfect HR development system. We should improve labor service institutions at provincial, municipal, county and village levels respectively. Each county/district ought to set up a high-standard training center in which government plays a leading role. Towns and villages with adequate conditions can establish labor training bases with local characteristics. Governments at county level and above should set up job centers where both professional talents and ordinary laborers find their jobs and where
the employers and job-hunters can go free of charge. Efforts should be made to further the understanding of transferred employment, improve the transfer level and efficiency. Through accelerating transfer of surplus labor, we can not only improve the utilization efficiency of HR, but also elevate HR competence and function and make them more capable of adapting to the market change.

4.6.6 We need to make more efforts in improving the ability of starting up a new business and broadening channels of HR development. We should strengthen education and training for administrators in enterprises via multiple means so as to speed up the cultivation of outstanding entrepreneurs who are familiar with internal and external markets, skillful in management and excellent in business operation. Company managers are encouraged and supported to go on further study in higher institutions or scientific research academies and practice their working ability in well-known enterprises. Competition mechanism among professionals is still to be improved and scientific research management system to be established step by step, which is market-oriented and aims to develop. It is imperative to foster and attract some high-level talents that are badly needed in our economic development effort, giving priority to improving technical skills and to training projects aiming to bring about more qualified technical experts, which can be fulfilled by school education, in-service training, self-teaching and other means.

4.6.7 We need to quicken the establishment of labor supply and demand information network and create brands for labor service with local or ethnic characteristics. It is necessary to accelerate the setup of provincial HR information network and realize online HR information share among provincial, municipal, county and village levels. If possible, job bases can be established in coastal developed areas and provinces or cities that face labor shortage to collect job information and organize labor transfer so as to better exchange with external labor market. Besides, party committees and governments at all levels need to be brand-conscious, exploring the potential and creating brands for labor service with local or ethnic characteristic by which both the internal quality and external image of local labor resources can be elevated to a large extent. Brands such as “Dongxiang Boiled Mutton”, “Islamic Food”, “Lanzhou Hand-stretched Beef Noodle”, “Gansu Security”, and “Tianshui White Girls
Housekeeping” have already found their feet nationwide and their experience is worth learning.

4.6.8 We need to strengthen supervision on law enforcement and protect lawful rights and interests of the migrant laborers. Introduction to laws should be reinforced in HR training so that the migrant workers are equipped with strong awareness of protecting their legal rights and interests with laws. In addition, we ought to strengthen supervision on law enforcement, restore order in labor market, and severely punish any conduct that impairs workers’ interests or hurts their feelings. It is necessary to establish supervision system to ensure the payment of migrant workers’ salary and the mechanism of paying some deposits to guarantee the payment. The latter one should be compulsory for the key enterprises such as construction enterprises. We have to strictly follow the stipulated minimum salary system for migrant workers in our province, build up social security system in a steady manner, and implement the “Safety Plan” which requires the migrant workers and highly risky enterprises be included in work-related injury insurance. Meanwhile, we need to popularize the work contract system to protect migrant workers’ legal rights and interests.

4.6.9 We need to further implement backup policies on employment and reemployment, and provide support for urban “zero employment families”. Special working teams on employment at all levels should take full initiative. Various backup policies ought to be materialized to promote employment and reemployment, and there should be wider scope where subsidies for work, vocational training and job recommendation can be paid, and the amount of the subsidies should be moderately increased. We need to further improve small-amount loan mechanism, streamline work procedures, cut down requirements for guarantee, and gradually enhance the laid-off workers’ self-reliant ability. In the meantime, we should give priority to the employment of urban “zero employment families”, stepping up our efforts in assisting them to be employed with some special programs.

4.6.10 We need to take more powerful measures to improve HR development. We ought to plan HR development in a systematic manner from overall and long-term perspective, and develop, utilize, regulate and allocate HR with clear objectives and steps. We should base on actual situation, follow economic rules and talent growth
rules, and integrate HR development with the adjustment of economic structure and the promotion of reform and opening-up, gradually setting up a long-term mechanism and improving it as well as paying heed to solve tangible problems at the same time. HR development requires that we attach utmost importance to it, taking it as one element in government assessment. Government departments at all levels should sign a commitment letter in terms of HR development, which sets out certain responsibilities. In a word, we should spare no effort in transforming the population pressure into HR advantage.

4.6.11 We will push forward HR development through carrying out more programs. We advise that the provincial government take the following programs into consideration: first, we can establish fund supporting system for training young and middle-aged farmers with the fiscal fund as the key support while making use of other training fund through various ways; second, we can set out to plan the “training program for young and middle-aged farmers in poor western areas”, aiming to make it a state-level program; third, we can start to draw the blueprint of the “standard senior high school construction and development program for poor rural areas in Gansu” which will help to lift the enrollment rate of senior high schools in these areas; fourth, we can set some plan for backup programs to assist those farmer-transferred workers to settle down in new places; fifth, we can strive to launch programs concerning the cultivation and employment of rural technical experts.
Migration through Education in Poor and Arid Counties of Gansu Province

A survey on poverty relief has been carried out in several poor counties since 2005, which shows that migration through education plays a more and more important role in migration and intellectual resources development in these counties. It, to a certain extent, ensures effective, stable and sustainable mobility of rural labor force. Therefore, we propose that this way of migration be adopted as an important strategic choice in many places of western China and be supported by the central government to alleviate poverty in the west. Education is the major way out for human capital development and migration.

1. Definition and practice of migration through education in poverty-stricken counties

1.1 Selection of places for the survey

From October 2005 to March 2006, a survey was carried out in four poor and arid counties of Gansu Province (Minqin, Huinig, Jingtai and Anding) to study the situation of migration through education. The four counties are typical poverty-stricken areas in China, especially in western China, who are mainly featured by arid and semi-arid climate, large rural population and redundant agricultural labor force that needs to be transferred.

1.2 Definition of migration through education

Migration through education is to transfer population out of poor areas under the support of governments so as to ease the pressure of population increase and subsistence. In other words, with the input from the governments, the education level of the citizens in poor and arid areas could be enhanced. As a result, more and more students in these areas can
go to high schools and colleges, and then move to other places for education, career and residence. This is an effective way of migration.

1.3. College enrollment since 1977

From 1977 to 2005, 68,284 students from the four counties were admitted to universities, and 41,489 to technical secondary schools, with a total number of 109,773. From 2001 to 2005, the college enrollment was 39,512, and technical secondary schools 14,254, with a total number of 53,766.

1.4. Annual numbers of the four counties’ graduates, those returned and those not.

We collected data on students going back to their hometowns for career development from 1997 to 2004 and the enrollment to universities, colleges and technical secondary schools from 1993 to 2000. Among the four counties, Anding and Minqin have relatively higher ratio. From 1997 to 2004, 40.9% of graduates originally coming from Anding and Minqin went back. The ratio in Anding has an upward tendency, 46.1% from 2001 to 2004 and 47.9% from 2003 to 2004. On the contrary, the ratio in Minqin has a downward tendency, with 43.3% from 2001 to 2004 and 31.2% from 2003 to 2004.

Table 7-9 Students admitted to colleges and technical secondary schools (1993-2000)

<table>
<thead>
<tr>
<th>Year</th>
<th>Huining</th>
<th>Jingtai</th>
<th>Minqin</th>
<th>Anding</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>1104</td>
<td>598</td>
<td>651</td>
<td>707</td>
<td>3060</td>
</tr>
<tr>
<td>1994</td>
<td>1557</td>
<td>745</td>
<td>557</td>
<td>721</td>
<td>3580</td>
</tr>
<tr>
<td>1995</td>
<td>1419</td>
<td>746</td>
<td>572</td>
<td>749</td>
<td>3486</td>
</tr>
<tr>
<td>1996</td>
<td>1479</td>
<td>647</td>
<td>572</td>
<td>721</td>
<td>3419</td>
</tr>
<tr>
<td>1997</td>
<td>1379</td>
<td>622</td>
<td>599</td>
<td>779</td>
<td>3379</td>
</tr>
<tr>
<td>1998</td>
<td>1237</td>
<td>510</td>
<td>665</td>
<td>918</td>
<td>3330</td>
</tr>
</tbody>
</table>

43 The return rate of graduates in a county (district) in a certain year= the number of graduates returning to work of that year/number of enrollment four years ago × 100%.
Table 7-10 Graduates returning to hometowns (1997-2004)

<table>
<thead>
<tr>
<th>Year</th>
<th>Huining</th>
<th>Jingtai</th>
<th>Minqin</th>
<th>Anding</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>214</td>
<td>49</td>
<td>280</td>
<td>511</td>
<td>1054</td>
</tr>
<tr>
<td>1998</td>
<td>251</td>
<td>143</td>
<td>321</td>
<td>519</td>
<td>1234</td>
</tr>
<tr>
<td>1999</td>
<td>320</td>
<td>123</td>
<td>405</td>
<td>467</td>
<td>1315</td>
</tr>
<tr>
<td>2000</td>
<td>350</td>
<td>71</td>
<td>399</td>
<td>449</td>
<td>1269</td>
</tr>
<tr>
<td>2001</td>
<td>280</td>
<td>88</td>
<td>350</td>
<td>571</td>
<td>1289</td>
</tr>
<tr>
<td>2002</td>
<td>272</td>
<td>103</td>
<td>347</td>
<td>584</td>
<td>1306</td>
</tr>
<tr>
<td>2003</td>
<td>348</td>
<td>130</td>
<td>448</td>
<td>701</td>
<td>1627</td>
</tr>
<tr>
<td>2004</td>
<td>283</td>
<td>192</td>
<td>372</td>
<td>1021</td>
<td>1868</td>
</tr>
</tbody>
</table>

Sources: Education Bureaus in Huining, Jingtai, Minqin and Anding

The slight differences of the four counties regarding the ratio of graduates returning to their hometowns for career development are decided by the social and economic situation in the four counties. Among them, Huining has the lowest per capita income of rural households 1,450 Yuan, followed by 1,593 Yuan in Anding, 2,200 Yuan in Jingtai, and 2,968 Yuan in Minqin which is the highest. Since Anding is the only district directly under the jurisdiction of Dingxi City, it has the highest ratio of returning among the four, 45.7% in 2004. Apart from Anding, the returning ratios in Huining, Jingtai and Minqin and their per capita net income are in direct proportion. With the highest per capita net income, Minqin has the highest ratio of returned graduates, 22.4% in 2004. With lower per capita net incomes, Huining and Jingtai have lower ratios of returned graduates, 12.7% and 14.5% respectively in 2004.

Table 7-11 Ratio of graduates returning to hometowns from 1997 to 2004 (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>Huining</th>
<th>Jingtai</th>
<th>Minqin</th>
<th>Anding</th>
</tr>
</thead>
</table>

Sources: Education Bureaus in Huining, Jingtai, Minqin and Anding
2. Contribution of migration through education to easing population pressure

2.1 Analysis model of the contribution of migration through education to social development.

In order to properly analyze the contribution of migration through education to local social and economic progress, we select to analyze its role in easing the pressure of increasing population, from which we get the following models:

Model 1: Contribution of migration through education from 1977 to 2005 = enrollment of colleges and technical secondary schools × (1 - ratio of returned graduates) × (1 + adjustment coefficient).

Model 2: Contribution of migration through education to easing the population pressure = contribution of migration through education from 1977 to 2005 / (local population in 2003 + contribution of migration through education in 29 years) × 100%.
2.2 Identification of adjustment coefficient for migration through education.

Those who went to colleges and technical secondary schools from 1977 to 2005 were unmarried then. If they had not left their hometown, most of them would have become peasants, got married and had children in rural areas. Graduates in 1977 and 1978 may have become grandparents already. Therefore, when talking about contribution to local migration through education, we should include both the number of students who left their hometowns as well as their children and grandchildren. The coefficient is the number of children and grandchildren each graduate may have in 2003. The details are as the follows:

<table>
<thead>
<tr>
<th>Programs</th>
<th>Adjustment Coefficient</th>
<th>Elaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program 1</td>
<td>0.5</td>
<td>If a couple has a child, each parent has 0.5 children on average. This is quite common in the city.</td>
</tr>
<tr>
<td>Program 2</td>
<td>1.0</td>
<td>If a couple has two children, each parent has one child on average. This is often seen in counties like Huining, Jingta, Minqin, and Anding.</td>
</tr>
<tr>
<td>Program 3</td>
<td>1.5</td>
<td>If a couple has three children, each parent has 1.5 children on average. This is often seen in rural areas of Huining, Jingta, Minqin, and Anding.</td>
</tr>
</tbody>
</table>

We set the adjustment coefficient at 1.0 in the following analysis for it is rather difficult to get the specific average number of children and grandchildren of those graduates who
are working outside their hometowns in 2003. The relative contribution to easing population pressure refers to the number of migrants through education as percentage of the local population if there were no migration.

2.3 Total contribution of migration through education.
Based on the model mentioned above, from 1977 to 2005, 109,773 students from Huining, Jingtai, Minqin and Anding were admitted to colleges and technical secondary schools. Among them, 34,436 returned to their hometowns upon graduation, and 75,337 started career in other places. The total contribution of migration through education (total population of migration through education) is 150,674, and their relative contribution to alleviating population pressure is 8.62%.

Table 7-13 Contribution of migration through education to easing population pressure

<table>
<thead>
<tr>
<th>County</th>
<th>Huining</th>
<th>Jingtai</th>
<th>Minqin</th>
<th>Anding</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Population (2003)</td>
<td>583,300</td>
<td>230,200</td>
<td>307,200</td>
<td>477,100</td>
<td>1,597,800</td>
</tr>
<tr>
<td>Number of Students Enrolled for Higher-education since 1977</td>
<td>39,754</td>
<td>18,729</td>
<td>23,335</td>
<td>27,955</td>
<td>109,773</td>
</tr>
<tr>
<td>Ratio of Graduates Returned to Hometowns (%)</td>
<td>20.2</td>
<td>15.4</td>
<td>51.8</td>
<td>40.9</td>
<td>31.4</td>
</tr>
<tr>
<td>Number of Graduates Returned to Hometown since 1977</td>
<td>8,030</td>
<td>2,884</td>
<td>12,088</td>
<td>11,434</td>
<td>34,436</td>
</tr>
<tr>
<td>Number of Graduates Working in Other Places since 1977</td>
<td>31,724</td>
<td>15,845</td>
<td>11,247</td>
<td>16,521</td>
<td>75,337</td>
</tr>
<tr>
<td>Total Contribution of Migration through Education since 1977</td>
<td>63,448</td>
<td>31,690</td>
<td>22,494</td>
<td>33,042</td>
<td>150,674</td>
</tr>
<tr>
<td>Relative Contribution to Easing Population Pressure</td>
<td>9.81</td>
<td>12.10</td>
<td>6.82</td>
<td>6.48</td>
<td>8.62</td>
</tr>
</tbody>
</table>
The total local population in 2003 comes from the “Yearbook of Gansu 2004”

| (%) |   |   |   |   |

3. Characteristics of migration through education in poverty-stricken counties

3.1 Migration through education is migration of well-educated people.

Migration due to ecological or development reasons refers to moving the entire village to a new location, with no special requirements for qualifications of migrants. The new settlement area will subsequently see no change other than increase of population. As for migration through education, qualifications of migrants such as education level and age are prerequisite. Migrants through education are often young people who will soon enter reproduction age. Therefore, migration through education helps control population growth at the source locations and improves population qualifications at recipient locations.

3.2 Migration through education bears evident effects.

Migration through education is quite effective in easing the population pressure in poor and arid counties. From 1977 to 2005, 109,773 students were admitted to higher-education, 34,436 of whom returned to their hometowns after graduation and 75,337 chose to work in other places. The total contribution of migration through education is 150,674 persons, and the relative contribution to easing population pressure is 8.62%. If there had been only a few of them leaving their hometowns for education and career, there would have been greater population pressure in these areas.

3.3 Migration through education has a stable mechanism.

Migration through education is based on HR development. Great attention and input to
education contribute to a stable mechanism of education development, thus leading to a sound cycle of “investment - education-migration - larger investment - better education - expansion of migration through education”. For example, Huining County has in recent years put education high on its development agenda and has adopted, in line with the local conditions, the strategy of migration through education. This has been proven a successful practice.

3.4 Migration through education may have collateral effects.

The survey also shows that migration through education has strong collateral effects, which is an advantage over other forms of migration. In addition to the migration of those well-educated people, once they get a foothold in the new place, their families and friends may also be attracted to the place too. This is very common in the counties. It is worth noticing that this form of migration doesn’t need government investment, but rather a volunteer action of people themselves.

3.5 The cost of migration through education is rather low.

Through certain calculating methods, we decide to take the cost of high school education as the cost for migration through education. Then, the average cost for each migrant is RMB 10,076 Yuan. Each year, parents pay RMB 1,000 Yuan for each child’s high school education, amounting to RMB3,000 Yuan for three years. The government pays RMB 7,776 Yuan for each student (according to the price level in 2004), less than RMB 8,000 Yuan. This is much lower than the government input to other migration projects. The per-capita cost undertaken by the government for the Shule River Project is RMB 21,831 Yuan, RMB 33,333 Yuan for the Three Gorges Project, RMB 20,000 Yuan in the relocation of herdsmen from Akesai County, and RMB 16,000 Yuan for the remote relocation projects, including the costs for production and public infrastructures and residence building. Of course, the cost of education here is only a theoretical one and different types of migration have their own features, inevitability and irreparability.
However, we can still draw some comparison among them from the perspective of government’s input for migrants.

<table>
<thead>
<tr>
<th>Migration Projects</th>
<th>Per-capita Government Input (Yuan)</th>
<th>Commodity Retail Price Index (1978 Index = 100)</th>
<th>Per-capita Government Input (Yuan) (Pricing in 2004)</th>
<th>Comparison of Migration Cost (Regarding the Cost of Migration through Education as 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migration through Education</td>
<td>7776</td>
<td>2004</td>
<td>356.4</td>
<td>7776 100</td>
</tr>
<tr>
<td>Migration from Shulehe River Region</td>
<td>21831</td>
<td>1994</td>
<td>310.2</td>
<td>25082 322</td>
</tr>
<tr>
<td>Migration for Three Gorges Project</td>
<td>33333</td>
<td>1993</td>
<td>254.9</td>
<td>46606 599</td>
</tr>
<tr>
<td>Migration due to Ecological Reasons in South Gansu</td>
<td>16000</td>
<td>2004</td>
<td>356.4</td>
<td>16000 205</td>
</tr>
<tr>
<td>Relocation in Akasai</td>
<td>20000</td>
<td>2000</td>
<td>354.4</td>
<td>20113 258</td>
</tr>
</tbody>
</table>
4. Promotion of migration through education in poverty stricken counties

4.1 The role of government.

It is essential to establish a stable education investment mechanism in poor counties.

Firstly, efforts should be made to implement county-based compulsory education mechanism in rural areas. Governments at the county (district or city) level should take developing compulsory education in rural areas as a major task, and increase input to it by setting up a stable education investment mechanism, readjusting structure of local fiscal expenditure, and properly using transfer payment from the central government.

Secondly, provincial governments should establish certain mechanisms to ensure that teachers in primary and middle schools in poor counties are paid on time and in full. When necessary, provincial governments should increase transfer payment to make up for the delayed salaries of teachers in poor counties and subsidize their salary payment.

Thirdly, governments at all levels should incorporate renovation of shabby school buildings into their local infrastructure development plan and allocate special funds for that purpose.

Fourthly, more educational resources should be pooled for high schools. The central and provincial governments should earmark certain percentage of poverty-relief or migration funds to increase resources and expand the scale of high school education so as to increase its enrollment.

4.2. The role of the public

Strategic priority should be given to education in local development agenda and migration through education should be regarded as an important means of migration. Meanwhile, the whole society should be mobilized to support education.
Firstly, local governments should actively seek education assistance from home and abroad, such as the Fund for the Reconstruction of Unsafe School Buildings, the Hope Project, the Spring Buds Program in support of poor girls, the Shanghai Youth Development Fund, the Hong Kong Nursery Project Fund, etc.

Secondly, governments should raise funds and materials to enlarge education resources and improve teaching conditions through various channels, such as calling on enterprises, individuals and civil society to contribute funds and teaching facilities--computers, projectors, radios, desks and chairs, books, etc, applying for loans from the financial sector and persuading construction companies to prepay the renovation of unsafe school buildings. For example, due to limited fiscal revenue, which is only RMB20 million Yuan yearly, Huining county has mainly relied on investment from higher-leveled governments as well as the society to improve its education situation, RMB81.244 million Yuan in 2002 and 2003 and over RMB30 million Yuan in 2004. From 2001 to 2004, some RMB120 million Yuan was spent on construction of schools in Huining, which was unprecedented in the county’s history. As a result, local education has been greatly promoted thanks to social support and finances.

4.3 The role of family

Family plays a pivotal role in migration through education in poor counties. Despite poverty, people in Huining and other poor counties always put children’s education on top of everything. No matter how destitute they are, they will support their children fulfilling education even by borrowed money. Lying in arid mountainous region in northern Huining County, the Dongpo Community, with only 38 households, 224 residents and less than 1000 Yuan annual income per person, has brought up 63 children who have received secondary or even higher education since 1977.

Another example is the Buzi Community in eastern Huining County, which has 31 households, 170 residents and less than 800 Yuan annual per capita income. However, there have been 75 students admitted to universities or technical secondary schools since
1977. From 1977 to 2005, there are 39,754 students from Huining County that have accepted higher education. Among them, over 200 have PhD degrees, more than 2,000 have master degrees, and over 20,000 have bachelor degrees. Many of them have successfully migrated through education, 500 of whom are now living in Beijing. This has not only eased population pressure at the source place, but also made greater contribution to social development.

4.4. The role of education loan

There are two kinds of education loan at present, commercial loan and state subsidized loan. The former is for student’s education in middle school and university at home or abroad for bachelor, master or PhD degrees (including traveling expenses for studying abroad). The latter is discount government loan for student’s tuition and miscellaneous fees in domestic higher learning institutions. There are strict criteria for discount loan application in terms of the applicant’s qualification, loan lines, loan terms and guarantee types. Most of these kinds of loan are given to sponsor higher learning. For poor farmers, who usually don’t have valuable asset as bank loan mortgage, find it hard to obtain loans for their children to go to primary or secondary schools. Therefore, it is an urgent task to reform the current education loan system by lowering thresholds and increasing fiscal subsidy to form a new mechanism that can provide loans for children’s primary and secondary education in poor areas. This will promote education, improve labor quality, and enhance migration through education in poor counties.

5. Strategy and policy of migration through education

Although those survey counties have done a lot in facilitating migration through education, we have noticed severe shortage of education resources in western poor and arid counties, which doesn’t justify the efforts they’ve made. Comparing the resources in Huining and Minqin counties in Gansu Province with that of Suzhou in Jiangsu Province, we find out an obvious disparity. To solve the problem, we have the following policy suggestions:
5.1 **12-year compulsory education should be implemented in western poverty-stricken regions and ethnic minority areas.**

It has been proven that in the light of current development and income gap among different regions and between urban and rural areas, adopting the same policy in places with unequal economic foundations is difficult to realize balanced development. Therefore, asymmetric policy should be taken. We propose to implement 12-year compulsory education in western poverty-stricken and ethnic minority areas, which can better help those areas develop education and narrow their gap with developed regions. The 9-year compulsory education can still be maintained in cities. We also suggest offer free technical and vocational secondary education to poor students in areas where poor and ethnic minority population is concentrated in.

5.2 **The central government should formulate special policy for migration through education in poor areas.**

There are many successful policies for poverty relief, such as work-for-relief, small river basin management, food-for-relief, the Hope Project, the Eco-home Project, etc. In addition, we suggest the government take migration through education as a special policy for poverty relief, give it special funds and formulate related plans and regulations so as to innovate China’s poverty relief system. The fund could either be a part of the poverty relief package or an independent one. A unified management system for the special fund of migration through education should be set up at all levels from the Ministry of Finance, the State Council Leading Group Office of Poverty Alleviation and Development to provincial, municipal and county offices of poverty alleviation.

5.3 **Migration through education should be highlighted in medium and long-term planning.**

We can insert migration through education as a special project into the package of developing agriculture and rural areas and increasing farmers’ income in the 11th
five-year plan. Local governments in western China should revise their plans on developing labor-service economy, promoting agriculture and rural areas, increasing farmer’s income, and on building new socialist countryside by adding migration through education so that it can become a new way of migration together with qualified migration of rural surplus labor and transnational migration. Education Departments could also consider including migration through education in the medium and long-term education planning.

5.4 Migration through education should be highlighted in the strategy of population development both at the central and local level. Governments should enhance the quality of population growth and promote migration through education as part of their efforts in controlling population growth, maintaining a low birth rate, and rewarding birth control. It is suggested that the Ministry of Finance, the Ministry of Education, the State Council Leading Group Office of Poverty Alleviation and Development and the National Population and Family Planning Commission work together to put forth policies concerning migration through education, especially preferential policies concerning loans for higher education at home or abroad of students whose families are in poor rural areas but meet birth control requirements.

5.5 To promote migration through education, poor regions should pay attention to pooling resources for the development of certain key schools, faculties and areas, and then realize all-around education development of the whole region. The survey in several poor counties in Gansu shows that it is a good strategic choice to alleviate poverty and practice migration through education. Many government and farmers have realized the importance of education. However, poor counties aren’t ready to encourage large-scale migration through education due to their lack of education resources. Governments are therefore urged to play a bigger supportive role in terms of special funds, infrastructure construction, faculty building, lab facilities and student subsidies, etc. This should be reflected in the medium and long-term local education development plans with clear priorities on certain key schools and areas.

5.6 We could select several counties in the west as demonstration sites of migration through education and give special policies, such as arid and poor area in Gansu
province, arid area in northern Shannxi province, Xihaigu area in Ningxia Autonomous Region and Haidong area in Qinhai province.

There are several key issues that we must bear in mind when designing relevant policies.

Firstly, the policy of migration through education in poverty-stricken counties should have an equal standing as the policies of poverty alleviation through development, work-for-relief, and relocation, etc.

Secondly, migration through education should be implemented in national poverty-stricken counties first, and then gradually expanded to provincial ones.

Thirdly, pilot work should be done prior to promotion and expansion so as to improve relevant policies.

Fourthly, the fund for migration through education should be managed as special project in the early stage, and then as project funds after conditions are ripe.

Fifthly, each target county could choose two key schools as pilot schools for the policy.

Sixthly, only local students could benefit from the policy.

Seventhly, there must be strict assessment over the performance of target counties.
Sub-report 8

Study on Public Finance System

SU Ming
Abstract

Finance policy is a key tool for carrying out government roles. The establishment and improvement of public finance system in Gansu serves as important fiscal guarantee for implementing the medium and long-term economic development strategy as well as promoting long-term sustainable socio-economic development in the province. From both theoretical and practical perspectives, this sub-report reveals the status quo and major conflicts in the fiscal operation in Gansu, elaborates on the goals, principles, difficulties and major policy framework for future public finance system construction in a systematic way and puts forward policy suggestions for expediting the undertaking. As an underdeveloped region, Gansu has to both rely on its own unremitting efforts and win national support in the setting up of public finance system. The suggestions to the central government raised by this report include: first, improving the central-to-local transfer payment system; second, taking preferential fiscal investment measures in the western region; third, building a local debt mechanism as soon as possible; forth, pushing forward the reform on resources tax; fifth, supporting “Hexi Corridor Experimental Zone for Coordinated Development between Man and Nature” through central fiscal policies. The suggestions to Gansu local government are: first, deepening the reform on grassroots finance system; second, enhancing local fiscal support to the “Three Rural” issues; third, improving the social security system; forth, vigorously supporting eco-environment protection and pollution treatment; fifth, facilitating growth of small and medium-sized enterprises through fiscal policies; sixth, deepening fiscal reform to build a conservation-oriented government.
Financial Policies serve not only as a major approach to realize government responsibilities, but also a guarantee for sustained socio-economic progress and social harmony. At the same time, to promote the implementation of the *Medium- and Long-Term Economic Development Strategy* in Gansu, we also need the support of sound public financial policies.

Since the reform on the tax distribution system, though Gansu has witnessed great increase in terms of total fiscal revenue, it is still lagged by other provinces with unbalanced financial distribution among governments at different levels, among different districts and between the urban and rural areas. In a word, Gansu is yet the poorest province in China, resulting from weak economic foundation as well as the lacking of sound mechanism and policies. This section analyses the financial status quo in Gansu through the empirical perspective and proposes thinking and policy suggestions on the future finance system building in Gansu.

**Section 1 Major Problems for Financial Operation in Gansu**

We have to look at Gansu's financial situation against the national socio-economic background to get a clearer picture. China has kept its annual economic growth at 9-11% during the 10th Five-Year Plan Period (FYP), the highest since the founding of China in 1949. Though the general economic strengthen has been enhanced, China is still facing two major problems: first is the co-existence of fast economic growth and unbalanced development between different regions and the insufficient natural resources; second, rapid increase of social demand and the lacking of a sound public finance system, in particular public services. Therefore, it is urgent for China to speed up the reform of public finance system to improve China’s policy on financial transfer payment and accelerate the progress of less developed regions, such as Gansu, so as to realize the balanced development of basic public services all over China.

The general features of Gansu and its finance system can be summarized as: 1) poor in natural resources, small in GDP, low in GDP per capita and unbalanced development between the urban and rural areas; 2) low fiscal revenue with large demand for expenditure, therefore heavy deficit. The following chapter will elaborate on these features.

**1.1. Analysis of status quo**

**1.1.1. Rapid increase of fiscal revenue**

Since the reform of opening up, Gansu has maintained good economic momentum, witnessing rapid
increase of local economy. The provincial GDP was increased from RMB45.2 billion in 1994 to RMB192.8 billion in 2005, with an annual growth rate of 14.1%. The GDP per capita was increased from RMB1,899 to RMB7,341 during the same period. The industrial structure was adjusted from 22.9:44.2:32.9 between the primary, secondary and tertiary industry to 15.6:43.4:41.1. With the sound economic development, the finance in Gansu has also witnessed good momentum. During the 10th FYP, the finance in Gansu has achieved three stages of development and two historical transformations. The local fiscal revenue and total revenue has reached RMB10 billion and RMB20 billion respectively, and the fiscal expenditure has increased to RMB42.9 billion in 2005. The local fiscal revenue of Gansu has grown to RMB12.35 billion in 2005, four times as that of RMB2.908 billion in 1994, with an annual increase of 14.05%. During the same period, the total revenue has increased from RMB6.262 billion to RMB25.457 billion, with an annual increase of 13.61%. The local fiscal revenue per capita also grew from RMB122 to RMB482, while the fiscal expenditure was increased by a rate of 17.57% each year, with RMB7.238 billion in 1994, RMB10.622 billion in 1997, RMB23.546 billion in 2001, RMB30.001 billion in 2003 and RMB42.935 billion in 2005 (Table 1).

Table 8-1  Fiscal Revenue and Expenditure of Gansu 1994-2005

<table>
<thead>
<tr>
<th>Year</th>
<th>Fiscal revenue</th>
<th>Local Fiscal revenue</th>
<th>Expenditure</th>
</tr>
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<td>1997</td>
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<td>106.72</td>
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<td>54.03</td>
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</tr>
<tr>
<td>2003</td>
<td>177.18</td>
<td>87.66</td>
<td>300.01</td>
</tr>
<tr>
<td>2004</td>
<td>215.86</td>
<td>104.16</td>
<td>356.94</td>
</tr>
<tr>
<td>2005</td>
<td>254.57</td>
<td>123.5</td>
<td>429.35</td>
</tr>
</tbody>
</table>

Annual Increase between 1995-2005 (\% )
13.61% 14.05% 17.57%

Annual Increase during the 9th FYP (\% )
9.50 12.56 18.26

Annual Increase during the 10th FYP (\% )
18.78 15.04 17.93

1.1.2. Increase of transfer payment from the central government

The transfer payment (TP) from the central government to Gansu has been greatly increased with the growing number of TP categories. In 1994, the TP totaled RMB4.319 billion in all the 6 categories, namely tax return, system-related subsidy, settlement subsidies, other subsidies, revenue adjustment subsidies, special subsidy, etc., totaling RMB4.319 billion. In 2005, the TP reached RMB31.047 billion in the 14 categories, 6.19 times more than the figure in 1994, with an annual increase of 19.64% (Table 2), which is higher than the increase rate of local fiscal revenue (14.05%) and total revenue (13.61%) as well as the fiscal expenditure (17.57%). Therefore, TP has become a major means to help with the local finance.

The TP of the central government is closely related to the self-sufficiency of local finance, referring to the rate of budget revenue (or local fiscal revenue) to fiscal expenditure. Generally speaking, the developed regions enjoy high sufficiency of the local revenue, while the less developed regions have a low sufficiency of its finance and the margin is subsidized with the central TP. The self-sufficiency rate of Gansu has dropped from 40.3% in 1994 to 28.7% in 2005, lower than the national average of 52%, which leads to the increase of central TP to the region.

Figure 8-1    Fiscal revenue in Gansu: 1994-2005
## Figure 8-2 Transfer Payment from the Central Government: 1994-2005

### Table 8-2 The Categories and Amount of Central Transfer Payment

Unit: RMB 100 million

<table>
<thead>
<tr>
<th>Year</th>
<th>Central subsidy</th>
<th>1. tax return</th>
<th>2. revenue tax return</th>
<th>3. system-related subsidy</th>
<th>4. general TP</th>
<th>5. TP subsidy in the minority districts</th>
<th>6. TP for tax reform in rural area</th>
<th>7. TP subsidy for counties and townships</th>
<th>8. TP for salary increase</th>
<th>9. settlement subsidies</th>
<th>10. TP for agriculture tax reduction and enterprises and institutions</th>
<th>11. other subsidies</th>
<th>12. TP subsidy for reducing farmers’ tax</th>
<th>13. subsidies for revenue adjustment</th>
<th>14. special subsidy</th>
<th>15. central returns on share subscription form income turn-ins</th>
<th>16. subsidy for issuing national</th>
</tr>
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<tbody>
<tr>
<td>1994</td>
<td>43.19</td>
<td>31.52</td>
<td>1.26</td>
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<td>0.79</td>
<td>5.36</td>
<td>2.07</td>
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<td>0.62</td>
<td>1.56</td>
<td>0.07</td>
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<td>1.56</td>
<td>0.07</td>
<td>0.31</td>
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<td>1.56</td>
<td>0.07</td>
<td>0.31</td>
<td>4.37</td>
<td>0.23</td>
<td>7.93</td>
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<td>0.62</td>
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<td>2.07</td>
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<td>0.62</td>
<td>1.56</td>
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<td>0.23</td>
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<td>1.56</td>
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<td>0.31</td>
<td>4.37</td>
<td>0.23</td>
<td>7.93</td>
</tr>
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1.1.3. Financial distribution orienting towards public services

With the advances of market economy, the financial distribution structure in Gansu is taking on great changes (see graph 3), orienting towards basic public services: **first, the Gansu local government has enhanced its support to basic infrastructure and major industries.** As China is implementing positive financial policies to expand the domestic market and push forward the national economy, the central government is gradually increasing its input to social infrastructure. In 2005, the budget for infrastructure reached RMB4.527 billion, 4.095 billion more or 9.32 times over 1994’s RMB432 million, with an annual increase of 24.09%. In addition, during the 10th FYP, the central government has increased the expenditure on infrastructure building by allocating RMB2.121 billion loans of national debt to the area. The 2005 expenditure on infrastructure accounted for 10.54% of the total, increased by 4.58 percentage points than the year 1994. **Second, the expenditure on pension and social security is growing fast, reflecting the public finance concept of “putting people’s livelihood first”.** During the 10th FYP, China has improved its social security system by establishing the mechanism on gratuity, guaranteed minimum income in urban areas, employment and re-employment, pension, unemployment and medical care, etc. The expenditure on “gratuity and social alms” and "social security subsidy" has been increased by 27.59% and 28.49% respectively, 9.66 and 10.56 percentage points higher than the increase of total fiscal expenditure, which have ensured the living fee for the laid-off workers from SOEs and the pension for the retired. From 2005, those live under the poverty line are expected to receive a 10% increase on their basic living fee. All these have contributed to the improved life of the poor, helped re-employment and sustained social stability. **Third, the fiscal expenditure structure has been optimized to focus on the key areas stipulated by the law, including agriculture and education.** During the 9th FYP, the agricultural expenditure of Gansu grew by 15.15% annually, lower than the average finance increase of the province. Thanks to the Western Development Strategy, the central government has increased its investment in agriculture activities, such as forest and grassland rehabilitation and comprehensive development, etc., which facilitated the agricultural expenditure in Gansu. During the 10th FYP, the figure soared to 20.01%, 2.08 percentage points higher than the provincial average financial growth rate of the year. And during the same period, the average fiscal expenditure supporting agriculture in Gansu reached 9.43%, 2.9 percentage points higher than the national average. During 1994-2005, the education expenditure in Gansu was increased by 18.93% annually, 1.61 percentage points higher than the growth rate of the total provincial expenditure. To be more specific, the education expenditure was increased with an average annual rate of 16.29% during the 9th FYP, 2 percentage points lower than
the total increase while the figures were 19.62% and 1.69 percentage points higher during the 10th FYP.
Table 8-3 The Fiscal Expenditure of Gansu and Its Structure: 1994—2005

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Fiscal Expenditure</th>
<th>Basic Construction</th>
<th>Agriculture</th>
<th>Education</th>
<th>S&amp;T</th>
<th>Health</th>
<th>Social Security</th>
<th>Pension</th>
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</table>

Annual average growth rate
- 17.32 21.35 17.12 18.93 10.12 13.84 38.4 62.26 15.9 10.89

Annual average growth rate during 9th FYP
- 18.26 35.58 15.15 16.29 8.61 55.29 24.56 6.16

Annual average growth rate during 10th FYP

Source: Finance Yearbook of Gansu

1.1.4. Efforts in striking financial balance

In 2001, the Gansu local government successfully stopped the growing trend of financial deficit and
achieved financial balance from 2002 to 2005, with a deficit of RMB7.04 million, RMB20.38 million, RMB1.6111 billion and RMB2.8448 billion assimilated respectively each year, a total of RMB0.473 billion. Since 1994, the wage-in-arrears problem of government agencies began to trouble Gansu province. However, through joint efforts, the local government turned the scale in 2003 by not only extending the monthly wage in time in 14 cities and 86 counties, but also paying the outstanding payments as well as subsidies and allowances in some localities. Gansu has obtained historical achievements in its finance.

1.2. Major problems

1.2.1. The low financial capacity has restricted future socio-economic development

Since the reform on tax distribution system, though Gansu has realized breakthrough in total fiscal revenue and expenditure, it is still lagged behind in terms of major financial indices with its low financial capability. Gansu is yet one of the poorest provinces in China.

**Gansu’s small and slowly growing fiscal revenue and expenditure is representing a decreasing proportion of the national total.** Gansu accounts for a decreasing percentage of the national fiscal revenue since 1994, dropping from 1.3% to 0.9% during 1994 to 2004, a decrease of 0.4 percentage point. During the 10th FYP, the average growth rate of general budget revenue in Gansu is 15.04%, while the figure for the whole country is 3.72 percentage points higher with 18.76%. In 2000, the average provincial (including autonomous region and municipalities directly administrated by the central government) fiscal revenue was RMB20.665 billion, 3.37 times of the general budget revenue in Gansu and the figures grew to RMB46.415 billion and 3.76 times in 2005. In 2004, there were 797 cities and counties across the country that collected a general budget revenue over RMB 100 million, with an average of RMB256.9513 million. Among them, only one came from Gansu, with revenue of RMB100.44 million. In terms of fiscal expenditure, the average local financial expenditure grew at 19.19% during the 10th FYP, 1.26 percentage points higher than that of Gansu and the proportion of Gansu to the whole country dropped from 1.8% in1994 to 1.7% in 2005, a fall of 0.1 percentage point. In 2005, the average provincial expenditure was RMB80.427 billion, 1.87 times of that in Gansu.

**Gansu ranks low in terms of total and per capita fiscal revenue and is still moving down on the national list.** In 1994, Gansu’s fiscal revenue ranked 25th nationwide and moved down to 26th in 1996 and 27th in 1997. Similarly, Gansu’s fiscal expenditure ranked 24th in 1994 and 27th in 2004, merely higher than the four provinces of Hainan, Ningxia, Qinghai and Tibet. In terms of fiscal revenue per capita, Gansu ranked 25th with 122.5 yuan in 1994, while moved down to 29th in 2004 with 398.93 yuan.
yuan. Compared with Shanghai, which boasts the highest fiscal revenue per capita with 1256.4 yuan in 1994 and 6407.14 yuan in 2004, the gap was enlarged by 5.30 times from 1134 yuan to 6008.21 yuan during the period. Gansu’s ranking in expenditure per capita was better, but also moved down from 17th to 20th during the same period (see table 4).

Table 8-4 Gansu’s ranking of fiscal revenue and expenditure

<table>
<thead>
<tr>
<th>Year</th>
<th>Local Fiscal Revenue</th>
<th>Local Fiscal Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>by total revenue</td>
<td>by revenue per capita</td>
</tr>
<tr>
<td>1994</td>
<td>25</td>
<td>122.4</td>
</tr>
<tr>
<td>2000</td>
<td>27</td>
<td>240.10</td>
</tr>
<tr>
<td>2004</td>
<td>27</td>
<td>398.93</td>
</tr>
</tbody>
</table>


The insufficient finance system has brought to Gansu various arrears, which hinders the long-term regional development. During the 10th FYP, the S&T expenditure in Gansu was 0.55% of its GDP, 0.57 percentage points lower than the national average; the expenditure on education, science and health and that on gratuity and social security alms were 22.82% and 2.17% respectively, both 0.23 percentage points lower than the national average. These figures indicated that Gansu should enhance its input in public products and social services. In addition, both the total investment and per capita expenditure on economic development in Gansu was far lower than the developed regions, which may lead to further backwardness and finance shortage in the less developed areas.

1.2.2. Inequivalent vertical distribution and greatest difficulties at the grassroots level

The finance at the county and township level constitutes an integral part of the national finance system as well as important branches of the local government. In the five-level national finance system in China, the finance at counties and villages are facing with the greatest difficulties, especially in Gansu.

Among the total fiscal revenue in Gansu, the proportion at the provincial and municipal level is going up while that at the county and township level is going down and the financial strength per capita at different levels varies much (see table 5).

Table 8-5 The Vertical Financial Distribution in Gansu
The growth of fiscal revenue in counties and towns relies on subsidies. Due to the lack of pillar industries, the total fiscal revenue at the county and village level is quite small. Among the 86 counties, only 10, or 11.6% achieved a revenue over RMB100 million in 2005; 61 or 70.9% obtained a revenue under RMB50 million. The revenue is not only small, but also increases very slowly. In 2005, the total fiscal revenue of the 86 counties increased by RMB250 million, an average of RMB2.9 million each. During the same period, the fiscal expenditure at the county level reported an increase of RMB3.79 billion, an average of RMB44.1 million each county. Therefore, the revenue increase was far slower than expenditure, leading to extrusive conflicts. The total fiscal revenue of Gansu in 2005 was RMB42.935 billion, among which RMB31.047 billion came from the central subsidy, accounting for 72.3% of the total. And in 62 of the 86 counties, over 80% of its expenditure came from subsidy.
indicating that the major source for county and township finance expenditure was the subsidy from superior government.

**The counties and townships cannot fill the gap between revenues and expenditure, shouldering heavy deficits.** Among the 14 municipalities and 86 counties in Gansu, the deficit of 8 municipalities and 67 counties added up to RMB2.956 billion by the end of 2005 and that of the rest 6 municipalities and 19 counties totaled RMB150 million. Linxia prefecture maintained the largest deficit with RMB180 million, as well as Zhenyuan county, Ning county, Xifeng district, Huanxian county and Zhengning county with RMB150 million, RMB130 million, RMB96.91 million and RMB91.42 million respectively. According to statistics, 556 or 27.5% of the 2020 counties in China accumulated a deficit of RMB12.745 billion in 2005; 348, or 39.4% of the 884 counties in the 12 western provinces could not meet their expenditure. In Gansu, 57, or 82.6% of the 69 counties and cities ran a deficit of RMB1.946 billion. The deficit rate of Gansu was higher than that of the whole country and the western region and the accumulative deficit of the province accounted for 15.28% of the state total and 23.73% of the western provinces.

The counties and townships are shouldering great pressure to repay the heavy debts. By the end of 2005, the county and village governments in Gansu were burdened with a debt of RMB23.79 billion, 5.9 times than the revenue. Among the 86 counties, one faced a debt over RMB1 billion, 10 counties between RMB500 million to RMB1 billion, 28 counties between RMB300 million to RMB500 million, 27 counties between RMB100 million to RMB300 million, 10 between RMB50 million to RMB100 million and 10 under RMB50 million. The money was invested in basic education, health and infrastructure, which can benefit the public but generates small profits. Therefore, the local finance is taking great risks and burdening heavy debts. The accumulative debts have exerted negative impact over the budget in the coming years and in some towns and villages, the public surrounded the government’s workplace to protest about the debts, which not only disturbed the operation of the government, but also damaged its authority, leading to instability in the rural area.

**The local government is facing great challenge from wage arrears.** After years’ efforts, the situation has been improved at the grassroots level and the local government can meet the salary requirements according the national rules. However, in some counties and townships, the back pay is not yet extended and the local authorities are not able to deliver the allowances and subsidies. According to the statistics, 3 of the 5 counties (districts) of Baiyin city owed a back pay of RMB67.36 million in 2005 (RMB20.11 million in Jingyuan county, RMB37.46 million in Huining county and RMB9.79 million in Jingtai county) and the various allowances and subsidies owed by the 5 counties added up to RMB10.047 billion according to the rules issued since 1997. Take Huining county as an example, the RMB 37.46 million wage arrears included a two months’ back pay of RMB8.56 million.
in 1996, which has not been extended yet as well as the salaries for the newly employed graduate students in various government agencies since 2000, who received living subsidy instead. Besides, Huining was not able to deliver the 480 yuan/person living subsidy and allowance according the rule issued by the provincial government, which totaled RMB378.93 million.

1.2.3. Unbalanced horizontal distribution of financial strength with increased gap between different districts

Due to the varied natural resources and economic strength, as well as limited TP under the current finance system, there is a huge and expanding gap between the fiscal revenue and expenditure of different areas inside Gansu. It is facing severe imbalance in terms of horizontal financial distribution.

The financial indices might draw a better picture. We have chosen three indices, namely average fiscal revenue, average fiscal expenditure and average financial strength. In the past decade, all the 14 prefectures in Gansu have achieved improvement in these three aspects, but there is still big and expanding gap between them (see table 6). For the average financial strength in 1995, 5 prefectures were above the provincial level of 7,352 yuan per capita, while the rest 9 were lower. The difference between Jiayuguan and Linxia prefecture reached RMB24,675, or 7.68 times. In 2005, the average financial strength was RMB24,841/person and still 5 prefectures above and 9 lower than the level. The difference between Jiayuguan and Dingxi city was RMB66,944, or 4.60 times.

There are also distinctive financial differences between the counties. For the same index (finance provided population) in 2000, Maqu county was the highest with RMB29,580, while the lowest was Jingyuan county, with only RMB6,129, reaching a difference of RMB23,451. In 2005, the highest was Jinchuan county with RMB41,980, and Maiji district was the lowest with RMB14,003, a difference of RMB27,977.

<table>
<thead>
<tr>
<th>Table 8-6 Financial Strength of Different Districts in Gansu</th>
<th>Unit: yuan/person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiscal revenue per capita</td>
<td>Fiscal expenditure per capita</td>
</tr>
<tr>
<td>The</td>
<td>142.5</td>
</tr>
</tbody>
</table>
### Table 1.1: Fiscal Revenue and Expenditure Per Capita in Gansu Province

<table>
<thead>
<tr>
<th>Province</th>
<th>Fiscal Revenue</th>
<th>Fiscal Expenditure</th>
<th>Income</th>
<th>Spending</th>
<th>Financial Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanzhou</td>
<td>380.6</td>
<td>444.3</td>
<td>16181</td>
<td>918.3</td>
<td>41960</td>
</tr>
<tr>
<td>Jiayuguan</td>
<td>1092</td>
<td>844.9</td>
<td>28368</td>
<td>2181</td>
<td>85540</td>
</tr>
<tr>
<td>Jinchang</td>
<td>332.0</td>
<td>555.1</td>
<td>21375</td>
<td>925.6</td>
<td>45647</td>
</tr>
<tr>
<td>Baiyin</td>
<td>108.6</td>
<td>204.1</td>
<td>9936</td>
<td>269.5</td>
<td>23000</td>
</tr>
<tr>
<td>Tianshui</td>
<td>63.4</td>
<td>157.5</td>
<td>5939</td>
<td>147.0</td>
<td>20389</td>
</tr>
<tr>
<td>Jiuquan</td>
<td>223.7</td>
<td>403.1</td>
<td>8456</td>
<td>434.3</td>
<td>27640</td>
</tr>
<tr>
<td>Zhangye</td>
<td>121.9</td>
<td>254.7</td>
<td>6625</td>
<td>256.4</td>
<td>23085</td>
</tr>
<tr>
<td>Wuwei</td>
<td>68.3</td>
<td>176.2</td>
<td>4776</td>
<td>133.4</td>
<td>19953</td>
</tr>
<tr>
<td>Dingxi</td>
<td>36.5</td>
<td>127.5</td>
<td>4371</td>
<td>85.2</td>
<td>18596</td>
</tr>
<tr>
<td>Longnan</td>
<td>38.6</td>
<td>166.3</td>
<td>4402</td>
<td>103.2</td>
<td>20046</td>
</tr>
<tr>
<td>Pingliang</td>
<td>67.2</td>
<td>176.9</td>
<td>4997</td>
<td>233.5</td>
<td>21489</td>
</tr>
<tr>
<td>Qingyang</td>
<td>90.7</td>
<td>218.8</td>
<td>5865</td>
<td>267.4</td>
<td>24661</td>
</tr>
<tr>
<td>Linxia</td>
<td>31.3</td>
<td>187.6</td>
<td>3693</td>
<td>98.8</td>
<td>19428</td>
</tr>
<tr>
<td>Gannan</td>
<td>99.5</td>
<td>380.9</td>
<td>6593</td>
<td>175.8</td>
<td>25619</td>
</tr>
</tbody>
</table>

Source: 1. The fiscal revenue and expenditure per capita are based on *Statistics Yearbook of Gansu*; 2. The financial strength per capita is based on the financial statements.

We can see from the figures that both the vertical and horizontal financial distribution varied substantially between different areas in Gansu under the current finance system. The financial strength is a key tool for the government to realize its responsibility as well as the guarantee for basic public products and social services. The weak financial strength and unbalanced distribution in Gansu has hindered the role of the local government and restricted the smooth supply of public products and the coordinated socio-economic development.

### 1.2.4. Unbalanced financial strengths between the urban and rural areas & lack of public products and services in the rural areas

Though Gansu has increased its input in the “three rural” issues in the recent years, the backwardness in the rural area has still caused the big conflicts between supply and demand of public products and services.

**Insufficient financial support and investment mechanism in the rural area results in major conflicts between capital supply and demand.** In recent years, with the rapid economic development
and financial growth in Gansu, the local government has kept increasing the financial input in the rural areas. Nevertheless, the total amount is still small and relies largely on central investment. Many of the counties can only make their ends meet and are not able to solicit more capital for the “three rural” issues. In addition, the collective economy at the village level and the general public are comparatively vulnerable and there is no sound mechanism for the enterprises, rural financial agencies and other social groups to invest in agriculture and rural issues, hence the supply-demand conflicts will remain outstanding for a long period of time.

The poor infrastructure and weak bio-environment in the rural area call for hard efforts to alleviate poverty and improve public services. Situated in the arid area in northwest China, Gansu is endowed with lean soil, unpleasant bio-environment and weak agricultural development. Gansu runs short of water and forest resources in particular. Its average water resources per capita is less than half and the water for arable land per mu is less than one fourth of the national average. The forestry coverage is only 9.1% and over 90% of its 270 million of natural grassland are degrading, among which 60% are facing severely degradation. The poor infrastructure and backward production methods in the rural areas lead to low agricultural productivity and the slow development of the secondary and tertiary industry. Hence, the local government is shouldering an arduous task to alleviate poverty in the area. Right now, 1.49 million people cannot make their ends meet and 3.98 million are living under the poverty line, accounting for 7.7% and 19.3% of the total population in Gansu respectively. 15% of the counties have no buses, 3% with no electricity, 10.7% without schools, 40.6% have no toilets and 1.6 million people don’t have enough drinking water. Though the Chinese government has formulated favorable policies for the poverty alleviation work in Gansu, the insufficient input to improve the living and work conditions for the rural population still results in the laggard health, education and social security system. It is a challenging task to alleviate poverty and enhance the public services in Gansu.

1.2.5. The waste of insufficient capital intensifies the conflicts

The financial difficulty is a bottleneck to the socio-economic growth in Gansu. Similar to most of the provinces in China, Gansu is facing a dilemma of insufficient capital and low financial efficiency. On the one hand, there is a great conflict between the supply and demand of capital; on the other hand, the money is wasted on repeated and unchecked construction, image and achievement projects and the unnecessary building and restoration of offices, which has greatly intensified the existing conflicts.
1.3. Reasons

1.3.1. Weak economy and laggard restructuring

With rapid development in recent years, the economic aggregates of Gansu is still smaller than most of the provinces. In 2005, its GDP reached RMB192.8 billion, ranking the 30th in China. The GDP per capita was RMB7,341, 52.5% of the national average. The major industries in Gansu are at the low end of the industrial structure and the province’s industrialization and urbanization level are below the national average, which curbs its fiscal development from the root. Since most counties and townships in Gansu depend on agricultural economy, the identical economic structure, low added value, few products make it difficult to generate fiscal revenue through scale performance. The majority of the enterprises there are small and at the county level. They make a living by processing energy, raw materials and primary products. Owning to the outdated equipments and technologies, these companies are vulnerable to the risks in the market and generate very small amount of profits and taxes. The fiscal revenue growth in Gansu still leans upon the large scale enterprises and some key industries. In many places, the secondary industry starts at a low point, works on repeated projects, faces huge difficulties in restructuring and boosts little potential in profit increase. All these have restricted the growth and structure optimization of local fiscal revenue.

1.3.2. Unmatched fiscal and administrative Capacity

Since the reform on the tax distribution system in 1994, China has achieved marvelous progress in strengthening macroeconomic regulation of the central government and mobilized the initiatives of the local governments in financing. Nevertheless, we cannot neglect the existing problems, namely the unmatched fiscal and administrative capacity. First, the central proportion is going up in the fiscal share between the central and Gansu government. For the total revenue in Gansu during the 10th FYP, the central proportion moved up from 43.65% in 2001 to 51.49% in 2005, while the local budget revenue reduced from 56.35% to 48.51% during the period. Second, the provincial and municipal proportion in fiscal distribution is increasing while that of the counties and townships is going down. For instance, the provincial proportion in fiscal revenue climbed from 19.93% in 1994 to 37.58% in 2005, the municipal proportion raised form 26.25% to 30.28%, but that of the counties and townships declined from 54.02% to 32.15% (see table 7). Third, the lack of clear-cut division of administrative responsibilities between governments at different levels leads to misplacement during power implementation and the subordinated governments are shouldering ever more responsibilities. In China, only the Constitution provides a rough division of the administrative responsibilities between the governments at different levels, which is difficult to operate, and the
expenditure scope of the governments decided by the fiscal system is general in nature. Therefore, the lack of clear-cut responsibilities may cause both power excess and absence. This indicates that the fiscal difficulties in Gansu are not only related to the weak local economy, but also the lack of a sound mechanism.

Table 8-7  Fiscal Revenue Proportion at Different Levels in Gansu

<table>
<thead>
<tr>
<th>Year</th>
<th>Proportion of the total</th>
<th>Proportion of the total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Province level</td>
<td>Prefecture level</td>
</tr>
<tr>
<td>1993</td>
<td>26.27%</td>
<td>32.36%</td>
</tr>
<tr>
<td>1994</td>
<td>19.73%</td>
<td>26.25%</td>
</tr>
<tr>
<td>1995</td>
<td>17.88%</td>
<td>27.90%</td>
</tr>
<tr>
<td>1996</td>
<td>19.91%</td>
<td>25.88%</td>
</tr>
<tr>
<td>1997</td>
<td>18.40%</td>
<td>25.42%</td>
</tr>
<tr>
<td>1998</td>
<td>18.17%</td>
<td>24.78%</td>
</tr>
<tr>
<td>1999</td>
<td>16.54%</td>
<td>24.89%</td>
</tr>
<tr>
<td>2000</td>
<td>17.56%</td>
<td>23.98%</td>
</tr>
<tr>
<td>2001</td>
<td>19.20%</td>
<td>25.15%</td>
</tr>
<tr>
<td>2002</td>
<td>21.68%</td>
<td>26.21%</td>
</tr>
<tr>
<td>2003</td>
<td>31.55%</td>
<td>29.67%</td>
</tr>
<tr>
<td>2004</td>
<td>33.06%</td>
<td>31.26%</td>
</tr>
<tr>
<td>2005</td>
<td>37.58%</td>
<td>30.28%</td>
</tr>
</tbody>
</table>


1.3.3 Unsound transfer payment mechanism

From the perspective of Gansu, the current problems of China’s national TP mechanism lie in: first, the system-related TP expands the gap between the east and west region. The system-related transfer aims at maintaining the vested interests. The returns on value added tax are linked to the growth of tax revenue and the reverse regulation increased the gap between the east and west China, shifting away from its goal of balanced development. In 2005, the national system-related TP rated RMB414.3 billion or 36% of the total, higher than financial TP and special TP. Conditioned by the local economy, the less developed the region, the less system-related subsidy it gets. The system-related subsidy in Guizhou and Gansu province accounts for only 19.51% and 17% of the total central TP to the province respectively, much lower than the national average of 36%. Second, the amount of general TP is small compared to the total financial TP, which has limited its role of
balancing the financial strength. Under the current system, the limited role of general TP due to its small amount has led to weakened financial independence of the local government. In 2005, China’s general TP reached RMB112 billion, 9.8% of the total, while as TP for revenue adjustment, tax reform in the rural area and agriculture tax reduction amounted to RMB165.4 billion, 14% of the total or 43% of financial TP. The above three subsidies serve as special compensation for policy-related revenue reduction and the local government cannot use the earmarked money for other purposes. Therefore, the three subsidies do not increase the disposable capital of the local government. In Gansu, the 2005 general TP from the central government was RMB4.358 billion, 3.89% of the national total or 14% of that to Gansu, which could only play a very limited role in adjusting local finance. Third, the various special TP accounts for a large proportion of the national total. Special TP is the central appropriation aiming to realize certain policy in the local areas, covering every expenditure item. In 2005, the 239 kinds of special TP in China reached RMB351.7 billion, 31% of the total TP. However, the lack of a sound and strict mechanism for special TP distribution causes corruption. Thereby, China should reduce special TP till the establishment of a healthy system and integrate its financial resources on the major socio-economic undertakings. The special TP to Gansu in 2005 reached RMB13.248 billion, 3.77% of the national total or 42.7% of the total to Gansu. Though it played a part in promoting local economic development, they were earmarked for the targeted goal and the Gansu government was not able to use it independently. Some urgently needed public services didn’t have the matching investment and could only be supported by local finance. Thus the central special TP mechanism needs to be improved.

1.3.4. Rapid increase of finance supported population

In 1995, the finance supported population of Gansu arrived at 682,209, 2.80% of the 24.3795 million people in the province. One of every 36 people was supported by local finance. By 2005, the figure increased to 977,426, or 3.78% of the total and the local finance had to support 1/27 of its people. In 1996, there were 36.72 million people supported by the government nationwide, and then grew to around 38.4 million. The proportion of finance supported population dropped from 3.0% to 2.95% and the finance supporting coefficient developed from 1:33 to 1:34. Therefore, the proportion of finance supported population in Gansu was higher than the national average, the coefficient of the former moving up while the latter going down. A large part of the newly increased revenue and TP are consumed by the increased finance supported population, which aggrandizes administrative cost and brings the local finance with additional burden. The fiscal budget of many counties and townships can only afford the finance supported population, unable to realize their responsibilities. The proportion of finance supported population is decided by a number of factors, including size of population, economic development, population density and level of urbanization, etc. Gansu is a less developed
region. Though it does not boost a large population, the backward economy, expansive area, low population density and urbanization level all contributes to the high proportion of finance supported population, but these can be made up in the future.

1.3.5. Unsound financial management mechanism

First, the government does not regulate all the revenue and expenditure items. Currently, the local financial capital includes budget, off-budget as well as off-system revenues and expenditures. The financial departments only regulate the budget revenue. Though an increasing part of the other two are included into the management system of the financial department, some items are still not regulated by the government. Second, the budget planning needs to be improved. Most cities and counties adopt Base Quota for budget planning. The backward approach, the lack of operation mechanism and legal procedures for budget adjustment, and the absence of consecutive and dynamic database make the economic analysis and budget planning unreasonable. Third, China has to establish both budget monitoring system and performance assessment mechanism.

Section 2 General Thinking for Setting up Public finance System

The market economic development requires a sound public finance system through system and mechanism innovation, which is the goal for the national and local financing reform. Taking into consideration the abovementioned problems and difficulties Gansu faces, this section proposes the general thinking for the public finance system building in the province from both theoretical and practical perspectives.

2.1. Goals and principles

2.1.1 Goals

Public finance is a model matching the market economy, by which a country fulfills its functions and meets the common social demands through government revenues and expenditures and integrated social resources. Public finance is fundamentally different from the centralized financing model or production-construction-financing under China’s central planning system. It aims at meeting public demands, including providing public products, facilitating fair distribution of social wealth and ensuring stable macroeconomic development, rather than participating in the competitive sectors.
Public finance serves the social interests, collects no profits and regulates related activities by the law.

**The general goals for Gansu’s medium and long-term financing reform are:** strengthening the local economy and financial strength according to the requirements of improving the market economic system with socialistic characteristics and building public finance; ensuring the effective performance of the government at different levels in the political, economic and social fields; realizing that the people in Gansu enjoy public services at the national average level; boosting economic growth through sound financial system and policies; promoting harmonious development inside the province.

Proposed key goals for Gansu's public finance system at different stages:

**Goal for 2007-2010:** to notably strengthen the financial power in Gansu, realize that the local fiscal revenue grows faster than GDP and narrow the gap between Gansu and the national average in fiscal strength per capita; to focus financial resources (local resources and central subsidy) on key social expenditure (education, health, science and technology, social security, etc.) and shorten the gap between Gansu and other areas; to solve the financial difficulties at the county and township level, write off deficits and reduce debts; to check the expanding gaps inside the province; to make up the gap between public products supply and demand.

**Goal for 2020:** to reduce the gap between financial strength per capita between Gansu and the national average through economic development, system innovation and policy adjustment; to make sure that people in Gansu enjoy the same public services as other parts in China; to expand the coverage of public finance in the rural area; to drive the systematic, standardized and scientific development of financing.

### 2.1.2. Basic principles

---**Coordinated reform between the central and local government.** The building of public finance system is a huge task, requiring the joint efforts of the central and local government. The central finance has to take the lead by making breakthroughs in defining duties and expenditure responsibilities and TP systems, setting the direction for local reform and enlarging the support for the less developed regions. At the same time, the local government ought to give up the dated idea of relying on the central government and show initiative in reform. It has to readjust the local fiscal distribution structure, push forward reform on budget management and enhance the efficiency of capital.

---**Matching expenditure responsibility with the fiscal strength.** Generally speaking, the division
of government functions at different levels has decided their corresponding expenditure responsibilities. Theoretically, we can divide the government responsibilities clearly by the principle of making maximum benefits and minimizing costs, etc. In reality, the government responsibilities are under constant change due to so many variables, especially during the process of improving the market economic system with socialistic characteristics. Therefore, though we should work towards the goal of clear and legal division of government expenditure responsibilities, we have to match them with corresponding financial strength for those difficult to be determined through legal approaches. In a word, we have to take into account its financial strength while setting government expenditure responsibilities and the superior government have to allocate TP for the gap between revenues and expenditure of the subordinates. In this case, it is important to build a sound TP system. Moreover, this has put forward strict requirements for the superior governments (provincial and municipal governments): first, the superiors must not transfer their own expenditure requirements or raise expenditure requirements to the subordinates; second, in case of expenditure responsibility transfer, the superior government must provide corresponding financial support to the subordinates. For the grassroots governments, they have to do their best to finish their incumbent tasks with adequate financing rather than asking for more subsidies from the superior government.

---The concentration of provincial revenues relates conversely to balanced economic development. It means that inside a province, the more unbalanced economic development among different areas leads to more concentrated fiscal strength at the provincial level or vice versa. Generally speaking, the balanced economic development among cities and counties would lead to lower provincial share of revenues, thus less centralized fiscal strength at provincial level and the unbalanced local development would lead to higher provincial share, thus more concentrated financing. The provincial financing shoulders the responsibility of macroeconomic regulation and promoting the equal development of public services in the whole province. The unbalanced local development is most prominent in Gansu. The limited fiscal resources are pooled in a few economically strong cities and counties. Most areas are economically weak and can provide very few public products. Therefore, in order to balance the public services in the province, the provincial government has to be endowed with more disposable financial resources so as to support the less developed areas. Only by enhancing the concentration of provincial financing can its regulation capability be upgraded.

2.2. Analysis of difficulties

Though there are a batch of advantages in the building of public finance system in Gansu, including increased central investment due to the Western Development Program, growing amount of TP with
the increase of national finance, the abundant human resources which enable some industrial
development in Gansu against the context of economic globalization, it is still faced with many
difficulties. The correct treatment of these difficulties will clear our goal, advance reform and drive
the smooth building of public finance system.

2.2.1. Gansu is Building its Public finance on A Poor Foundation

China is building and improving its public finance system across the country. The developed regions
own high level of public goods and services due to their powerful economy and is facing less pressure
on reforming the finance system. The less developed regions have a low coverage of public goods and
services as well as large amount of debts because of limited financing, thus more difficulties in
building the finance system. Gansu is lagging behind in both economic strength and fiscal resources,
so it is facing a hard task to shorten the distance with the national average in terms of per capita fiscal
strength and social services.

2.2.2. The dual influence of corpus function area

From the macro perspective, the enhancement of corpus function area can facilitate the harmonious
development between man and nature and match rational economic and population distribution with
the bearing capacity of resources and environment. It is also beneficial to space management as well
as the standardization and optimization of space developing order so as to form a rational structure. It
is also good to the distribution efficiency of resources and promotes a regional and work division
pattern with own features. In a word, the corpus function area is a new regional development thinking
explored according to the Scientific Outlook on Development. From the perspective of Gansu, the
corpus function area has both advantages and disadvantages to its economic and finance system. On
the one hand, due to the vulnerable ecosystem in Gansu, the increased central TP in the building of
corpus function area will become important financial resources in the province. On the other hand,
many regions in Gansu will become restricted development area or forbidden development area,
which will curb the economic growth and lead to decrease of fiscal revenue.

2.2.3. Reform on current resources is more difficult than newly increased ones

The building of public finance system in Gansu cannot only rely on the reform of newly increased
resources, but should drive forward reform of existing ones. The reform of newly increased resources
will not touch upon the vested interests; therefore, it is easily accepted by all walks of life. However,
for the reform of existing resources, the readjustment and reallocation of vested interests makes it
more difficult. Take central TP as an example, the government not only has to allocate a larger proportion of newly increased TP to the middle and western areas, but should also reform the current tax return system. In the readjustment of fiscal expenditure structure in Gansu, the government will reduce or even cancel the expenditure in some areas. Such reform is necessary, but difficult to push forward.

2.3. Major policies

This part does not touch upon all the issues related to the public finance system in Gansu. Rather, it emphasizes on the discussion of the major policy framework (or the key issues to be addressed) on the basis of the analysis above.

2.3.1. Gradual realization of balanced basic public services

Basic public services refer to the public products provided by the government to meet common social needs and include the following three areas: 1) “basic services for people’s livelihood”, which includes employment service and basic social security; 2) public undertaking, including compulsory education, public health and medical care, public cultural service, etc.; 3) basic services for public welfare, including such infrastructure as roads and drinking water and protection of ecosystem, etc.

The basic public services were put forward by the 4th Plenary Session of the 16th Central Committee Meeting of CPC. It is the common practice of world countries in the market economy, the requirements of building a harmonious socialist society in China and the key issue for building public finance system in Gansu.

Theoretically speaking, efforts in balancing the basic public services are important reparation for market regulation failure, embodying the “people oriented” thinking. Sticking to the principle of “people oriented” is to develop for the people, by the people and share the achievements with the people and not only meet the material needs, but also the spiritual, health and safety needs of the people. In order to realize this goal, the government has to balance its basic public services. It is proved by the experience in both developed countries and China’ reform that the market mechanism is irreplaceable in providing products and services for the private sector; however, the mechanism is limited or may fail in providing pubic goods and services. Therefore, a balancing mechanism for public services is needed. As we know it, public finance, a distribution activity by the government to meet the social needs, is a match for the socialist market economy. Compared to the production-oriented finance under the central planning economy, public finance is for the public and social interests, much fairer and regulates by the law. Therefore, to meet social needs and provide
public services is not only a basic feature of public finance, but its fundamental role as well. In compliance with the policy of the central government, to embody the thinking of building a harmonious society in public finance and services is to take Scientific Outlook on Development as the guidance and improve the public service system by deepening reform and innovating socialist public finance system, to realize the balanced development of public services on the basis of sustained economic growth and secured government progress and to lay a solid foundation for social equity and harmony by ensuring equal share of public services for all citizens.

From the perspective of practice, the balanced development of public services is a need for addressing social conflicts, strengthening social management and public services as well as promoting coordinated regional progress. Right now, there are several conflicts damaging the generally harmonious society in China, including the unbalanced development between urban and rural areas, between different regions and between economy and social services. As for the regional gap, it is impossible for the middle and western area to catch up with the eastern part in terms of economic aggregate and GDP per capita in a short period of time. However, it is possible to gradually realize balanced public services among the people. Hence, to narrow down the gap in public services will have positive impact on easing regional conflicts.

In recent years, the academic communities in China have attached great importance to the issue of public services. The 2006 China Public Service Development Report divides the public service assessment system into eight subsystems, including basic education, public health, social security, public safety, environment protection, infrastructure, science and technology and general services. For each subsystem, we have designed three kinds of index, namely input, output and effect and set up an evaluation system with 165 indices which cover the key information in the area comprehensively and scientifically. Within the evaluation system, the Report used large amount of statistics to carry out an all-round assessment for the eight subsystems and the overall public services in such four areas as general performance (ranking), input-output efficiency, improvement and regional difference in the period of 2000-2004. The Report concludes that the current public service is generally backward, unbalanced and inefficient. The generally low development level is represented in the way that the increase rate of public service input is lower than that of overall fiscal expenditure, public service progress slower than economic growth rate and the quantity and quality of public service behind public expectation. The unbalanced development refers to the regional difference of public service in that east China excels middle and western regions; unbalanced development in urban and rural areas and the severe lack of public services in the rural area; imbalances among different kinds of services and insufficiency in education, health, social security, public safety and environment protection, which catches more public attention. Inefficiency is showcased in the unchangeable input-output ratio in different areas. The public service system of the government falls into the category of "heavy input"
rather than "high efficiency" and the regional difference lies in its different scale of input. Therefore, it is necessary and urgent to address the low efficiency and unbalanced development through effective measures nationwide.

As a less developed region, the economic development, fiscal aggregate and income and consumption of its people in Gansu are all far behind other regions, let alone the developed ones. Due to the weak fiscal and economic power analyzed above, the fiscal distribution and public product in Gansu is facing imbalanced development among governments at different levels, among different districts and between the urban and rural areas, which has already become the major factor restricting coordinated socio-economic development. The overall public services in Gansu are backward, among which some rank the bottom across the country. During the period of 2000-2004, the general ranking of Gansu's public service was low on the national list. Except that its scientific research ranked 19th, the other seven were all behind 25th and the ranking of basic education, social security and public safety fell to 28th, 26th and 27th respectively in 2004. Its services in infrastructure and environment protection were at the bottom in the same period (see table 8). Both the Gansu and central government have to attach importance to this issue. Since it is impossible to fill the gap of economic strength in a short period of time, it is necessary and urgent to improve the public services in Gansu so as to achieve balanced development across the country. It will take the lead in boosting socio-economic development and the finance system building in the region, and lay a solid foundation for narrowing down the gap between Gansu and other regions as well as addressing the imbalanced development in Gansu.

| Table 8-8  Public Service Ranking of Gansu among 31 Provinces |
|-------------------------|-------|-------|-------|-------|-------|-------|
| Basic education         | 25    | 25    | 27    | 28    | 28    | 27    |
| Public health           | 27    | 27    | 29    | 29    | 21    | 28    |
| Social security         | 24    | 25    | 26    | 26    | 26    | 25    |
| infrastructure          | 31    | 31    | 31    | 31    | 31    | 31    |
| Scientific research     | 18    | 19    | 20    | 21    | 17    | 19    |
| Public safety           | 24    | 22    | 27    | 28    | 27    | 27    |
| Environment protection  | 31    | 30    | 31    | 30    | 31    | 28    |
| General public service  | 28    | 22    | 27    | 25    | 26    | 27    |


The key factor for achieving balanced development of public services between Gansu and other parts in China is to set up a sound finance system, make clear the connection between the central and local finance and increase the central subsidies to the former revolutionary bases, minority area, border area, poverty-stricken area, major food production area, mining area and those with a heavy task for environment protection through an improved central TP system.
2.3.2. Vigorously pushing forward innovation of TP system

Intergovernmental TP refers to the volunteer transfer payment among the governments at different levels of a certain country under their specific responsibilities, expenditure duties and tax framework. Intergovernmental TP is a key component of the budget management system, influencing its fairness and efficiency. Central TP exists in every country, whether it is federal or unitary, with different forms. Central TP is necessary because: 1) it can address the vertically imbalanced fiscal distribution. The unbalance between revenues and expenditure leads to a revenue shortage for a government (usually the government at a lower level). Hence, it requires TP to make up the gap to realize balanced government financing at different levels; 2) it can address the horizontally imbalanced fiscal distribution. The unbalance among governments at the same level refers to the conflicts between the different net fiscal subsidies and the same goal for public services, which also requires central TP; 3) it can rectify the exterior effect of local public services. Central TP is needed to adjust the spilling over (exterior effects) of benefits by government activities outside its jurisdiction. For instance, the treatment of natural environment by planting trees in the upstream of rivers can benefit all the regions along the river. Here central TP is necessary to adjust the benefits according to a uniform standard; 4) it can achieve specific policy goals. TP also serves as an important means to coordinated local activities for specific national goals. Central TP will support the expenditures that cannot be fulfilled by local governments or with high risks. In addition, the central government helps the border area and minority area boost economic growth and improve public services with special subsidies, so as to achieve ethnic unity and border safety. Another example is that central TP may support local revenue decrease or increase caused by uncontrollable factors.

<table>
<thead>
<tr>
<th>Column 1 International Experience in Transfer Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Combination of various TP. Every country in the world adopts different forms of TP with two major categories, special TP and general TP. They play different roles, have different targets and achieve different goals.</td>
</tr>
<tr>
<td>2. They set different structure for TP. There is no set rule for the proportion of general TP and special TP and the two can differ very much. The proportion for general TP in Canada is 20.6%, 47% in Australia, 56.1% in Japan and 80% in Britain. Correspondingly, the special TP in these countries are 79.4%, 53%, 43.95% and 20% respectively. We can see that each country has different appropriation for the two kinds of TP according to their domestic conditions and requirements.</td>
</tr>
<tr>
<td>3. They have standardized and formulized measures for TP. Many countries (such as Australia, Germany, Canada, etc.) have adopted strict but flexible measures for TP on the basis of local</td>
</tr>
</tbody>
</table>
capacity for balanced finance assessed with objective factors. It can prevent blind and random TP by reducing subjective interferences. In the western countries, they rely on the "scientific standard" for TP.

Since the reform of tax distribution system in 1994, the Chinese government has adopted various forms for intergovernmental TP while giving priority to TP from the central government to local authorities. In order to ensure the smooth reform, China has not only sustained the traditional TP forms to maintain the vested interests, but also introduced new forms to accommodate the development of market economic system. By now, its TP system is composed of system-related TP, fiscal TP and special TP.

Since the overall fiscal capacity and central fiscal strength in China has been increasing after the tax distribution reform, the central TP has also grown rapidly. In 1995, the central TP was RMB253 billion in total and the figure grew by 4.5 times till 2005, reaching RMB1148.3 billion. Among them, fiscal and special TP increased more rapidly (see table 9).

**Table 8-9  Increase of Fiscal and Special TP since 1995**

<table>
<thead>
<tr>
<th>Year</th>
<th>Fiscal TP</th>
<th>Special TP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>91</td>
<td>375</td>
</tr>
<tr>
<td>1996</td>
<td>107</td>
<td>489</td>
</tr>
<tr>
<td>1997</td>
<td>143</td>
<td>518</td>
</tr>
<tr>
<td>1998</td>
<td>155</td>
<td>878</td>
</tr>
<tr>
<td>1999</td>
<td>336</td>
<td>1360</td>
</tr>
<tr>
<td>2000</td>
<td>506</td>
<td>287</td>
</tr>
<tr>
<td>2001</td>
<td>1108</td>
<td>221</td>
</tr>
<tr>
<td>2002</td>
<td>1586</td>
<td>449</td>
</tr>
<tr>
<td>2003</td>
<td>1914</td>
<td>877</td>
</tr>
<tr>
<td>2004</td>
<td>2605</td>
<td>2434</td>
</tr>
<tr>
<td>2005</td>
<td>3963</td>
<td>2598</td>
</tr>
</tbody>
</table>


Though central TP is playing an active role as reparation for local financial shortage, promoting balanced economic development and supporting major economic reform, there are some problems to be solved (we have already discussed about TP in the section 1 and will not repeat here). Table 10 illustrates the fiscal strength per capita in seven provinces, which are located in east, middle and west
China respectively. During the period of 1995-2005, Guangdong and Shanghai, the two eastern provinces, held far higher fiscal strength per capita than the middle and western provinces whereas Gansu ranked bottom all through the period. Moreover, the gap between the seven provinces were increasing constantly, with the coefficient difference of fiscal strength per capita growing from 1.069 in 1995 to 1.33 in 2005, which indicates the aggrandizing gap between Gansu and the developed regions. Please see table 10 for detailed information.

Table 8-10 Fiscal Strength per capita in Seven Provinces

<table>
<thead>
<tr>
<th>Province</th>
<th>1995</th>
<th>1997</th>
<th>1999</th>
<th>2001</th>
<th>2003</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guangdong</td>
<td>525.90</td>
<td>748.20</td>
<td>153.90</td>
<td>1491.09</td>
<td>1653.90</td>
<td>1964.33</td>
</tr>
<tr>
<td>Shanghai</td>
<td>1489.60</td>
<td>2255.50</td>
<td>2849.10</td>
<td>3776.16</td>
<td>5179.59</td>
<td>8064.68</td>
</tr>
<tr>
<td>Jiangxi</td>
<td>148.40</td>
<td>209.00</td>
<td>248.50</td>
<td>315.29</td>
<td>395.32</td>
<td>586.61</td>
</tr>
<tr>
<td>Hunan</td>
<td>165.60</td>
<td>210.00</td>
<td>254.90</td>
<td>311.42</td>
<td>403.19</td>
<td>574.15</td>
</tr>
<tr>
<td>Guizhou</td>
<td>104.60</td>
<td>150.60</td>
<td>200.20</td>
<td>262.57</td>
<td>321.85</td>
<td>464.02</td>
</tr>
<tr>
<td>Yunnan</td>
<td>234.60</td>
<td>358.80</td>
<td>411.90</td>
<td>446.19</td>
<td>523.31</td>
<td>702.41</td>
</tr>
<tr>
<td>Gansu</td>
<td>132.40</td>
<td>183.12</td>
<td>227.81</td>
<td>271.64</td>
<td>336.75</td>
<td>476.11</td>
</tr>
<tr>
<td>Different coefficient</td>
<td>1.179</td>
<td>1.219</td>
<td>1.216</td>
<td>1.260</td>
<td>1.325</td>
<td>1.373</td>
</tr>
</tbody>
</table>


Note: 1) the fiscal strength per capita in 1995-1999 are based on the population in 2000; the figure in 2001-2005 are based on the population of the year;

2) difference coefficient is calculated by dividing standard deviation with arithmetic average.

It is very urgent for China to innovate its TP system and the innovation is particularly important for Gansu because: **first, TP is the major guarantee for the balanced public services between Gansu and the rest of the country.** Domestic theory and foreign experience has proved that regional disparity is common in most of the countries and is represented by imbalanced fiscal distribution in finance. The horizontal disparity may lead to social inefficiency and inequity and thus regional differences in public services. In this case, the production essentials will flow excessively to the affluent areas, aggravating the economic unbalance and impeding the healthy, stable and sustained socio-economic development. Hence, it is indispensable for the government to ensure balanced growth through fiscal regulation. The central government can set up the lowest standard for social services and infrastructure by the use of TP, facilitating the flow of labor, capital and commodities, helping to nurture a unified domestic market as well as carrying out national policies. **Second, TP is the key factor promoting the building of corpus function area in Gansu.** The 11th Five-Year Plan divides national land into four kinds of corpus function areas, namely prioritized development area, key development area, restricted development area and forbidden development area. The corpus function areas are space units of special corpus function defined on the basis of their bearing capacity for resources and environment, current development density and potential, population distribution and according to the regional work division and the principle of coordinated development. It is a new
thinking for regional development put forward in line with the Scientific Outlook. Gansu is of strategic significance in terms of bio-safety, geopolitical safety and certain industrial progress. In order to make into full play the corpus function area of Gansu, adjustment should be made on the central-local fiscal relationship, especially the TP system. In the future, increased TP is required for the government to enhance environment protection and provide efficient basic public services in the restricted and forbidden development area as well as support the key and prioritized development area in Gansu. If there is no innovation on TP system, improving the corpus function area will remain as a slogan on the paper.

2.3.3. Optimizing the fiscal distribution structure

The fiscal distribution structure includes both the frameworks of revenue and expenditure distribution. China has to optimize them in the light of market economy and internationalization.

With over 20 years’ reform on fiscal revenue distribution structure, tax income has become the dominant footing in fiscal revenue and the structure inside the tax income has been optimized. Nevertheless, China still needs to address some existing problems through deepened reform according to public finance requirements. From the perspective of both Gansu and the whole country, we have to further tax reform, expedite the adjustment on production value-added-tax and consumption value-added-tax, push forward the amalgamation of income tax rules for domestic and foreign companies, and improve reform on resources tax and export tax return mechanism and initiate fuel tax at an appropriate time. In addition, we must improve local tax system on the principle of matched administrative and fiscal power and enhance the management over non-tax income.

Furthermore, breakthrough has not been achieved on the issue of local debts. Local debt is a common practice in countries with market economy, serving not only as a vital source for local fiscal income, but also a key approach for socio-economic regulation by the local government. Though local debts are not allowed in the current financial system in China, there are large amounts of various hidden local debts in China. The first one is the central support for local public services and infrastructure by providing loans to the local government with the national debt. The local government is responsible for the loan principal and interest. Hence, the central government has been issuing debts for the local authorities in the name of national debt, totaling RMB245 billion during year 1998-2005. The second is the bonds earmarked to urban infrastructure by municipal engineering corporations to avoid the restrictions of current finance and legal system on local debts. Due to the relations between the companies and the local government as well as the purpose of the capital, the bonds payable are actually government bonds, such as the RMB4 billion bonds of rail transit in Shanghai, the RMB1
billion bonds of Suzhou industrial park and the RMB900 million transport bonds in Jiangsu, etc. The third one is that the municipal government applies loans from the National Development Bank through enterprises so as to raise fund for projects on infrastructure and public facilities. The National Development Bank will sign the Agreement on Financial Cooperation in Exploration with the local government while issuing the loan, which is actually government debt. The fourth one is that the government issues fund trust programs through local trust investment companies so as to finance for municipal engineering projects. For example, Shanghai AJ Trust & Investment Co., Ltd developed a RMB550 million fund trust program for the “Shanghai Outer Loop Tunnel Project” and Beijing International Trust Co., Ltd issued the RMB1.5 billion fund trust program for “Beijing CBD Land Development Project”. The fifth is that local authorities get loans from the central government to address local financial risks. For the above five hidden debts, it is wiser to gradually permit local debts rather than forbid them and thus help avoid local fiscal debt risks by carving out a new channel for local financing and socioeconomic development.

### Column 2  Foreign Experience on Local Debts

1. The local governments may issue debts in a certain range. It has been proved that issuing debts is an effective way to release local conflicts between capital supply and demand. Furthermore, in order to increase the sense of responsibility and enable fair play for the local government, the central authority has to mobilize local initiatives by transferring the administrative and fiscal power to the subordinates. Therefore, the local governments in many countries are allowed to issue debts in a certain range.

2. The term structure of local debts is used to adjust local capital. The local debts can be divided into short-term bonds and medium- and long-term ones. The short-term bond is with short duration, low interests, low cost, more flexibility and convenience. Therefore, the local government may issue short-term bonds at any time needed to address the seasonal capital shortage. The medium- and long-term bond is with long duration, high interests, high cost and is worth investing. This kind of bond is used for the engineering projects and public services that take a long time and the duration is determined according to the investment recovery period of the project. Both the short-term and long-term bonds facilitate the local government to regulate capital.

3. Local debts are used for public undertakings and economic development. In the U.S., the state governments raise money by issuing public debts for the projects that private capital is unable or unwilling to carry out, such as industrial infrastructure (roads, ports and docks, etc.) and schools, social welfare and other public facilities. The Japanese Law on Local Bonds prescribes clearly that local debts are used for constructive expenditures in principle. Some developing countries use the money raised through local debts to improve the management and maintenance of local infrastructure.
4. They have strict management over local debts. The Japanese experience proves that planned management is needed for local debts. The rigorous Japanese management over local debts is combined by the planning and approval mechanism. In the U.S., the municipal engineering bonds are managed by the issuer, market mechanism and transparent legal framework so as to restrict the lending activities by the state and local governments. In France, a batch of government agencies supervises and regulates the debt issuing activities of the local government.

The fiscal expenditure structure refers to the proportion of all the items in public expenditure, impacting and deciding the proportion between accumulation and consumption of the whole country and influencing the role of macro regulation through financial policies. For this reason, we have to identify the optimization of expenditure structure as an important part of setting up public finance system in Gansu. The Gansu government ought to address the following two problems in its fiscal expenditure structure in the future: first, efforts should be made to increase expenditure on public services. Public expenditure includes many areas, such as science and technology, education, health, social security, environment protection, etc. It represents the expenditure for public interests and long-term interests and constitutes an integral part of the national fiscal expenditure structure under the market economy. With the economic progress and increase of national fiscal strength, the industrial countries have increased their expenditure on public undertaking, its proportion in total expenditure going up, which is key to economic regulation and development. During the 11th FYP, though the expenditure for social services in Gansu enjoyed rapid growth, it was still lower than the national average. The three expenditures on science and technology reached 0.55%, 0.57 percentage points lower than the national average; expenditure on culture, education and health was 22.82%, 0.23 percentage points lower and that on gratuity and social security increased to 2.17%, 0.23 percentage points lower. Gansu must intensity the expenditure on social services through appropriate policies. Of course, we should see the fact that Gansu and the whole China is at a different development stage with the industrialized countries, lacking behind in both economic power and fiscal strength. Hence we should take into consideration the national situation while increasing expenditure on social services and cannot exceed the bearing capacity. Second, we should vigorously increase the investment in major industries and areas. In addition to expenditure on public services, attention should also be focused on the investment on economic promotion during the adjustment of national fiscal expenditure structure. The modern economic growth theory has not only revealed the inherent relationship between investment and economic growth, but also made in-depth discussion on the features and roles played by government input in the total social investment. ①As the mainstay of macro regulation, the government may assess and arrange its investment by taking into account social effect and social cost rather than making a profit. Projects invested by the government, such as the projects on social infrastructure, may largely improve the overall benefits of the national economy. ②With ample free capital, the government may engage in large or long-term projects. ③The
government is able to invest in the projects with high social benefits but low profits. The three reasons indicate that government investment shows different features with the non-government input and is a major force driving the economic development. With low productivity, China is facing a hard task achieving industrialization. On the one hand, China is shouldering a heavy burden if promoting its modernization; on the other hand, China is in a world with rapid science and technology development. If the government does not formulate a unified strategy for industrialization and make vigorous investment, it is impossible to achieve industrialization and modernization in a short period or realize a well-off society in an all-round way. International experience shows that the government intervention is growing in the market economic system and fiscal investment serves as a key measure for achieving national policies and macro regulation, which is irreplaceable by the credit policies of the banks. The fiscal investment is imbalanced across China, with the less developed regions enjoying a much lower amount than the developed ones. In 2005, the fiscal investment in Gansu arrived at RMB4.53 billion, or 10.6% of the total fiscal expenditure. The figures for Guangdong, Jiangsu and Zhejiang were RMB26.44 billion and 11.55%, RMB15.37 billion and 9.79%, RMB9.24 billion and 7.3% respectively. The difference in fiscal investment will lead to further gap in regional economic power. To reverse the trend, the central government should enhance macro regulation in the less developed regions by increasing fiscal investment to the region and making full play of fiscal investment policies in economic development and restructuring. At the same time, the Gansu government has to focus its fiscal power on the most urgent needs of its socio-economic growth. The priorities for the medium and long-term fiscal investment in Gansu include enhancing social infrastructure, strengthening agriculture as the economic foundation, supporting reform on state-owned enterprises and urbanization.

Section 3 Suggestions on Building Public finance System in Gansu

Since Gansu is an underdeveloped region, its public finance system has to not only rely on its own unremitting efforts, but also need the reform and support on the national level, both of which of equal importance. Here, the suggestions of this section are made from the two perspectives.

3.1. Suggestions to the central government

3.1.1. Improving the central-to-local transfer payment system

China is at the crossroad of transformation today and for the near future. The fiscal strength varies due
to the imbalanced economic development between different regions, which again intensifies the regional difference. Therefore, the goal of the TP system reform lies on balanced development. In another word, the government should, through intergovernmental TP, build up the fiscal capability of the less developed regions, narrow down the gap between backward and developed regions in terms of infrastructure, compulsory education, medical care, public health, social security and employment and promote social stability and economic growth in the poverty-stricken areas by ensuring the rights of the people there to develop, to receive education and to stay healthy. To be more specific:

---The government should encourage the system innovation on general TP. Among the various forms of TP in China, only general TP can be attributed to balanced TP, which is capable of achieving balanced development vertically and horizontally. However, it takes up a very small amount of the total TP, only RMB112 billion in 2005, and cannot play a big role in narrowing down regional gap in public services and economic growth. Therefore, the next step reform aims at improving general TP system according to the goal and principle of balanced social services and making full play of central regulation in the area. First, the government should increase its appropriation to general TP. This is determined by both the fiscal strength of the central government and the proportion of general TP in central revenue increase. In order to ensure the increase of general TP, the government has to identify the proportion of general TP in central revenue increase and its growth rate as well as a medium and long-term goal and plan for the expansion of capital sources to scale up the role of TP in balanced development. It is suggested that the central government may allocate a special sum for increased general TP in addition to the expenditure increases to help with fiscal insufficiency in the middle and western regions. Second, the government should assign general TP on the basis of fiscal strength per capita. The standardized regional income and expenditure ought to be set according to the economic development and income in the region and the objective factors influencing fiscal revenue. The central government should make regional TP through factor analysis instead of Base Quota. Factor analysis takes various factors into account with the focus on fiscal strength per capita. Regions with strong fiscal strength per capita get less central TP and vice versa. The reform may play an active role in addressing the financial difficulties in Gansu. Third, the government should increase central TP to the forbidden and restricted development areas in Gansu. Due to its vulnerable ecosystem, Gansu owns a larger acreage of forbidden and restricted development area than other provinces. With weak economy, insufficient fiscal strength and incapability of providing enough public products and services, these areas will suffer from more restrictions on local economic and financial development while shouldering a heavier burden of ecosystem protection. Moreover, their public products and services also need improvement. In such cases, the increased central TP will serve as a key measure for carrying out the strategic planning of the corpus function area.

---Efforts should be taken to deepen reform on special TP system. The various special TP
accounts for a large proportion in central subsidy, covering almost all the budget items, but lacks a clear and strict administrative power definition as well as standard distribution measure and transparency. The TP is distributed at will and the lack of reasoning for some projects lead to low efficiency or even invalid use of capital. Hence, the government has to deepen the reform on special TP in the future. **First, the local government ought to liquidate and integrate current special TP according to the national policies and the principle of administrative power clarification.** The central government only provides special TP to the undertakings which is encouraged by the central government and shared between both central and local authorities. In the coming period, China should put the corpus function area as its special TP priority. Moreover, the central government should make efforts to cancel the outdated items and those unworthy of their names, merge the repeated items, bring the fixed local fiscal expenditure into general TP and strictly control the scale of special TP. **Second, actions should be taken to improve the distribution of special TP.** Since the local government gets a clearer understanding of how to use most of the TP, it will be more practical for them to arrange the money to meet the public needs. Therefore, it is suggested that reform should be made on the current special TP mechanism in which the central government make all the decisions. Instead, it will be more efficient for the central government to set the scale of the TP and let the local governments decide on the specific projects. **Third, the government must formulate strict rules on the approval of special TP.** In addition to the setting of some major projects, the central government ought to build up strict mechanism on the establishment, management and selection of the special TP programs. **Fourth, the government has to improve the related local policies on special TP.** The current central special TP requires excessive matching capital from the local government. This results in that the regions without sufficient fiscal strength but need the TP more urgently cannot get the projects. They make false reports on their fiscal power and exert negative impact on the realization of the goals of special TP. Hence, while identifying the programs for special TP, the central government may give up the requirements of matching capital for the western regions according the local conditions.

----The government shall push forward TP legislation. A reasonable TP system is an integral component of the fiscal management system based on tax distribution. We should strengthen legislation over the TP system so as to ensure its healthy operation, and adequately deal with the fiscal distribution between central and local governments in the market economic system. Currently, the intergovernmental TP is based on the decision made by the State Council in 1993 on fiscal management based on tax distribution system and the interim fiscal TP provisions formulated by the Department of Finance in 1995. Both the decision and the provisions belong to administrative rules, which are not as authoritative as laws and hinder the improvement of fiscal TP system and the market economic system reform. Therefore, it is in dire need for the government to push forward the legislation over TP system in a two-step manner: first, prescribing the basic principles, procedures
(including requirements and procedures over general TP and special TP), organization, supervision and legal liabilities in the *Provisions on Fiscal Transfer Payment of the People’s Republic of China*; second, formulating the *Law on Fiscal Transfer Payment of the People’s Republic of China* on the basis of the Provisions and years’ practice. **It is important to point out that it will take years for China to promulgate laws on TP. Before the TP law comes out, the central government should make clear the preeminent problems in the less developed region (e.g., Gansu) to be addressed by TP system as well as policy adjustment, including balanced public services, restoration of ecosystem and giving up matching capital for central TP, etc.**

### 3.1.2. Taking preferential fiscal investment measures in the western region

National fiscal investment is an important approach for industrial restructuring and economic promotion as well as a key tool for narrowing down regional gap and facilitating coordinated regional development. The goal of national medium and long-term policy on fiscal investment is to ensure steady growth of fiscal investment while favoring the underdeveloped regions.

---The national budget should increase its investment extensively when the long-term national debt is decreasing. China carried out active fiscal policy during 1998-2004 and the long-term national debt totaled RMB910 billion during the period, which was used in infrastructure, environment protection and ecosystem restoration, technology upgrade of enterprises and the Western Development Program. It played a crucial role in implementing national policies and boosting stable and coordinated national economy. Since 2005, China began to pursue a prudent fiscal policy, reducing the long-term national debt to RMB90 billion in 2005, RMB60 billion in 2006 and RMB50 billion in 2007. In order to meet the needs of economic development and macro regulation as well as prevent fiscal risks, it is estimated by national authorities that China may continue to issue long-term debt in the coming years, but on a smaller scale. **In such cases, it is advisable for the government to maintain a fast growth of in-budget investment so as to insure the scale of national fiscal investment and the continuity of economic progress.** In practice, the budget investment in China rises by RMB15-25 billion annually in the recent years, which helped with macro regulation greatly. In addition, the national fiscal revenue grows at RMB500-700 billion every year, making the increase of budget investment necessary and possible.

---From regional distribution, the government should enhance the preferential investment measures in the western region (including Gansu) and point out the direction and focus for investment. Since the initiation of the Western Development Program, the western region has witnessed prominent socio-economic progress. However, the accumulated conflicts, fragile eco-environment, lack of public services and insufficient capability to achieve self-development decide that China should take favorable fiscal investment measures in the western region. **In addition**
to its support to the infrastructure and public services in Gansu, the national long-term debts and budget also choose the pillar industry and featured industry, ecosystem restoration and environment protection, energy conservation and emissions reduction as its focus, which are key to the economic growth in the province as well as coordinated development among different regions.

----Efforts should be made to innovate the fiscal investment measures. ① Investment subsidy. For those national projects that meet the industrial policies and can drive forward industrial development, the central government should provide investment subsidy through free appropriation. ② Fiscal interest deduction, an important approach supporting economic growth by government in the market economy, is effective and should be popularized. ③ Share portfolio. Since 2006, the central government has achieved remarkable results by supporting the industrialization of agriculture through share portfolio and this measure should be extended to other fields.

3.1.3. Building a local debt mechanism as soon as possible

Local debt is a common practice by the marketized countries and regions to solicit capital. It may contribute a lot to the socio-economic progress of the less developed regions and is a major issue to be addressed for realizing responsibilities of the local authorities as well as building public finance system. In the future, the central government should allow local debts under its supervision and regulation.

----Speeding up legislation over local debts. China should improve its laws and regulations over local debts in the future. The central and local government ought to clarify its rights over issuing debts by law; revise the Law on Budget and other financial regulations; formulate and promulgate the Law on Public Debts and Law on Local Debts as soon as possible; make strict provisions over the qualification of issuing agencies, application and approval of debts issuing, its approaches, scope and target of local debts, compensation system, fee collection and the responsibilities of using the fee and evaluation and assessment of projects. The government shall punish those against the relevant laws and regulations to maintain the reverence of the legal system.

----Including local debts into budget management. In order to limit the scale of local government debt and increase the government’s awareness over risks, especially that of the financial department, the local authorities may make budget on debts and include it into the budget management. One approach is to create a double-entry budget which separates the regular budget and the construction-related budget, the latter including local public debts and special fund of the government (e.g. revenue and expenditure on city planning and transportation). Another way is to set up a special
account for local public debts or debt budget. The first one needs drastic reform whereas the second one does not change the existing budget framework and therefore easy to carry out. Compared to other fiscal capital, the revenues and expenditure of debts are independent, featured by long time span and greater continuity, so it is proper to set a single account for it. The local debt budget made by the local financial department should give detailed explanation on the amount, purpose, term, interest, sales approach, usage and the source of the repayment and get the approval of the local people’s congress so as to ensure the examination and supervision of the people’s congress over the scale, purpose and repayment of the local debts to prevent improper decisions and short-term behavior of the local government.

----Establishing local fiscal repayment mechanism. The major risk of local debts lies in repayment. If the local government cannot repay the debts, it will damage the confidence of the investors and cause severe fiscal and financial crisis. Hence, to ensure that the local government can repay the principal and interest of the bonds, the local financial department shall establish the repayment fund through annual budget, fiscal balance and transfer of part of the profits of liability investment projects to repay the local debts. It is a long time process, so that once the fund for repayment is established, the local government shall take it as a fixed annual expenditure and arrange increasing budget for it every year. The local financial department ought to monitor the projects with profits and urge the contract agencies to carry out repayment by transferring the repaying capital into the special account set up for the repayment fund and the local financial agencies will be responsible to pay the principal and interests. Building a local repayment mechanism and including the repayment into fiscal budget is propitious to eliminating the possibility of difficult local budget due to rapidly increasing expenditure on debts, ensuring the capital source for debt repayment and restricting the growth of new debts. The relevant central authorities should also carry out supervision and inspection over the arrangement and use of repayment fund and make it an important basis for local credit for repaying debts.

3.1.4. Pushing forward the reform on resources tax

The reform on resources tax, an adjuster of interests, is closely related to the sustainable development of the western region and will bring readjustment to the relations between central and local governments. The western region is endowed with rich mineral and energy resources. Xinjiang, Sichuan, Inner Mongolia and Gansu export the natural resources including natural gas, coal and minerals, but get little profits. Though the oil price in the international market remains above RMB3,800/ton these few years, the resources tax for natural gas stays at RMB12-14 per ton, and was raised to RMB14-30 per ton in July, 2005. In the future, the reform on resources tax should address the following three issues: first, raising tax rate to benefit the resource rich areas and
narrow down the regional gap due to resource exploitation. 

**Second, efforts should be taken to change the basis for taxation.** Taking into consideration resource efficiency, the government may collect tax on the basis of amount instead of price, which means to take sales revenue of resource products as the basis for taxation and change the current trend of resources tax separated from resource profits. It is impossible to set a unified rate for taxation based on price, since the endowment, geography and mining difficulties of the various resource products are different. The government may set different rate for resources tax according to the specific conditions. 

**Third, the western region should be involved in the profit distribution of resources-based enterprises.** Under the current system, the abundant natural resources have not benefited their localities much, but created unfair profit distribution and to some extent limit the transfer of resource advantages to economic advantages in the western region. Therefore, it is advisable for the government to set up a compensation mechanism for resource exploitation and environment protection, prescribing that the resource development enterprises shall, out of their profits, make compensations for their impact on farmers and the ecosystem. 

### 3.1.5. Supporting “Hexi Corridor Experimental Zone for Coordinated Development between Man and Nature” through central fiscal policies

The Hexi district, an important channel for economic development and culture exchange in northwest China, is facing with severe challenges in sustainable progress. The building of “Hexi Corridor Experimental Zone for Coordinated Development between Man and Nature” aims at exploring new ways to boost the mutual promotion between ecosystem projects and system innovation and creating an effective long-term mechanism for the coordinated development in Hexi so as to upgrade its capability for sustained progress. The central government ought to attach focus and actively support the development in Hexi through fiscal polices. First, central TP to the regions should be enhanced to improve the basic public services. With poor natural environment, fragile ecosystem and weak economic and financial foundation result in poor social services in the area. The central TP can strengthen the fiscal power and provide financial guarantee for the public services in the region, serving as a crucial precondition for the sustainable development in Hexi. Second, the central government should formulate favorable policies for in-budget investment and long-term national debts in Hexi. The core issue to be tackled in the experimental zone is water resources, so the central investment needs to focus on the key measures to improve the eco-environment there, including promoting water-saving industry, agriculture and other water conservancy and ecosystem protection projects. Third, the central government may support the water conservancy and environment protection in Hexi through favorable taxation policies, such as tax reduction, tax preference for investment credit, tax deduction and accelerated depreciation, etc.
3.2. Suggestions to Gansu

3.2.1. Deepening the reform on grassroots finance system

Advancing reform on the provincial supervision over county finance. Some provinces, including Zhejiang, Hubei, Henan and Jilin have consecutively carried out reform on the counties administrated by province fiscal system and achieved remarkable results. Since 2007, Gansu has chosen 10 pilot counties for the reform. The provincial government directly checks and supervises the counties in terms of system-related subsidy, tax return, transfer payment, financial settlement, special subsidy and capital control, which is crucial in playing down administrative hierarchy, addressing the fiscal difficulties at the grassroots level and boosting efficiency of fiscal capital. The local government needs to find out problems and improve the pilot pattern. Based on the experience, it may extend the model in the whole province to set up a fiscal management system in which the provincial government administers the county directly in terms of financial settlement, revenue assessment, capital control and subsidy.

Pushing forward the reform on “management of township budget”. In the reform of fiscal management system at the county and township level, the government should vigorously advance the pilot reform and carry out “management of township budget”. While maintaining the right of villages and towns to own, use and approve fiscal capital, the county government shall directly administrate their fiscal revenue and expenditure by “joint budget compilation, joint accounts, collected revenue and expenditure, collected purchasing and integrated management of notes”. The financial department at the township level is only responsible for taxation and reimbursement. Some counties and cities in Gansu, including Dunhuang and Tanchang, have already started the pilot reform and got some worthy experience. For example, the Tanchang government implemented the “zero reception” policy during the reform, canceling the reception budget for the township authorities as well as checking and initially liquidating their debts. All these measures are welcomed by the people and achieved success. Therefore, it is advisable for the provincial government to extend the reform in qualified districts and popularize the deeds of Tanchang.

Improving the income system at the county and township level. The provincial government ought to advance the tax distribution reform by rationalizing the fiscal income framework at the provincial, municipal, county and township level and improving income system for counties and townships. Based on the socio-economic and fiscal development in Gansu, it is suggested that the county and township government be in charge of such local taxes as real-estate tax, urban tenure tax, land
appreciation tax, stamp tax, tax on dividends and farmland occupation tax, or increase their share in provincial finance. Efforts should be made to reduce the share of in-budget charging items (such as land use fee) at the provincial and municipal level to mobilize the enthusiasm of county and township governments in developing economy and increasing income. The county and township governments should be encouraged to make a bigger pie for local economy and finance so as to achieve a virtuous economic circle of self-development, independent innovation and self-accumulation in line with the Scientific Outlook on Development.

Removing grassroots debts. Efforts should be made to address both existing and increasing fiscal debts at the grassroots level. First, since the county and township fiscal debts are going to last for a long time, it is necessary to limit the newly increased debts. The local government shall make investment in social services based on their income; prohibit loans with high interests by restricting the increased loans from financial institutions; regulate the activities of grassroots government by stopping them from providing loan insurance for enterprises and set up a scientific outlook for fiscal management under the public finance framework. Second, the government should remove the existing debts by category. For the fiscal loans with high interests, the government shall separate principal from interest and forbid the transfer of interest into principal; for the debts resulted from the rural tax default handed over by fiscal loans, it shall formulate special policies; for those incapable of repaying the debts, it shall issue policies to reduce, dismiss or delay the repayments; the farmers may repay the debts through amortization; for those burdened with large amount of debts, the government may provide favorable polices to encourage repayment; and for those who have the money but refuse to repay the debts, the government may force them to make repayment through legal procedures. The local government may refer to the approaches adopted by state-owned enterprises to stop interest counting for the debts formed by loans from the banks and credit cooperatives, remove grassroots debts and alleviate their repayment burden.

Strengthening management over grassroots finance. With the deepening of rural tax reform, a rural compulsory education system “centering on counties” has been established as well as other relevant reforms, thus the fiscal and administrative power of the county and township governments has gone through great changes. In this context, efforts should be made to strengthen management over the grassroots finance in line with the principles of “one government, one finance and one budget” and “matched fiscal and administrative power”. Clarification should be made on the expenditure responsibilities shouldered by governments at different levels on the grassroots affairs in the rural area. The provincial and municipal governments shall allocate sufficient capital for the expenditures they are shouldering and try their best to reduce and eliminate matching capital from the county and township governments, cut down the assessment on county and township finance and give more fiscal power to them. For the administrative power exercised by the county and township governments, the
superior government shall enhance fiscal supervision and provide them with the necessary money for basic public services. Measures shall be taken to intensify the budget constraint over grassroots finance through the reform on “management of township budget” and arrange the rational expenditure order in compliance with the sequence of “salary, government operation and construction”. Vigorous efforts should be taken to push forward budget management reform by improving the integrity and transparency of grassroots budget and setting up public finance framework so as to realize efficient management.

3.2.2. Enhancing local fiscal support to the “Three Rural” issues

**Increasing investment to rural infrastructure.** Since Gansu is situated in the arid region in northwest China, the poor natural environment leads to weak rural infrastructure. Therefore, the fiscal investment to the “three rural” issues should put infrastructure as their first priority. Through safe drinking water projects, grid reconstruction projects and road building in the rural area, the government should provide people with sufficient water for work and life, extend electricity to every village and strive to build blacktops in every town and roads in 80% of the villages in Gansu by 2010. The government should also borrow the experience from the “six mini projects” (e.g. water saving in irrigation, water use of man and animals, roads in villages, rural biogas, rural electricity and grassland enclosure) to include small and medium-sized infrastructure building into government budget instead of invested by farmers.

**Supporting modernized agriculture and expanding income channels.** First, the government shall increase the input in subsidy for growing improved seeds, S&T agricultural demonstration extension and industrialization of agriculture and make full use of the regional resources to support featured and brand agriculture according to the strategy of “one brand for each village” and “one industry in each district” so as to speed up the building of advantageous industries and advantageous agricultural product bases. It should also focus on developing eco-friendly and benefit-oriented agriculture, support industrialization of agriculture, nurture a batch of large scale leading enterprises that have strong market penetration capability to increase farmers’ income and build the new rural area. Second, efforts should be made to enhance work training to migrant workers and help them increase income. The government shall integrate the capital for training programs to migrant workers, young farmers and those on technical education and poverty alleviation to raise the farmers’ literacy, promote employment, increase their income and bring up modernized farmers. The government agencies should also formulate a government-led and multi-channel investment mechanism for expanding training to farmers, raising the quality of training so as to export labor on large scale, develop labor economy and expand income channels. Third, the government shall increase the input on special
economic cooperation organizations formed by farmers, such as technical association and industrial association of agro-products, to change the individual managing mode and protect farmers’ interests by improving their capability of dealing with market risks through the organizations. Fourth, measures shall be taken to set up a risk prevention system for agriculture and raise the risk prevention capability. The government should vigorously support the setting up of a disaster prevention and mitigation mechanism for agriculture as well as improve the agro-product safety system and supervision, alarming, prevention, control and assistance for animal and plant diseases. They should also make pilot study on the agro-insurance policy for such staple crops as corn seeding and beer barley to stabilize farmers’ income.

**Increasing fiscal input to rural social services.** First, a long-term insurance system should be established to guarantee the money for rural compulsory education in line with the principle of "clarifying responsibilities, sharing between central and local government, increasing fiscal input, improving insurance standard and step-by-step implementation". Efforts should be made to exempt the incidental expenses and textbook fees for the rural children receiving compulsory education, provide boarding subsidy for the impoverished families and insure rural compulsory education through local finance to realize free compulsory education in the rural area; to increase input in expenditure for public use in primary and secondary schools, set up a long-term mechanism for schoolhouse maintenance and restoration and improve the insurance mechanism for teachers' salary; the central government ought to focus on the middle and western regions as well as the poverty-stricken areas in east China to set up long-term mechanism safeguarding educational fees in which the central and local government share the projects and finance at a certain proportion so as to promote fair education. Second, the government should vigorously increase its input in rural healthcare. The central government shall increase both amount and proportion of its input in healthcare to the less developed regions, narrow down the regional health resource distribution gap while at the same time, the local government should also increase its fiscal allocation in this area to provide sufficient support to rural healthcare and narrow down the gap between the urban and rural areas; fiscal capital should be turned to focus on the healthcare network at the county and village level rather than the three-level network; the government shall clarify its expenditure scope in building healthcare agencies at the county and township level and increase its budget for the services at such agencies.

**3.2.3. Improving the social security system**

**Supporting urban reform on social security system.** The government shall expand the coverage of social security, set up incentives through fiscal measures to encourage the local departments of taxation and labor to broaden their devotion to the insurance for the aged and unemployed and strive
to cover every citizen for healthcare. Measures should be taken to improve the planning of social security through integrated insurance for the aged and unemployed at the municipal level and finally at the provincial level so as to bring into full play the role of insurance. The government ought to enhance the management over social security expenses by adjusting the relevant policies, making detailed expenditure management and preventing moral risks. It should also stick to the principle of localized management, improve the lowest living guarantee mechanism, carry out categorized insurance and dynamic management and include the qualified citizen into the insurance system to provide more help to those under the poverty line.

**Facilitating employment and reemployment.** During the 11th Five-Year Plan period, the government should properly address the basic living guarantee, social security and work relations for the laid-off workers from the state-owned enterprises according to the integration plan, establish a virtuous interactive mechanism for social security and reemployment to insure the smooth operation of the integration plan and social stability. The government shall improve the reemployment policies and ensure preferential polices for the laid-off, such as small amount loans, social security subsidy and tax reduction, etc. The government should improve the long-term mechanism for employment and reemployment by continuing the favorable fiscal and credit polices which encourage the enterprises to increase employment and relevant training, providing better assistance to the needed as well as encouraging various forms of employment.

**Setting up social security system in the rural area.** Efforts should be made to expedite the new cooperated healthcare system in the rural area to standardize the social assistance and healthcare; to carry out the amended *Provision on Supporting the Five Guarantees in the Rural Area*, improve assistance to the poor and establish the lowest living guarantee in line with situation in the rural area; to provide social security for the migrant workers and the farmers being confiscated of land, provide migrant workers with insurance for work injury, serious diseases and aging.

**3.2.4. Vigorously supporting eco-environment protection and pollution treatment optimizing fiscal expenditure to strengthen the support to eco-environment protection.**

Gansu is facing with severe urban pollution, thus a pivot province for eco-environment protection. In order to protect the environment and address pollution, the provincial government shall focus on the major forestry ecosystem projects, such as protection of natural forestry, forest rehabilitation and relevant compensation. In addition, the government should increase input to addressing desertification, support key ecosystem programs, carry out eco-forestry projects and raise energy efficiency in the rural area so as to improve the eco-environment.
Expanding capital channels & increasing input to pollution prevention and treatment. The treatment of pollutants needs huge amount of money as well as the encouragement and support from the government. One possible policy is to set up special fund for addressing pollutants. The users should pay compensation for using the fund, which then develops in a rolling manner. The fund comes from, among others, pollutant charge and environment tax, and is supervised by fiscal department and used by environment protection authorities. The government should also increase the fiscal investment in the area and enhance urban public infrastructure. Taking the opportunity of public finance strengthening, the government may increase urban public infrastructure, especially the provision of natural gas, public transportation and equipment for treating industrial and urban sewage and civil garbage.

Promoting S&T progress to develop environment protection industries. First, the government should set up the investment mechanism for the technologies related to environment protection and expedite its industrialization. Second, the government ought to establish a subsidy mechanism for major restructuring programs. The government should force the enterprises that waste resources and pollute the environment with backward technologies to abandon the dated facilities and improve technologies through subsidy, such as interest deducted loans and matching capital, etc. Third, the government ought to formulate preferential taxation policies for the environment protection industries. In addition to resources tax, fixed assets investment tax and income tax, the government may also encourage the development of environment protection industries through value-added tax and consumption tax.

3.2.5. Facilitating growth of small and medium-Sized enterprises through fiscal polices

The local government should attach importance to the development of small and medium-sized companies since they are playing an irreplaceable role in creating employment, innovating technologies and boosting economic progress. The fiscal policies should focus on creating a sound environment for such enterprises, set up incentives and improve the services to them from the following three aspects:

Carrying out low-tax policies. The local government may carry out low tax rate for small and medium-sized companies to reduce their cost, thus support such enterprises among the non-state economy, township enterprises and private sector and help them become complementary sources for government finance.
Creating favorable financing environment by supporting assurance system and fiscal interest deduction. First, the government may help the growth of such enterprises through fiscal interest deduction to reduce their cost, thus boost economy through reduced investment. Second, the authorities may integrate all the fiscal resources and explore financing and credit assurance mechanism to expand the financial channels for the small and medium-sized companies. They should also implement the preferential policies to protect the legal rights of the enterprises, create favorable investment environment and reduce the risks for startups and innovation. The government should give special support to the enterprises at the initial stage, support original innovation and improve their innovativeness so as to facilitate rapid local economic growth.

Supporting the SMEs through government procurement. In compliance with the policies from the Law on Promotion of Small and Medium-Sized Enterprises and Law on Government Procurement, the government may set part of government procurement to small and medium-sized companies through tendering.

3.2.6. Deepening fiscal reform to build a conservation-oriented government

The government should set a good example for building a conservation-oriented society and the finance policy reform is especially important in the process. As a less developed region, Gansu is facing with great pressure, but may achieve a lot in this area.

Formulating reasonable fiscal budget and a constraint mechanism for rational expenditure growth. The government ought to improve the budget formulation by enhancing its management over budget and increasing transparency. It should set fixed fiscal expenditure standard on the basis of scientific evidence, improve budget formulation quality, standardize fiscal management and form effective constraint mechanism to ensure that fiscal expenditure grows in a rational and orderly manner.

Pushing forward government restructuring to reduce operational cost. In line with the requirements of building an uncorrupted and efficient government, the government should carry on the institutional restructuring to remove or incorporate the less competent agencies, streamline government institutions and separate the enterprise-like agencies from the government finance to reduce administrative cost and ease the burden on fiscal expenditure.

Controlling the population supported by government finance and setting up constraint
mechanism based on the finance-personnel-composition balance. Taking into consideration economic development and fiscal capability, the government should check the positions of its agencies according to their responsibilities and control the finance supported population. Following the principle of “efficiency first”, a real-name composition policy should be introduced to realize controlling finance supported population through personnel composition and gradually cut off the exceeded personnel year by year. For those agencies which need to increase its employees, strict assessment based on personnel, composition and fiscal regulations should be carried out to prevent the rebound of finance provided population and enhance the authority of composition management policies.

Setting up assessment and supervision mechanism over budget expenses to ensure safe and effective use of fiscal capital. The government ought to form a coordinated, fair, transparent, uncorrupted and efficient budget management system by enhancing the budget assessment and feedback system. Efforts can be made to introduce performance assessment into project budget formulation, including basic expenses and special expenses. According to the performance-based budget policy, the budget government agencies may get is determined by what they do and how they perform rather than how much they ask for. Each agency obtains the budget only through strict performance evaluation. All these contribute to the efficiency for budget allocation and fiscal capital use.
Reference:


Ecological Protection and Construction

SHI Peiji
Abstract

Gansu Province lies in the intersection of three natural geographic regions, namely, the Northwest arid region, the Tibet high and cold area, and the East monsoon region. It is in the upstream of the Yellow River and the Yangtze River. The Qilian mountainous region to the west of the Yellow River is the source region for four big continental rivers, the Shiyang River, Hei River, Shule River and the Haerteng River. Apart from being the only province with three kinds of natural geographic regions, Gansu is also a key area lying in the upstream of wind and rivers. The Tibet Plateau, Loess Plateau, Inner Mongolia Plateau and Qinlin Mountainous Region intersect here, creating a vulnerable and diversified ecologic environment. This is an ecological hub with special ecological functions and essential ecological status in western China.

However the present ecological environment situation is “general degradation in spite of partial improvement”. Due to people’s opinions, systems, poverty and inferior position in market competition, development excessively depends upon natural resources, and many areas are suffering from overloading in terms of population and economy. The result is, worsening undersupply of water resources, serious land degradation, spreading sandstorm sources, and huge difficulties in pollution control.

This report suggests that ecology protection and construction in Gansu is a strategic, elemental and imperative move. The state and the local governments should proceed from the general public interest, overall interest and long-term interest as well as support the public services, ecological environment protection, featured industrial development and social management in the key ecological functional areas and ecology vulnerable areas through financial transfer payment, so as to protect regional and national ecological security. In addition, opinions, systems and models of ecology protection and construction should be innovated to promote the traditional economic and social development model to transform to the ecological modernization model, to facilitate the interaction of industrial restructuring and ecology protection and social development, in an effort to realize win-win socio-economic development and form a virtuous cycle in the ecological system. The report has proposed the targets, countermeasures, key projects and policy suggestions for ecology protection and construction in Gansu Province.
Gansu Province lies in the intersection of three natural geographic regions, namely, the Northwest arid region, the Tibet high and cold area, and the East monsoon region. It is in the upstream of the Yellow River and the Yangtze River. The Qilian mountainous region to the west of the Yellow River is the source region for four big continental rivers, the Shiyang River, Hei River, Shule River and the Haer teng River. Apart from being the only province with three kinds of natural geographic regions, Gansu is also a key area lying in the upstream of wind and rivers. The Tibet Plateau, Loess Plateau, Inner Mongolia Plateau and Qinlin Mountainous Region intersect here, creating a vulnerable and diversified ecologic environment. This is an ecological hub with special ecological functions and essential ecological status in western China.

Understanding the importance of ecological protection and construction in Gansu Province to the future development of the state and the region, curbing the crisis of ecological environment degradation in Gansu and promoting ecological construction, is an important issue relating to the sustainable socio-economic development in Gansu. Since the implementation of the Western Development Program, the state and Gansu provincial government has taken a series of policies to promote ecological protection and construction, leading to the improvement of ecological environment in some regions. However, ecological system in Gansu is vulnerable, combining unsatisfactory national environment and excessive development, with insufficient ecological protection and construction in the past and resulting in “general degradation in spite of partial improvement”. In addition, due to people’s opinions, systems, poverty and inferior position in market competition, the development of Gansu excessively depends upon natural resources, and many areas are suffering from overloading in terms of population and economy. The result is, worsening undersupply of water resources, serious land degradation, expanding water and soil losses, lowering headwater conservation capacity in mountainous regions, forests and grasslands, shrinking lakes and wetlands, overall degradation of the ecological system in the oasis, spreading sandstorm sources, and huge difficulties in pollution control. Ecology resulted poverty and the negative externalities of the ecological environment are continuously revealed, with ecological refugees emerging in some regions. The interaction and integration of ecological problems with social problems has led to the “generally worsening” tendency of the Gansu ecological environment. This threatens not only the sustainable development of Gansu, but also the national ecological security, harmony between different ethnic groups in the west and the smooth operation of the state Northwest Passage.

Considering Gansu’s hub status in the ecological system of West China and the whole country and its worsening environment, the report suggests that ecological protection and construction in Gansu is a
strategic, elemental and imperative move. The state and the local governments should proceed from
the general public interest, overall interest and long term interest, build a ecological network with key
ecological functional areas, natural protection zones and ecological corridors as the framework, and
support the public services, ecological environment protection, featured industrial development and
social management in the key ecological functional areas and ecology vulnerable areas through
financial transfer payment, so as to protect regional and national ecological security. In addition,
opinions, systems and models of ecological protection and construction should be innovated to
promote the traditional socio-economic development model to transform to the ecological
modernization model, to facilitate the interaction of industrial restructuring and ecological protection
and social development, in an effort to realize win-win socio-economic development and form a
virtuous cycle in the ecological system. The report has proposed the targets, countermeasures, key
projects and policy suggestions for ecological protection and construction in Gansu Province.

Section 1 Gansu’s Position in Safeguarding National Ecological Security

1.1. Gansu lies in the intersection of three natural geographical regions, and is an
essential ecological hub in West China.

Gansu Province lies in the intersection of three natural geographic regions, namely, the Northwest arid
region, the Tibet high and cold area, and the East monsoon region, and it’s the only province with
three natural geographical regions. The Gannan Plateau, Qilian Mountain and Aerjin Mountain in its
territory form a curving belt to the northeast of the Tibet Plateau. The north, middle and east of the
province are in the subtropical zone, warm temperate zone and temperate zone of the eastern monsoon
region respectively, while the Hexi Corridor, Alashan Plateau and Beishan mountainous regions are in
the northwest arid region. Such a special location determines Gansu’s essential position in West
China, its venerable and diversified ecological environment, and its sensitiveness to global climate
change. Inappropriate land development might easily lead to water and land loss and desertification,
backfiring on the stability and sound development of the regional ecological system.
1.2. Gansu lies in the upstream of the Yellow River, Yangtze River and the continental rivers in Hexi, with the upper reaches of many important rivers in this province

Gansu lies in the intersection of Tibet Plateau, Loess Plateau and the Inner Mongolia Plateau, and the upstream of the Yellow River, Yangtze River and the continental rivers in Hexi. There are four large continental rivers in Hexi, namely, the Shiyang River, Hei River, Shule River and Haerteng River from east to west. It holds an important position in water ecological system in the drainage area. Its ecological security is not only closely linked with Gansu’s sustainable development, but also national ecological security, mainly shown in the following areas:

1.2.1. Ecological problems in the important water resource region for the Yellow river in Gannan have a direct bearing over the sustainable development in the Yellow River drainage area

The Yellow River water source region in Gannan supplies the Yellow river with 6.59 billion m$^3$ of water every year, accounting for 11.4% of the total flow. The flow in Quma increased by 10.81 m$^3$ billion compared with Jimai, accounting for 58.7% of the total flow in the Yellow River Source Region. Gannan also provides 2.77 billion m$^3$ of water to Bailong River, a branch of the Yangtze River. Apparently, Gannan is an important water source for Yellow River and Bailong River, and is a key component for “China Water Tower”. However, ecological environment degradation is worsening, reflected in the three kinds of degradation of grassland, the sharp decrease of wetland, and the lowering water conserving capacity. At present, 80% of natural grassland has shown different degrees of degradation, with 34.1% suffering from serious degradation, the area of the desertified natural grassland has amounted to 53,000 hm$^2$, and 102,000 hm$^2$ of the Maqu wetland, which is called “the reservoir for the Yellow River”, has gone dry, with its water conserving capacity sharply decreasing. All these pose serious threat to the sustainable development in the Yellow River drainage area.
1.2.2. Decrease of ice and snow resources in the Qilian Mountainous Region and the water conserving capacity of forests and grasslands seriously threaten the ecological environment of the drainage area of the continental rivers in Hexi

During the recent 50 years, the ice and snow resources of the Qilian Mountain obviously diminished, with modern glacier 2% to 4% less than 1960s, and snow line up by 30m. The degraded grassland reached 50%, with shrinking forest coverage and lowering water conserving capacity, seriously dampening the sustainable development of water resources in the Hexi continental rivers. The shortage of water resources has led to a prominent problem of undersupply, resulting in severer conflicts between industry and agriculture, between the middle reaches and the lower reaches, and between socio-economic development and eco-environment protection. The oasis moving according to the changing water source, the desert invading southward, sandstorm source expanding, and “ecological refugees” increasing, all these threaten the stable and harmonious development of the different ethnic groups and the smooth operation of the Western Passage.

1.2.3. Water and soil loss and water pollution in the Gansu Yellow River drainage area threatens the middle and lower reaches

The dust and sand in the Yellow River is a main cause to the floods in middle and lower reaches. To bring the problem of water and soil loss in the Loess plateau under control is highly significant to the ecological security of middle and lower reaches of the Yellow River. The soil erosion modulus in most part of the Loess Plateau is 3000-12000 ton/km², mainly resulted from water erosion, with hillside cultivated land losing 4 to 8 tons of surface soil per mu every year (1 mu=1/15 ha.). Water quality in the Lanzhou part of Yellow River, Tianshui part of the Wei River and Jing River seriously impacted on the sustainable development of the middle and lower reaches. Wei River Plain is a key region for Western Development Program, while Gansu is in the upper reaches of Wei River, so rectifying the Gansu part of Wei River is very important to the sustainable development of the Guanzhong Plain.

1.2.4. Landslide, debris flow and water and soil loss in the Yangtze River drainage area within Gansu seriously impacts over the ecological improvement of the Yangtze River drainage area
Southern Gansu mountainous region is an important water source in the upstream of the Yangtze River. Because of poverty, forestry destruction and unstable geological environment, it also constantly suffers from debris flow and landslide. 30% of the Yangtze River drainage area has witnessed landslide and debris flow, and curing the problem is directly related to the ecological improvement of Jialing River and Yangtze River.

1.3. Gansu lies in the “wind gap” of Northwest China, and its sandstorm seriously deteriorates air quality in North China

Under the combined influence of the west planet wind, winter wind from the Tibet Plateau and the small scale wind, Gansu, which lies in the upper wind of North China, has every condition for forming strong winds, and Hexi Corridor was called the “wind gap”. Strong winds, in addition to desert and Gobi, sandy land and degraded land in the agriculture and animal farming transition area, has made Hexi one of the regions with frequent strong sandstorms, with the center near Minqin and Erjina Qi of Inner Mongolia in the lower reaches of the Hei River. According to statistics, the frequency and scale of strong and super sandstorms in Gansu has been constantly increasing, not only hitting Gansu, but also exacerbating air quality in North China.

Section 2 Evaluation of Ecological Environment

The present eco-environment in Gansu is “inadequate reserve of water and soil resources, generally vulnerable ecological environment, partial improvement with general deterioration and grim reality”.

2.1. The problem of water resources are mainly shown in the following areas:

2.1.1. The total amount of water resource is small. For many years, the average total amount of water resource is 28.9441 billion m³, among which there is 28.214 billion m³ of locally generated surface water, and 730 million m³ of underground water. The total amount of locally generated water
resources ranks 29th among 32 provinces (including cities directly under the central government and autonomous regions), accounting for 1% of the total surface water in China.

2.1.2. The water resource per capita and per mu is very limited. Gansu’s water resource per capita is 1077 m³, which is only half of the national average, ranking 20th in the country, and is close to the international standard for serious water inadequacy of 500 – 1000 m³. The amount for arable land per mu is 404 m³, which is only a quarter of the national average, ranking 22nd in China.

2.1.3. Unbalanced geographical distribution. The drainage area of the continental rivers is highly arid, with only 5.7 billion m³ of locally generated surface water, accounting for a mere 20% of the province total, while its land area accounts for over 60%, with the area of arable land and population taking up 18% of the province, and producing 1/3 of the total grain, providing 71% of the commodity grain. Lack of water resource restrains sustainable economic development in the drainage area. The Yellow River drainage area has limited water but large amount of land. It has 70% of the population, arable land and industrial output, but locally generated water only accounts for 44.1% of the provincial total. The Yangtze River drainage area has limited land but lots of water. It has 12% of the arable land and population, but 36% of the water resources.

2.1.4. Unbalanced seasonal distribution. Water accumulated in the 4 months of the flood season accounts for 62.2% of the total annual flow, and most of the water is in the form of storms or floods, and can hardly be utilized.

2.1.5. Serious undersupply. Because of small amount of precipitation in most part of Gansu and the imbalance of distribution in terms of time and geography, undersupply of water resources is a big problem. The gap of water for all economic sectors reaches 1.27 billion m³. The utilization rate for water in the drainage area of the continental rivers is high, with a gap of 300 million m³, especially in the Shiyang River reaches, which has a utilization rate of 172% and degrading ecosystem. The Yellow River drainage area is lacking 700 million m³ of water and in most areas, the problem of arid undersupply is not totally addressed. Water consumption in the Yellow River trunk is close to the quota set by the state. Water resources in the Yangtze River drainage area is unevenly distributed, with much difficulty to be tapped, and is a technical undersupply. Because of arid undersupply, there are 3 million more mu of arable land suffering from different degrees of drought, and 63 counties suffering from lack of water.

2.1.6. Extensive model of water consumption, and low utilization efficiency. Gansu on the one hand suffers from insufficient water resources and arid undersupply, while on the other hand, is wasting water severely. The biggest reason is the backward irrigation techniques and extensive model of water management resulting in low water utilization efficiency. Now the water utilization rate is only 47%, slightly higher than the 45% national average. The comprehensive irrigation is 568 m³/mu,
higher than the national average of 430 m³/mu. Water efficient irrigation area is only 60% of the total irrigation area, and the water production ratio is only 1.31 kg/m³, which is incompatible with the fact of serious water undersupply. In industrial field, water consumption every 10,000 yuan is 631 m³, higher than the national average of 400 m³, and the recycling ratio is only 40%, far lower than the national average of 62%. The awareness for planned water consumption and water conservation is weak, and there are not enough effective measures in this area.

2.1.7. Unbalanced water utilization structure, efficiency urgently in need of improvement. Water resources are not rationally distributed among different sectors. In the present structure, agriculture takes up the largest proportion, consuming 9.7 billion m³ or 80%; industry and construction uses 1.6 billion m³ or 13%; services, 80 million m³ or 1%; civil consumption, 800 million m³ or 6%; ecological environment, 20 million m³ or 0.2%. Among the water consumed in the continental river drainage area, most goes to agriculture, taking up 94%, among which irrigation takes up 86%. At present, the national average for agriculture water consumption (including forestry and wetland) is 66%, which is obvious much less than Gansu.

2.1.8. Insufficient adjusting and storing capacity, and heavy construction burden. The existing water related projects do not have sufficient adjusting and storing capacity, and the utilization rate for the water resources in some rivers is quite low. The total capacity of all the reservoirs is only 7% of the annual flow, lower than the 15% national average. Watering conservation project can only provide what amounts to 27% of the volume provided by surface water, lower than the 54% national average. The total number of reservoirs in the province is only 0.3% of the country, with their total capacity only taking up 1.5%. Tao River, Daxia River, Datong River and Wei River, which are the main tributaries of the Yellow River, do not have reservoirs for adjustment. There are very few cross-drainage-area water related projects, which makes it difficult to adjust the resources between different drainage areas.

2.1.9. Drinking water safety in the rural areas can be hardly ensured.

2.2. Large amount of land resources but small production potential

The land area in Gansu Province is 454,000 km² (the latest investigation suggests 425,800 km², to be publicized by the State Council). It has large amount of land resources, with the total land area ranking 7th and the land area per capita ranking 5th in the country). However, the actual amount of arable land is not large. According to the Gansu provincial land resource report, by 2006, there is 4.6171 million hm² of cultivated land, accounting for 3.9% of the state total, ranking the 11th, and the area per capita
2.63 mu, ranking the 6th. Among the cultivated land, 3.6032 hm² is dry land, accounting for 77.87%, and 1.0062 hm² is irrigated land, accounting for 21.75%. The land utilization rate in the province is 58.02%, while the area of un-utilized land accounts for 41.98%, which includes desert, Gobi, high and cold stony mountains, bare rock, low-lying alkaline land and marsh. According to the transformation report in 2006, there are 3.1675 million hm² of hillside cultivated land with a degree of less than 15º, accounting for 48.46%, and 1.2006 million hm² of those with a degree of 15-25º, accounting for 25.95%, and 259,000 hm² over 25º, accounting for 5.59%. The basic features of the cultivated land are: hillside land outweighs riverside land; dry land outweighs irrigated land. The average yield every mu in 2005 was 215.65kg, far less than the 310 kg/mu national average, indicating a low land production capacity.

2.3. Excessive use of natural grassland leads to hard task for grassland rehabilitation

The total area of grassland is 17.90 million hm², with 14.1129 million hm² that could be utilized, accounting for 31.03% of the total area of the province, and 5.6% of the total grassland area in the country, ranking the 6th largest grassland for animal husbandry in the country. Natural grassland mainly locates in the Gannan Plateau, Qilian mountainous regions, Hexi Corridor plain and the Loess Plateau in east Gansu. Natural grasslands are mainly of the temperate zone grassland type, temperate zone desert type, mountain meadow type and arid meadow type. There are 2129 kinds of feeder plantation, totaling 154 families and 716 genera.

2.3.1. Natural grassland productivity is at the middle and lower end of the country

There are 14.1139 million hm² of usable grassland in the province, which could hold 13.85 million livestock in theory. However, the density is only 1 cattle per 1.02 hm², which means the grassland productivity is at the middle and lower end of the country. The productivity of natural grassland in different areas differ quite a lot, with the productivity in Gannan, Longnan and Wuwei quite high, where each cattle only needs 0.73 hm², 0.75 hm², 0.42 hm² of natural grassland, whereas the productivity in Lanzhou, Jinchang, Baiyin, Jiuquan and Linxia quite low, where the land needed per cattle is 2.03 hm², 2.03 hm², 2.49 hm², 2.53 hm² and 2.43 hm² respectively.

2.3.2. Natural grasslands are basically in the transitional utilization status
At present, the degraded grassland takes up 80% of the total grassland area. The arid meadow in Gannan shows the “black soil beach” type of degradation. Both Long Mountain and Qilian Mountainous area are witnessing sparse plantation and serious water and soil loss, while the Hexi Corridor desert suffers from plantation destruction and desertification. Grassland degradation not only hinders the development of animal husbandry, but also aggravates ecological environment. With the implementation of ecological protection projects, the actual utilization area and utilization time of the natural grasslands will be influenced to different degrees, and the decrease of natural animal husbandry output in some parts of the province within the next 10 years is unavoidable.

2.3.3. Livestock products cannot meet the demands of the residents

The average annual consumption for each western resident is 100kg of meat, 300kg of milk, 15kg of eggs, 50kg of fruits, and 60kg of grain. In contrast, the average consumption for each Gansu resident in 2005 was 30.65kg of meat, 5.58kg of eggs, and 12.2kg of milk, and the gap compared with the national average is 16.55kg, 16.44kg, 8.89kg respectively. If everyone of the existing population consumes one liang (50g) more meat every day, then 467,000 tons of output must be added every year (which equals to 69% of the present total output); and one more egg means 510,000 more tons of egg output (4 times of the present provincial output). Therefore, livestock products cannot meet the increasing demands of the people.

2.4. Vulnerable ecological system with obvious land degradation

Gansu has one of the most vulnerable ecological systems among all Chinese provinces. Mountainous regions, plateau, desert and Gobi take up 85% of the total land area. Most parts of the province are dry and have little rain, with annual precipitation roughly 300mm for many years, which is less than 1/2 of the national average of 650mm, while the vaporized amount is more than 2000mm. The area suffering from water and land loss reaches 38.9 million hm²; the salinized land area is about 10.5 million hm², while the degraded grassland area is 11.29 million hm², which is 80% of the total area of the usable grassland in the province. From 1960s, 30 million hm² of forest has been seriously destructed. The general ecological environment is only better than Qinghai, Tibet and Ningxia.

The land suffering from water and soil loss accounts for 85% of the total land area. In the Loess Plateau of Gansu, 500 million tons of soil is lost every year. There are landslides or debris flows in the Longnan almost every year. Serious water and soil loss has damaged the water and soil resources and
the ecological environment, resulting in lean land, low agricultural and animal husbandry output, and siltation in various reservoirs and other irrigation work, which impairs the functions of the projects, shortens their life and increases project maintenance investment. There is 38.90 million hm² of land suffering from water and soil loss, taking up 85.7% of the total land area, among which 11.30 million hm² or 29% is in the Yellow River drainage area, 1.80 million hm² or 4.6% in the Yangtze River drainage area, 26.00 million hm² or 66.83% in the continental rivers drainage area. In terms of the amount of lost water and soil, the Yellow River drainage area accounts for 89%, the Yangtze River drainage area 9%, and the continental river drainage area 2%.

Desertified land area in the province is 480,000 hm², among which 410,000 hm² or 85% is in Hexi. Rapidly desertified land area is 227,000 hm², seriously desertified land area is 182,000 hm², and the deserted cultivated land is 127,000 hm². Land desertification mostly happens in Hexi, and with Shiyang River drainage area most typical. In the recent 20 years, the land desertification in Gannan Plateau is also very serious. The trend is also witnessed in north of Baiyin city, northwest of Huachi county and north of Huan county. There is 10.50 million hm² of salinized land in the province, among which 4.50 million hm² is damp salinized land and 6.00 million hm² dry. In addition, lakes are shrinking, with the area of wetland hugely reduced.

86 counties and cities are rated according to the ecological environment quality index (see table 9-1 and graph 9-2). 43.7% of the counties and cities are rated as excellent or good, and 56.3% are rated as or below ordinary.

| Table 9-1 Ecological environment quality rating of counties and cities |
|-----------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Level | Excellent | Good | Ordinary | Quite poor | Poor |
| Points | ≥75 | 55—75 | 35—55 | 20—35 | <20 |
| Cities | Liangdang County, Diebu County, Zhuoni County, Luqu County, Zhouqu County, Hui County, Lintan County, Wen County | Xiahe County, Hezuo City, Cheng County, Tuochang County, Linxia City, Linxia City, Maiji District, Qinzhou District, Dongxiang Autonomous Region, Maqu County, Kang County | Sunanyu Autonomous County, Gu Autonomous County, Ning County, Zhaonan County, Guanghe County, Chongxin County, Yongdeng County, Qingshui County, Jingning County, five districts of Lanzhou City, Kongtong District, | Jinchuan District, Huan County, Yumen City, Subei Mongolia Autonomous County, Linze County, Gaotai County, Jinta County, Aksaihasak Autonomous | Minqin County, Guazhou County, Dunhuang City |

753
| County, Yongjing County, Xihe County, Min County, Kangle County, Tianzhu Zang Autonomous County, Hezheng County, Heshui County, Wudu District, Zhang County, Li County, Zhengning County, Wudang County, Minle County, Jishishan Bao’an Autonomous County, Lintai County, Weiyuan County, Zhangjiachuan Hui Autonomous County, Huating County | Jingchuan County, Shandan County, Gangu County, Xifeng County, Yuzhong County, Lintao County, Suzhou District, Jingtai County, Longxi County, Huachi County, Baiyin County, Pingchuan County, Tongwei County, Qingcheng County, Jingyuan County, Fulan County, Anding District, Liangzhou District, Huining County, Qin’an County, Gulang County, Yongchang County, Jiayuguan City, Zhenyuan County, Ganzhou District | County, |
|---|---|
| 11.2 | 32.5 | 42.5 | 10.0 | 3.8 |

Note: the boroughs of a city are rated as one unit, such as the five boroughs in Lanzhou. (Source: 2005 Gansu Environment Report)
2.5. Heavy burden in environment pollution control, with the environment condition highly worrisome

Aggravating water pollution gives water environment dire prospects. The major pollutions are industrial waste water and civil waste water directly drained into the rivers, and pollution from pesticides and chemical fertilizers in plantation. In 2005, the total amount of waste water in the province reached 1.1 billion tons, accounting for 47% of the total amount of industrial and civil water consumption. In the 7133 km of major rivers in Gansu, polluted water (Grade IV) and seriously polluted water (Grade V) accounts for 19% of the total length. The Lanzhou part of the Yellow River, Wei River, Jing River, Wanchuan River, Shiyang River, Hongyashan Reservoirs, and small and medium-sized rivers in Baiyin, Dingxi, Tianshui, Qingyang and Pingliang have witnessed an exacerbating pollution. At the same time, river water environment protection mechanism is still backward.

Among the 30 rivers (part of rivers) monitored by the Gansu Province, 6 have reached Grade I and II, 9 have reached Grade III, 3 Grade IV and 12 Grade V or below, with 14 above standards (see table 9-2). The major pollution indices are still chemical oxygen demand, biochemical oxygen demand, ammonia nitrogen and etc.

Table 9-2 Comparison of River Water Quality Tests
Among the 9 rivers of 3 drainage regions under monitor, 4 have good quality, 1 is lightly polluted, 1 moderately polluted and 3 seriously polluted. (See table 9-3)

<table>
<thead>
<tr>
<th>River</th>
<th>Number of Sections</th>
<th>I—III (%)</th>
<th>IV, V (%)</th>
<th>Below V (%)</th>
<th>Water Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow River</td>
<td>7</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>Good</td>
</tr>
<tr>
<td>Tao River</td>
<td>2</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>Lightly Polluted</td>
</tr>
<tr>
<td>Wei River</td>
<td>6</td>
<td>50.0</td>
<td>33.3</td>
<td>16.7</td>
<td>Moderately Polluted</td>
</tr>
<tr>
<td>Jing River</td>
<td>3</td>
<td>0</td>
<td>33.3</td>
<td>66.7</td>
<td>Seriously Polluted</td>
</tr>
<tr>
<td>Huangshui River</td>
<td>1</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>Good</td>
</tr>
<tr>
<td>Shiyang River</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>100</td>
<td>Seriously Polluted</td>
</tr>
<tr>
<td>Hei River</td>
<td>4</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>Good</td>
</tr>
<tr>
<td>Shiyou River</td>
<td>2</td>
<td>0</td>
<td>50.0</td>
<td>50.0</td>
<td>Seriously Polluted</td>
</tr>
<tr>
<td>Bailong River</td>
<td>3</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>Good</td>
</tr>
</tbody>
</table>

By 2004, only 7.1% of the cities reached grade II in terms of air quality, 50% reached grade III, while the rest 42.9% below grade III. Particles are the main pollutants, accounting for 57% of the total pollutants, and the rest are mainly sulfur dioxide and nitrogen dioxide, which account for 35% and 8% respectively. In 2005, the air quality was a little better, but the situation in Lanzhou, Baiyin and Jinchang were still quite bad, with particles remaining the major pollutants. (See Figure 9-2)
Figure 9-2 Comprehensive Pollution Index in Gansu  
(Source: 2005 Gansu Province Environment Report)

The precipitation monitoring in 12 cities showed PH between 4.38-8.74, with 5 acid rains in Jinchang only during March and July.

2.6. Serious debris flow

Tianshui, Longnan and Gannan region is one of the 4 areas suffering from frequent landslide and debris flow. Such disaster is wide spread, concentrated, frequent and highly damaging. There are over 12,000 landslide masses distributed in over 900,000 hm$^2$ of land. The distribution of debris flow is similar to that of landslide, reaching 1.2 million hm$^2$, with 6260 confirmed debris flow channels. Landslide and debris flow are severe disasters threatening local socio-economic development.

Section 3 Analysis of the Causes for the Eco-environment Problems

3.1. Vulnerable ecological system is the root for aggravating ecological environment

Gansu Province is the intersection and transition area for 3 natural regions. The diversified and transitional natural geographical features have determined the vulnerability of Gansu’s natural ecological conditions. Hexi region is dry, with little rain, small vegetation coverage, severe frequent wind erosion of soil, and frequent sand storms. Most of the Loess Plateau has arid or semi arid climate, with the surface covered by hills or channels, which suffers from serious land and water loss. The mountainous region in Longnan has vast land and deep channels with complicated geographical features and suffers from severe landslide and debris flow. The Gannan Plateau has a cold climate and vulnerable ecological system, which means restoration of forest and grassland is very difficult. The vulnerability of the ecological system decides that the ecological system is easy to be disrupted and destroyed, and difficult to be restored. Once it is destroyed, it will be difficult to be restored and reconstructed.
3.2. Increasing population poses heavy pressure for the ecological environment protection

From 1949 to 1990, Gansu’s population had been growing by 20.8‰ annually on average, higher than the 18.2‰ of the national average. From 1990 to 2000, the average annual growth rate was 13.2‰. By the end of 2005, the total population in the province reached 26.3459 million, with a growth rate of 6.02‰. The population density is 61.87 per kilometer, less than half of the national average (43%). However, over 40% of the land is hard to be utilized, which results in limited space for human residence. The average population density in the regions suitable for residence is far above the bearing capacity of the local water and land resources, posing great threat to the vulnerable ecological environment.

3.3. Backward productivity and extensive growth model has aggravated ecological degradation

Backward productivity and extensive growth model are mainly reflected in the irrational development and utilization of natural resources, which can be summarized as “5 abuses”, that is, abuse of reclamation (unplanned and unrestrained land reclamation), abuse of pasturing (excessive pasturing), abuse of felling (forest), abuse of herborizing (herbs and turf) and abuse of water resources (ecology unfriendly use of water, excessive extraction of underground water). Such extensive economic activities have disrupted the balance of the natural eco-system and have aggravated ecological degradation.

3.4. Sustaining resource exploitation without any protection has damaged the stability of ecological system and environment quality

Gansu is among the earliest developed areas in China’s history, with the Hexi region enjoying the reputation of “grain barn” since long ago. After 1950, Hexi region became a base for commercial grain. In 1982, the Hexi region was identified by the State Council as a key agricultural region. The Hexi region is paying huge ecological price while winning the reputation as the “grain barn” through highly intensive agricultural development. Pastures are generally overloaded, with ecological conditions in the grasslands severely degrading.
3.5. Poverty and market competition are the modern causes leading to excessive
natural resource development and ecological damages

Gansu Province is one of the poorest provinces in China. Gauged by GDP per capita and income per
capita, Gansu is only next to Guizhou in terms of poverty. If evaluated by combining ecological
environment and poverty, Gansu is undoubtedly the most underdeveloped province. There are 43 or
50% of state level poor counties among the 86 counties (districts). If the provincial level poor counties
are taken into account, than the proportion is over 50%. The number of poor population decreased
from 12.5442 million in 1983 to 1.59 million in 2004. By the standard of 1300 yuan of net income per
capita as the poverty line, there are 14.036 million rural residents in poverty, or 69.4%. Poverty,
subsistence and competition have directly resulted in overdependence over natural resources, and are
the biggest modern causes for ecological environment damage.

3.6. Wrong government decision is another direct cause for ecological degradation in
some areas

Over-emphasis on GDP growth, too many projects for political show, lack of ecological environment
awareness, short-sighted policies and segmentation of political districts have led to erroneous political
decisions in the provincial, municipal and county level governments, which include Hexi
transformation, grain self-sufficiency, too many small hydropower projects, unchecked local gold
mining rights auctions and excessive reclamation of unsuitable land.

Section 4 Evaluation of Irrigation and Ecological Construction in the
Last 30 Years

Since 1970s, Gansu Province has launched many key irrigation projects, and has constructed Jingdian
Projects, Minqin Water Project and Yanhuandinyanghuang Projects Phase 1. The key projects under
construction now include Channeling Water to Qin Project, Shule River Agricultural Comprehensive
Development Projects, Dongxiang Nanyang Channel Irrigation Project and Hei River Drainage Area
Comprehensive Overhauling Project. Since 1980s, projects including nature conservation zone, natural forest protection, small drainage area overhauling and forest & grassland rehabilitation have achieved apparent ecological, social and economic effects.

4.1. Finished key irrigation projects

4.1.1. Jingtaichuan Electricity Projects (Jingdian Project)

Jingdian project is a large scale cross drainage area power and irrigation project with high lifting range, multi-cascade and huge flow rate, and the planned water lifting capacity is 28.6$m^3$/s, with an increased flow rate of 33$m^3$/s and installed capacity of 259.7 MW. The number of new pumping stations is 43, the irrigation coverage 830,000 mu and annual water lifting capacity 414 million m$^3$. The irrigation zones cover Jingtai, Gulang and Alashan Zuoqi of Inner Mongolia.

The project started from 1969 and was divided into two phases. The first phase began in 1969 and completed in 1974, with 66.08 million of state investment and 306,000 mu of present irrigation coverage.

The second phase started in July 1984 and completed in 1999, with 488 million of state investment and 520,500 mu of irrigation coverage.

Jingdian Project has turned desert into oasis and accommodated more than 300,000 immigrants, providing good conditions for subsistence and development in Jingtai and Gulang. During the 30 odd years since its operation, agriculture, forestry, animal husbandry and township enterprises in the irrigation zones have all developed rapidly, forming a pattern of intertwining agriculture, industry and commerce and generating huge economic, social and ecological benefits. The region has become a demonstration base for agricultural technology, “high efficiency, high output and good quality” agriculture and building a moderately prosperous society in an all-round way.

4.1.2. Jingdian Project Phase 2 expands to transmit water to Minqin

Minqin water project is to utilize the free capacity of the Jingdian project phase 2 to transmit water to Minqin and relieve Minqin’s urgent demand for water resources. The water channel is 101 km, with a
designed flow rate of 6m³ / s and annual water transmission capacity of 61 million m³. The state invested RMB302 million. The reclaimed irrigation area is 150,000 mu. The project started in November 1995 and completed in November 2000. The major problems are high water price and heavy subsidy burden for government.

4.1.3. Yanhuandingyanghuang Gansu Exclusive Project

This project aims at addressing drinking water difficulty in Dingbian of Shaanxi, Huan County of Gansu, Yanchi and Tongxin county of Ningxia, prevent pandemics, develop irrigation, improve environment and alleviate local people from poverty. It is one of the key construction projects in the 8th Five Year Plan (FYP). The project is divided into shared project and three provincial exclusive projects, with a total investment of RMB 304 million.

In the Gansu Exclusive project, water is channeled from 11 pumping stations of Lijia Dazhuang of Yanchi County, Ningxia, with the total designed flow rate of 1.8m³ / s. The project is divided into two phases. The first phase, with a RMB 99.65 million investment, has solved the drinking water difficulty for 11,000 people and 36,000 cattle, and provided sweet water irrigation for 23,500 mu. The project started in 1992, and was put into operation and began generating benefits in 2002.

4.1.4. Channeling Liu to Jinchang Project

Channeling Liu to Jinchang is a cross-drainage region project aiming at providing industrial and civil use water for Jinchang city. It is composed of water channeling hub and water channels. The hub is in Menyuan county of Qinghai province, and the water is channeled to the Xidahe reservoir of Jinchang, which provides water to Jinchang after some adjustments. The total investment for the project is RMB266 million, mainly raised from Jinchang city. It started in 1995 and completed in May 2003. The project has ensured water resource supply in Jinchang.

4.1.5. Channeling Da to Qin Irrigation project

The project is a cross drainage area irrigation project. So far, the main channels have been completed, with total length of 52 branch channels estimated at 690.03km. The finished part irrigates 866,400 mu
of land and 611,150 mu of land have been prepared for the project. 54703 migrants have been relocated. The total actualized investment was RMB2.461 billion. The project plays an important role in optimizing water and land resources allocation in different regions, and in improving the rural and urban layout of Lanzhou city.

4.1.6. Shule River Agriculture Comprehensive Development Project

Shule River project is a large agriculture comprehensive development project using loans from the World Bank. The project, which started from 1996, had been adjusted according to the requirement of the World Bank and the reality. The adjusted targets include providing irrigation for another 408,200 mu of land, improving irrigation in 651,000 mu land, totaling 1.0592 million mu, and relocate 75,000 migrants. The project supplies 745 million m³ of water every year and the total investment is RMB1.971 billion, among which USD119 million or RMB978 million comes from the World Bank, and RMB993 million is domestically funded.

So far, the actualized investment is RMB1.36651 billion. The mid-term construction targets have been realized, which include providing irrigation for 1.06 million mu of land and relocating 57,000 migrants.

4.1.7. Dongxiang Nanyang Channel Irrigation Project

The project aims at providing water for irrigation and for human and animal drinking in Dongxiang, Hezheng and Linxia, improving local ecology, production and living conditions, so as to alleviate poverty. The designed quantity of annual water supply is 46.40 million m³, and the total investment is RMB556 million. By now, the actualized investment is RMB525 million, with 60,000 mu of land prepared with infrastructure. The project started providing irrigation since 2005, and has been quite successful.

4.1.8. Hei River Drainage Area Rectification Project

The project aims at sustainable utilization of the water resources in Hei River drainage area, promoting sustainable socio-economic development and ecological environment in this area. The 94th
Premiere official meeting of the State Council in 1991 approved the project plan.

The main goal of the project is to, through three years’ efforts, construct or rebuild 649.62km of main channels, 768.18km of branch channels, 895.23km of sublateral channels, provide coordinated facilities in 1.4155 million mu of land, renovate 1544 old wells, build 765 new motor-pumped wells, build 516,000 mu of land into efficient water conservation area, consolidate 21 channels, phase out 7 small plain reservoirs, return 320,000 mu of cultivated land to forest or grassland, increase 300,000 mu of natural forest in Qilian Mountain fenced off for reservation, 600,000 mu of grassland fenced off for conservation, and newly afforest 40,000 mu of land in Ganzhou, Linze, Gaotai, Sunan county of Ganye city and the Jintai county of Jiuquan city. Through the above measures, the water channeled away for irrigation in the middle reaches is reduced, and the lower reaches of the Hei River below the Zhengyi Gorge has witnessed an increase of 255 million m³ of water every year. The target the state set for distribution of water in the trunk stream of Hei River is realized, namely, when there is 1.58 billion m³ of water coming to the Yingluo Gorge, there should be 950 million m³ of water coming out of the Zhengyi Gorge. The total investment for the project is RMB1.705 billion.

The project started in 2002, and all the tasks have been fulfilled, except for the goal of forest or grassland rehabilitation due to state policy adjustment. The aggregate investment is RMB974 million. The project has reduced the amount of water diverted in the middle reaches, realized the annual water distribution target on time, and ensured the ecological and civil water consumption in Ejina Qi of Inner Mongolia.

4.2. Analysis of ecological projects’ effects

4.2.1. Forest Rehabilitation

4.2.1.1. Project overview. Gansu is one of the 3 provinces that pioneered in forest rehabilitation pilot project in 1999, and also a key province in the national project. From 1999 to 2005, the aggregate afforested area totaled 23.133 million mu, with 9.833 million mu of returned cultivated land, 12.4 million mu of deserted land newly afforested and 0.9 million mu fenced off. The project covers 14 cities or prefectures (100% coverage), 86 counties or districts (100% coverage), 1231 towns (89.9% coverage), 12,561 administrative villages (73.7% coverage), 1.56 million rural households (34% of coverage) and 6.7 million rural population (32.5% coverage).
4.2.1.2. Major effects. The project ushers in a new era for ecological environment construction in Gansu, and plays an important role in rural industrial restructuring, increasing farmers’ income and promoting rural socio-economic development, generating huge ecological, economic and social benefits.

----The eco-environment has been markedly improved. Since the implementation of the project, 9.833 million of desertified land or steep slope land has been rectified, 13.30 million deserted area has been afforested, which increased the provincial plantation coverage by 3.35 percentage points. In places that started quite early, water and soil loss has been controlled to some extent; sand storms are diminishing; natural ecological system has got a chance to recover; animals that have disappeared for many years show up again; biological diversification is improved; water is reserved in the mountains and mud is constrained to the channels. According to 2003 Yangtze River Mud and Sand Report released by Changjiang (Yangtze River) Water Resources Commission, the sand transmission volume and sand content of the river in 2003 were obviously smaller than that in the past. Experts attributed this to the forest rehabilitation project carried out in the upper reaches of the river. According to monitoring statistics of Qinzhou district of Tianshui city, area with water and land loss in the district reduced from 31,430 hm² in 1998 to 9,074 hm² in 2004, down by 71.7%; quantity of eroded land reduced from 2.0824 million tons before the project to 0.9556 million tons, down by 54.11%, indicating marked improvement in ecological environment. After 3 to 5 years of management, forests will play an even bigger role in adjusting water supply, conserving water resources, conserving water and land, and improving climate and environment.

----Rural industrial structure is optimized. After the implementation of the project, Gansu agricultural economic restructuring has welcomed new opportunities. The project has not only promoted the development of featured rural industries, such as fruit industry, pasturing, herb plantation, ecological tourism, and forest byproduct processing, but also contributed to rural industrial structure optimizing. According to statistics, the proportion of grain, cash crops and fodder crops is adjusted from 73:12:15 in 1998 to 60:15:25 in 2004.

----Farmers’ income has increased markedly. From 1999 to 2005, the state invested RMB6.44 billion as construction funds in Gansu, averaging RMB4, 128 every rural household that returned their farmland to forest or 900 every person. From 1999 to 2004, the province constructed 4 million more cash trees, 3.3 million of pasture, and 0.4 million mu of herbal medicine base. Longnan alone has built
0.8 million mu of pepper, walnut and olive trees, and fostered a batch of processing and marketing enterprises, forming a comprehensive cash tree development system. In 2004, the cash trees output per capita in the city reached RMB224, up by 48%. Nearly 0.2 million households or 0.8 million population have been alleviated from poverty. Anding district of Dingxi city adopted the forest and grass inter-cropping model, interplanting 0.342 million mu of alfalfa and other quality grazing grass, generating RMB146 million of output in animal husbandry, averaging 240 yuan per capita. In addition, there are more migrant workers after the project implementation, bringing more income as salaries. In 2005, the province provided 4.0983 million of labor, who generated RMB 10.082 billion of income, taking up 27.2% of farmers’ net income.

Now there are 40.67 million mu of land suitable for forest rehabilitation, with 11.58 million in slopes of over 25 degrees, 21.84 million in slopes between 15 to 25 degrees with vulnerable ecological system, 7.25 million in seriously desertified area, which amount to a formidable task. If the state reduces the project scale greatly, it would not only backfire on project management, but would also misguide the public that the state policies are changing, and thus pay less attention to consolidating the fruits, and even destroy the forest to re-cultivate land.

**4.2.2. Stop pasturing to conserve grassland**

**4.2.2.1. Project overview**

Since 2003 when the state piloted on grassland rehabilitation, Gansu started the pilot project in ten counties in Gannan prefecture, Jiuquan city, Zhangye city and Wuwei city, namely Maqu, Luqu, Xiahe, Zhuoni, Diebu, Guazhou, Subei, Akesai, Sunan, and Tianzhu. These 10 counties have 139 million mu of natural grassland and 0.52 million of rural population. From 2003 to 2004, the task was completed in 22.8 million mu of land. After the pilot project finished, in 2005 and 2006, another 11 million mu was conserved. During these 4 years, the total rehabilitation area amounted to 44.8 million mu, with an investment of RMB1.02363 billion, among which 738.74 million was state funded and 284.89 million was local funded.

**4.2.2.2. Effects**

---Apparent ecological effects. After the grassland is fenced off, overloading in seriously degraded grassland is initially controlled, with ecology system somewhat recovered. According to statistics, the
plantation coverage of lowland salty meadow district in deserts of west Gansu has reached 24%, higher by 4 percentage points than that outside the district, and the grass height is 30cm, higher by 4 cm. In the temperate zone desert grassland, plantation coverage reached 12%, higher by 2 percentage points than that outside the project zone, and the grass height is 16 cm, 1cm higher. The plantation coverage of pasturing forbidden zone in Gannan prefecture registers 80%, 9 percentage points higher than that outside, with a height of 14cm, 2cm higher. In pasturing suspension zone, plantation coverage reaches 90%, higher by 9 percentage points, with a height of 16.2cm, higher by 4.8cm.

---Economic effects are gradually revealed. According to monitoring statistics, the amount of creatures in the pasturing forbidden grassland of Tibet Plateau project is 117kg higher than that outside the project zone, and the amount in pasturing suspension zone is 68kg higher. The figures for grassland in west desert project are 5kg and 2kg higher respectively. The amount of grass alone is up by 532 million kg, generating RMB266 million of economic benefits. At the same time, the implementation of pasturing forbidding and suspending policy has encouraged farmers to adjust cattle structure, accelerated cattle fattening process, upgraded species, developed stall feeding, and thus effectively increased farmers’ income and realized the balance between grassland and cattle. Animal husbandry restructuring is promoted. For instance, Ganan project zone established a batch of high efficiency animal husbandry technology demonstration base, fine breed base, and cattle and sheep fattening base, driving restructuring of the industry. In the project zone, a household usually fed 200 to 300 animals in the past, but only less than 100 after the project. Combined with the fast cycling, advantages of the new breed are fully shown, and farmers’ income is steadily increased. Ganan project zone has further adjusted cattle structure and increased cycling, which ensures steady growth of farmers’ income in spite of effective restructuring. In 2004, net income per capita for farmers in the Quan prefecture was RMB1, 433, up by RMB92 than 2003. The average household income of Akesai project was RMB18, 727 in 2004, net income per capita RMB4, 871, an increase of RMB209 than year 2003.

---Social benefits are outstanding. The project combines grassland contracting with people’s interests and in this way motivates farmers to protect, build and rationally use grassland. The combination of stopping pasturing while intertwined with farmer relocation, industrial development and township construction has together promoted the economic development of ethnic regions, accelerated township construction and building a moderately prosperous society in the pasturing areas.
Section 5 Ecological Environment Bearing Capacity

5.1. Method and results

This report uses bearing capacity index, pressure index and pressure capacity rate index to describe ecological situation in 12 prefecture level cities and 2 autonomous prefectures. Bearing index shows the bearing capacity of the bearing media in an objective way, as shown in the following formula:

$$CSI = \sum_{j=1}^{m_1} Z_j W_j$$  \hspace{1cm} (1)

$CSI$ is the bearing capacity of ecological system; $Z_j$ is the $j$ in zero dimension; $W_j$ is the weight of $j$ and $m_1$ is the number of supporting indices.

The pressure index shows the pressure on resources and environment arising from life quality progress and social progress, as shown in the following formula:

$$CPI = \sum_{j=1}^{m_2} Z_j W_j$$  \hspace{1cm} (2)

In the formula, $CPI$ is the pressure index for ecological system; $Z_j$ is the $j$ in zero dimension; $W_j$ is the weight of $j$ and $m_2$ is the number of supporting indices.

The pressure capacity rate index reflects the comparative size of ecological system bearing capacity and pressure. It can reflect the ecological burden in a certain area and accurately determine whether the bearing capacity is high or low. The formula is as follows:

$$CCPS = \frac{CPI}{CSI}$$  \hspace{1cm} (3)

In the formula, $CCPS$ is the pressure capacity rate; $CPI$ is the pressure index and $CSI$ is the bearing capacity index.

Using the above calculation method and grading method (as in table 9-4), the three indices of all cities (prefectures) of Gansu are calculated and graded, as shown in table 9-5.

<table>
<thead>
<tr>
<th>Table 9-4 Ecological bearing capacity grading standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index reference</td>
</tr>
<tr>
<td>Capacity grading</td>
</tr>
<tr>
<td>Pressure grading</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Index reference</td>
</tr>
<tr>
<td>Pressure capacity grading</td>
</tr>
</tbody>
</table>
Table 9-5 Gansu ecological bearing capacity evaluation result

<table>
<thead>
<tr>
<th>City</th>
<th>Capacity index</th>
<th>Pressure index</th>
<th>Pressure capacity rate index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanzhou</td>
<td>0.5242</td>
<td>0.6362</td>
<td>1.2135 (High pressure)</td>
</tr>
<tr>
<td></td>
<td>Medium capacity</td>
<td>Moderately high pressure</td>
<td></td>
</tr>
<tr>
<td>Jiaoyuguan</td>
<td>0.4141</td>
<td>0.3973</td>
<td>0.9594 (Medium capacity)</td>
</tr>
<tr>
<td></td>
<td>Medium capacity</td>
<td>Low pressure</td>
<td></td>
</tr>
<tr>
<td>Jinchgang</td>
<td>0.3909 Low capacity</td>
<td>0.6000</td>
<td>1.5351 (High pressure)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderately high pressure</td>
<td></td>
</tr>
<tr>
<td>Baiyin</td>
<td>0.4076</td>
<td>0.3484</td>
<td>0.8549 (Low pressure)</td>
</tr>
<tr>
<td></td>
<td>Medium capacity</td>
<td>Low pressure</td>
<td></td>
</tr>
<tr>
<td>Tianshui</td>
<td>0.5560</td>
<td>0.6708</td>
<td>1.2064 (High pressure)</td>
</tr>
<tr>
<td></td>
<td>Medium capacity</td>
<td>Moderately high pressure</td>
<td></td>
</tr>
<tr>
<td>Wuwei</td>
<td>0.4898</td>
<td>0.6005</td>
<td>1.2259 (High pressure)</td>
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<tr>
<td></td>
<td>Medium capacity</td>
<td>Moderately high pressure</td>
<td></td>
</tr>
<tr>
<td>Zhangye</td>
<td>0.4096</td>
<td>0.2768</td>
<td>0.6759 (Low pressure)</td>
</tr>
<tr>
<td></td>
<td>Medium capacity</td>
<td>Low pressure</td>
<td></td>
</tr>
<tr>
<td>Pingliang</td>
<td>0.4468</td>
<td>0.4493</td>
<td>1.0057 (Medium capacity)</td>
</tr>
<tr>
<td></td>
<td>Medium capacity</td>
<td>Medium pressure</td>
<td></td>
</tr>
<tr>
<td>Jiuquan</td>
<td>0.5376</td>
<td>0.3761</td>
<td>0.6996 (Low pressure)</td>
</tr>
<tr>
<td></td>
<td>Medium capacity</td>
<td>Low pressure</td>
<td></td>
</tr>
<tr>
<td>Qingyang</td>
<td>0.5013</td>
<td>0.6021</td>
<td>1.2010 (High pressure)</td>
</tr>
<tr>
<td></td>
<td>Medium capacity</td>
<td>Moderately high pressure</td>
<td></td>
</tr>
<tr>
<td>Dingxi</td>
<td>0.4004</td>
<td>0.4900</td>
<td>1.2238 (High pressure)</td>
</tr>
<tr>
<td></td>
<td>Medium capacity</td>
<td>Medium pressure</td>
<td></td>
</tr>
<tr>
<td>Longnan</td>
<td>0.3942 Low capacity</td>
<td>0.4335</td>
<td>1.0998 (Medium capacity)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium pressure</td>
<td></td>
</tr>
<tr>
<td>Linxian</td>
<td>0.3899 Low capacity</td>
<td>0.4733</td>
<td>1.2139 (High pressure)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium pressure</td>
<td></td>
</tr>
<tr>
<td>Gannan</td>
<td>0.3902 Low capacity</td>
<td>0.5403</td>
<td>1.3844 (High pressure)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium pressure</td>
<td></td>
</tr>
</tbody>
</table>

5.2. Comprehensive analysis of ecological bearing capacity

Support system comprehensive evaluation is shown in the capacity index, and the curve in graph 4 shows the changes in capacity index of all different cities (prefectures) of Gansu in 2005.
Figure 9-3 capacity index curve of cities in Gansu 2005

Figure 9-3 shows that Linxia, Gannan, Lingnan and Jinchang have low capacity, while the other 10 cities have medium capacity, there is no region with weak capacity, moderately high capacity or high capacity. The rankings of the cities are: Tianshui, Jiuquan, Lanzhou, Qingyang, Wuwei, Pingliang, Jiayuguan, Zhangye, Baiyin, Dingxi, Longnan, Jinchang, Gannan and Linxia. 28.6% of the cities have low capacity while 71.4% have medium capacity. In conclusion, most cities in Gansu have medium capacity.

The pressure index evaluates the pressure system. Figure 9-4 shows the curve of changing pressure index of various cities in 2005.

Figure 9-4 pressure index curve of cities in Gansu 2005

Graph 10-5 shows that Zhangye, Baiyin, Jiuquan and Jiayuguan have low pressure index, Tianshui, Lanzhou, Jinchang, Wuwei and Qingyang have moderately high index, while the others belong to medium pressure zone. There is no weak pressure or high pressure zone. The rankings are: Tianshui, Lanzhou, Qingyang, Wuwei, Jinchang, Gannan, Dingxi, Linxia, Pingliang, Longnan, Jiayuguan, Jiuquan, Baiyin and Zhangye. 28.6% of the cities have low pressure, 35.7% have medium pressure, while 35.7% have moderately high pressure. This is huge pressure for the ecological system in Gansu.
The pressure capacity rate reflects the relationship between the bearing capacity and the pressure. Graph 10-6 shows the curve of changing rates among different cities in 2005.

![Figure 9-5 bearing pressure rate curve of cities in Gansu 2005](image)

Figure 9-5 shows that the cities with low burden, including Jiuquan, Zhangye and Baiyin, taking up 21.4% of the total; Jiayuguan, Pingliang and Longnan have medium burden, accounting for 21.4%; Lanzhou, Jinchang, Tianshui, Wuwei, Qingyang, Dingxi, Linxia and Gannan have high pressure, taking up 57.2%. Generally speaking, Jinchang has the heaviest burden, while Jiuquan the lowest. Over half of the cities have high burden, which means the ecological condition is very dangerous.

![Figure 9-6 comparison of bearing capacity system and pressure system in Gansu](image)

Figure 9-6 shows that in Jinchang, Gannan, Wuwei, Dingxi, Linxia, Lanzhou, Tianshui, Qingyang, the pressure index is larger than capacity index and the gap is quite big, indicating these cities have high burden. Jinchang is a resources-based city with non-ferrous metal and chemical industry playing a dominant role. It lies in Shiyang river drainage area, which is arid with little rain. There is a lack of water resources, the water environment is worsening, and air pollution and desertification are aggravating, which all result in weak capacity and high ecological pressure. Gannan has abundant natural resources, especially in water resources and mineral resources. However, it has high altitude, cold climate and vulnerable ecological environment. Excessive exploitation has led to degradation of grasslands and decreasing capacity of water conservation in the wetlands. Wuwei is the most densely
populated region in Hexi. The large population and the low level economy give huge burden to the ecological system. Dingxi is arid with little rain. It boasts 14.8% of arable land in Gansu but only 4.9% of the total water resources. Poverty and water and soil loss are pestering the city.

Longnan, Pingliang and Jiayuguan have a higher pressure index than capacity index, but the two figures are quite close. These belong to medium burden zones.

In Baiyin, Zhangye and Jiuquan, the pressure index is lower than capacity index, making them low burden zones. Zhangye has vast and plain fields, with good conditions in lighting, heating, water and soil. The natural population growth rate is 4.91‰, lower than provincial average of 6.04‰. It enjoys medium capacity but low burden. In Jiuquan, farmers’ per capita net income is RMB4,374, urban residents’ disposable income is RMB8,929, industrialization ratio is 35%, and urbanization rate is 52%. Economy is developing soundly, and ecological bearing capacity is quite good.

Generally speaking, 78.6% of the cities in Gansu have high or medium burden, and only 28.6% have low burden. The disharmony between economy and population, resources and environment is quite outstanding in some regions.

Section 6 Analysis and Forecast of Water and Soil Resources Capacity

6.1. Analysis of water resources capacity

6.1.1. Availability of water resource availability

According to national resource comprehensive planning technical standards, the availability of water resources refers to the water consumed when water resource is utilized, and is the maximum degree for reasonable water resource development and utilization. It means the maximum amount of water that can be used for one time in the drainage area in the foreseeable future. According to the requirements of coordinated utilization of civil, industrial and ecological water, from analysis of provincial locally generated water, the total amount of available water resource is 10.666 billion m³ in 2005, in which 5.354 billion m³ is in continental river drainage area, 5.019 billion m³ is in Yellow
River drainage area, and 293 million is in Yangtze River drainage area. It is expected that the amount will be 11.321 billion m$^3$ in 2010, with 5.354 billion m$^3$ in continental river drainage area, 5.614 billion in Yellow River drainage area, 351 million m$^3$ in Yangtze River drainage area.

Following the “87 water allocation” quota set by the government for Yellow River drainage area, the total amount of available water resources in the Yellow River drainage area is 3.119 billion m$^3$, among which 3.04 billion m$^3$ is surface water, and 79 million m$^3$ is underground water. Therefore, the total amount of available water in 2005 is only 8.766 billion m$^3$ and 8.826 billion m$^3$ in 2010. To address supply and demand conflict in water resources, the only hope is after the implementation of South Water Transmitted to North Program, the State will increase the quota for Yellow River drainage area in Gansu. Table 9-6 shows the total amount of available water resources.

<table>
<thead>
<tr>
<th>Drainage area</th>
<th>Total amount of water resource</th>
<th>Available amount in 2005</th>
<th>Available amount in 2010</th>
<th>Available amount in 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Province</td>
<td>289.44</td>
<td>106.66(87.66)</td>
<td>113.21(88.26)</td>
<td>122.37</td>
</tr>
<tr>
<td>Continental rivers</td>
<td>61.30</td>
<td>53.54</td>
<td>53.54</td>
<td>53.54</td>
</tr>
<tr>
<td>Yellow River</td>
<td>127.78</td>
<td>50.19(31.19)</td>
<td>56.14(31.19)</td>
<td>63.46</td>
</tr>
<tr>
<td>Yangtze River</td>
<td>100.36</td>
<td>2.93</td>
<td>3.53</td>
<td>5.37</td>
</tr>
</tbody>
</table>

Note: data in the brackets is the available amount of water considering “87 water allocation” quota

6.1.2. The development and utilization of water resources

6.1.2.1. Water supply capacity. In 2005, all kinds of water supply projects have a total capacity of 13.774 billion m$^3$, among which 3.204 billion m$^3$ is in water impoundment projects, 7.57 billion in water channeling projects, 2.843 billion in underground water projects, 120 million in water transmission projects, and 37 million in other water projects. Table 9-7 shows water supply capacity of the province in 2005.
6.1.2.2. Amount of consumption. In 2005, the real water consumption amount of Gansu in 2005 is 12.172 billion m³, among which 402 million is for urban civil use, accounting for 3.28%; 307 million m³ is for rural civil use, accounting for 2.5%; 1.642 billion m³ is for urban industrial use, accounting for 13.38%; 9.898 billion m³ is for rural production use, accounting for 80.66%; 22 million is for ecological use, accounting for 0.18%. Table 9-8 and 9-9 show the actual supply of water supply projects and actual water consumption in 2005.

<table>
<thead>
<tr>
<th>Surface water supply project</th>
<th>Underground water supply</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water impoundment projects</td>
<td>Water channeling projects</td>
<td>Water transmission projects</td>
</tr>
<tr>
<td>Continental river</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow River</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yangtze River</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Province</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 9-8 Actual water supply of water supply projects in 2005

Unit: 100 million m³
6.1.2.3. Water consumption. In 2005, the total water consumption in the province is 8.05 billion m³, among which 6.979 billion m³ or 86.7% is for rural production, 620 million m³ or 7.7% for urban production, 441 million m³ or 5.5% for civil use, and 10 million m³ or 0.1% for ecological use. Divided by drainage area, 5.15 billion m³ is in continental river drainage area, accounting for 63.98%; 2.66 billion m³ or 33.04% is in Yellow River drainage area; 240 million m³ or 2.98% is in Yellow River drainage area.

6.1.2.4. Exploitation of water resource. In 2005, 40.4% of water is utilized, accounting for 75.5% of the total available water resource, or 91.8% of the quota in “87 water allocation”. The rate for continental river drainage area is the highest, 98.6% of the total water resources is exploited, accounting for 96.2% of the available water resources. Consumption in Shiyang River drainage area has exceeded the available amount, triggering serious ecological problems. Exploitation rate in the Yellow River drainage area is 35.1%, accounting for 85.3% of the “87 water allocation” quota, and while taking into consideration supply for channeling Tao projects, further tapping the resources is under restraint of water allocation quota. Exploitation rate in Yangtze River drainage area is 3.4%, and exploitation of water resources is constrained by natural conditions.

6.1.3. Water security analysis

With social and economic development, water demand in the province will further increase in the near future, which is a great challenge to Gansu, a province in the arid region lack of water, and water security is not to be optimistic about. According to plans for national economy and the 11th FYP, water for civil use forecast should meet the increasing demands in both rural and urban areas, water
for industrial use forecast should meet the demands of ecological structural adjustments and ecological development, while ecological water use forecast should aim at improving ecological environment. To ensure the realization of provincial ecological and social development goals, it is expected that in 2010, the total water demand would be 14.39 billion \(\text{m}^3\) at most, or 13.94 billion \(\text{m}^3\) for the medium level, or 13.56 billion \(\text{m}^3\) at least. The medium level is recommended. Table 9-10 and 9-11 show different water demand in each drainage area and for the whole province at different levels.

**Table 9-10 planned water demand in each drainage area**

<table>
<thead>
<tr>
<th>Drainage area</th>
<th>Year 2005</th>
<th>Year 2010</th>
<th>Year 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continental river</td>
<td>80.51</td>
<td>78.37</td>
<td>77.77</td>
</tr>
<tr>
<td>Yellow River</td>
<td>51.38</td>
<td>56.14</td>
<td>66.95</td>
</tr>
<tr>
<td>Yangtze River</td>
<td>4.29</td>
<td>4.89</td>
<td>5.91</td>
</tr>
<tr>
<td>Province</td>
<td>136.18</td>
<td>139.40</td>
<td>150.63</td>
</tr>
</tbody>
</table>

**Unit: 100 million \(\text{m}^3\)**
Generally speaking, water demand for all social sectors will continue to increase in the future. In terms of different departments, agricultural use will be steady, and its share will decrease gradually. In continental river drainage area, with the progress of technology, agricultural water use will decrease obviously, and with accelerated industrialization, industrial water use will keep a strong growth momentum, and its share in total water demand will increase greatly, especially in the Yellow River drainage area. With the development of urbanization and living standards, urban civil water use will grow rapidly, and its share will increase apparently. With rising living standards in the rural areas, rural water demand will grow slowly.

It is forecasted that in 2010 and 2015, population in Gansu will reach 27.8612 million and 29.2353 million respectively, which means a reduction in water resources per capita. Rapidly growing population will put even greater pressure to the already austere water security. In 2015, water resources per capita in Gansu will be a mere 990 m³/person, lower than the international warning point of 1000 m³/person. For the three major drainage areas, water resources per capita in Yellow River drainage area is the smallest, which will be reduced to 656 m³/person in 2010 and further to 626 m³/person in 2015, approaching the 500 m³/person standard for serious water deficiency, which means greater pressure of population over water resources.

<table>
<thead>
<tr>
<th>Table 9-12 Changes in water resources per capita in the province</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit: m³/person</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Province</td>
</tr>
<tr>
<td>continental river drainage area</td>
</tr>
<tr>
<td>Yellow River drainage area</td>
</tr>
<tr>
<td>Yangtze River drainage area</td>
</tr>
</tbody>
</table>

777
unbalanced, with major water sources in Longnan, Gannan and Linxia, which boast 62% of the total. The three areas with the least amount are Baiyin, Jinchang and Jiayuguan, which produce only 0.7% of the total water. Water resource in per capita terms is highest in Gannan, with 13747 m$^3$/person, while the amount for Jinchang, Baiyin, Lanzhou and Jiayuguan is less than 100 m$^3$. Water resources per mu in Gannan is 6434 m$^3$, which is the highest in the province, while that in Lanzhou, Jinchang, Baiyin and Jiayuguan is the smallest, with 16 to 54 m$^3$ per mu.

Table 9-13 Locally generated water resources, amount per capita and per mu in different cities

<table>
<thead>
<tr>
<th>Administrative zones</th>
<th>Annual locally generated water resources (100 million m$^3$)</th>
<th>Average surface flow depth (mm)</th>
<th>Water resource per capita (m$^3$/person)</th>
<th>Average water resource per mu (m$^3$/mu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jiuquan</td>
<td>20.64</td>
<td>10.8</td>
<td>2124</td>
<td>721</td>
</tr>
<tr>
<td>Jiayuguan</td>
<td>0.01</td>
<td>0.8</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Zhangye</td>
<td>28.72</td>
<td>70.2</td>
<td>2247</td>
<td>759</td>
</tr>
<tr>
<td>Jinchang</td>
<td>0.44</td>
<td>5.8</td>
<td>95</td>
<td>33</td>
</tr>
<tr>
<td>Wuwei</td>
<td>11.35</td>
<td>34.1</td>
<td>588</td>
<td>236</td>
</tr>
<tr>
<td>Lanzhou</td>
<td>2.23</td>
<td>16.4</td>
<td>73</td>
<td>54</td>
</tr>
<tr>
<td>Baiyin</td>
<td>1.40</td>
<td>7.0</td>
<td>80</td>
<td>24</td>
</tr>
<tr>
<td>Linxia</td>
<td>12.64</td>
<td>154.7</td>
<td>653</td>
<td>363</td>
</tr>
<tr>
<td>Dingxi</td>
<td>13.73</td>
<td>70.0</td>
<td>462</td>
<td>135</td>
</tr>
<tr>
<td>Tianshui</td>
<td>15.17</td>
<td>106.0</td>
<td>436</td>
<td>189</td>
</tr>
<tr>
<td>Pingliang</td>
<td>6.74</td>
<td>60.5</td>
<td>302</td>
<td>117</td>
</tr>
<tr>
<td>Qinyang</td>
<td>7.78</td>
<td>28.0</td>
<td>303</td>
<td>78</td>
</tr>
<tr>
<td>Gannan prefecture</td>
<td>92.71</td>
<td>241.0</td>
<td>13747</td>
<td>6434</td>
</tr>
<tr>
<td>Longnan</td>
<td>68.58</td>
<td>245.8</td>
<td>2531</td>
<td>827</td>
</tr>
<tr>
<td>Province</td>
<td>282.14</td>
<td>62.1</td>
<td>1077</td>
<td>404</td>
</tr>
</tbody>
</table>

Now the province lacks 1.27 billion m$^3$ of water in all economic sectors, among which 0.3 billion is needed in Hexi continental river drainage area while 0.7 billion is needed in Yellow River drainage area. Arid and semi-arid zones in the middle of the province, represented by Dingxi and Huining have very little locally generated water resources, and some rivers have quite poor water quality, with nothing to be utilized. Yangtze River drainage area also has a water deficiency resulted from lack of water projects. Because of water deficiency, 3 million more mu of cultivated land in the province suffer from different degrees of drought, while some industrial enterprises are under big impacts from lack of water, and new industrial projects are also plagued by water deficiency. Among the 86
counties (cities and districts included), 63 are in want of water. Some towns can only provide water at the fixed time with fixed amount. Supply and demand conflict of water will exist for quite a long time.

Water development and utilization level of water in Gansu is still quite low, while that in continental river drainage area is very high. According to a report compiled by Chinese Academy of Sciences on water resources allocation, ecological environment construction and sustainable development strategy research, total water consumption for social and economic purpose in land-locked arid zones should be no more than 50% of the total water resources. The continental river drainage area is far above this level. Production use water is squeezing the amount of ecological use water, posing serious threat to ecological environment. To realize regional sustainable development, lack of ecological use water should be addressed, which is a huge threat to water security in this region.

Water pollution is another serious problem threatening water security in Gansu. Due to rapid industrial development in the recent years, amount for industrial use water has been growing rapidly, and a huge amount of industrial waste water is directly disposed to the surface water bodies without treatment, polluting the water environment seriously. Because of deteriorating water quality, development of water resources is further restrained. Things in the Yangtze River drainage area are better, but water pollution in such places as Changfeng River, Qingni River and Xihan River is also alarming due to exploitation of lead and zinc mines. Yellow River drainage area bears 74% of the exposed water water, Linxia part of Daxia River, Guanchuan River, Longxi, Wushan and Tianshui part of Wei River, part below Kongtongxia of Jing River, Qingyang part of Malian River all register a water quality of grade V or worse. In continental river drainage areas, Doufutai to Chijinxia part of Shiyang River, and trunk of Shiyang River are above grade V in water quality. Because of serious water pollution, lack of clean water in some regions is very prominent, making water deficiency an even greater problem.

According to *Gansu 11th FYP on Irrigation Development and Reform*, by 2010, there should be 380 million m$^3$ of newly added supply capacity, adding the total capacity to 14.15 billion m$^3$ and supply amount to 13.08 billion m$^3$. Farmland irrigation rate should be increased from the present 85.6% to over 91%. If the order of civil use, ecological use, industrial use and finally agricultural use is followed, irrigation rate in 2010 will only be 87%, still some way to go towards the 91% target, with a gap of 49,600 hm$^2$ farmland to be irrigated.

Water resources supply in Gansu in 2010 can basically satisfy civil, ecological and production use in 2010, and can generally realize the targets set by the 11th FYP. However, the gap between supply and
demand is still huge. If calculated by 2133.22 of effective irrigation area, then 14.3882 billion m$^3$ of water is needed, with a gap of 1.3082 billion, accounting for 9.09%. If all the area should be irrigated fully, water utilization coefficient should be increased, and net irrigation rate per unit should be reduced. If the water utilization coefficient should be lifted to 0.52, then 91% of irrigation coverage could be reached in 2010, satisfying the needs for national socio-economic development during the 11$^{th}$ FYP. If the water utilization coefficient is boosted to 0.56, then 1.42215 million hm$^2$ of effective irrigation area could be irrigated, reaching 100% in actual irrigation rate. This requires Gansu to modernize irrigation facilities and develop water saving irrigation technology.

Generally speaking, with the increase of population and development of economy and society, water security in Gansu is even more formidable. Lack of water and conflict in supply and demand will exist for a long time. If saving water through engineering technology, restructuring and demand management is practiced, water resources in Gansu could basically support a 10% economic development. However, to ensure the water demand from ecological restoration and agricultural progress is still a difficult task.

6.1.4. Regional water resources supply and demand problem

6.1.4.1. Serious water resources deficiency in Shiyang River drainage area, prominent supply and demand conflict

In 2000, exploitation rate of water resources in the drainage area was already 172%, ranking the top among continental drainage areas. Now still 1.29 million mu of farmland cannot be irrigated, underground water in Minqin Basin of the lower reaches is excessively tapped, and ecological deterioration is horrible.

6.1.4.2. Water resources in Hei River drainage area cannot meet the demands of local economic development and ecological balance

This is a major commercial grain base in Gansu, with water resources exploitation rate reaching 93.7%. Economic development has squeezed the amount of water for ecological use in the middle and lower reaches, and conflicts between middle and lower reaches are great, with water resources
difficult to meet the demands for local economic development and ecological balance.

6.1.4.3. Yellow River drainage area is limited by state water distribution quota, which is another cause for water deficiency

Yellow River drainage area allocates 3.119 billion m³ to Gansu, yet the actual usage has reached 4.33 billion m³. With soci-economic development and ecological construction, demand for water resources will further grow. Water deficiency due to state quota, lack of water resources, lack of water projects and lack of clean water will coexist for some time.

6.2. Analysis & forecast of cultivated land resources bearing capacity

6.2.1. Analysis of dynamic changes of population, cultivated land and grain output in Gansu

6.2.1.1. Analysis of the matching between population, cultivated land and grain output

During the 50 more years since the foundation of PRC, great changes have taken place in total population, arable land area and grain output in Gansu. To remove influence from different indices, the original data are transformed through formula (4)

\[ a_i = \frac{x_i}{x_0} \quad (4) \]

In this formula, \( a_i \) is the transformed number of population (cultivated land area, grain output), \( x_i \) is the total population (cultivated land area, grain output) by the end of year \( i \), while \( x_0 \) is the total population (cultivated land area, grain output) by the end of 1949.

After the transformation of total population, cultivated land area and grain output according to the above formula, indices of total population, cultivated land area and grain output have shown a trend in graph 10-8.
Figure 9-7 Changes in total population, cultivated land area and grain output from 1949 to 2005
(Source: Gansu Statistics Yearbook: 1990-2006)

Figure 9-7 shows that there are big differences in the changes of these three indices: First, grain output has been increasing rapidly in spite of fluctuations. The output in 1962 is the lowest, with only 1.9547 million tons, and that in 1998 is the highest, reaching 8.7195 million tons. In terms of five year average, average grain output during 2001 to 2005 is 3.3 times of that between 1949 and 1953. Second, total population has been rocketing. The number by the end of 1949 is 9.6845 million, while that by the end of 2005 is 26.3459 million, up by 1.72 times than 1957, registering a fast growth rate. Third, cultivated land area has been decreasing generally, but the change is divided into two phases. From 1949 to 1958, the area had been increasing from 3.3522 million hm² to 3.8291 hm² in 1958. Since then, it has been decreasing with fluctuations. The downward trend is especially obvious during 1999 to 2005, when the area decreased by 0.11 million hm² during 6 years. The area in 2005 is only 3.421 hm² (Source: Gansu Statistics Yearbook: 1990-2006. Note: the figure in National Resources Report is 4.6326 million hm²).

Gansu has insufficient backup cultivated land resources. Remote Sensing Research on Gansu Land Resources reveals that by 2004, the backup cultivated land resources in Gansu was only 0.7508 million hm², mainly deserted arable land. However, with increase of construction land, land degradation and implementation of the forest and grassland rehabilitation policy (the state provides that terraces over 25° must be returned, terraces of 15-25° should be partly returned depending on land deficiency). The decreasing trend of land area is irreversible (see Figure 9-8, source: 2006 Gansu Land Resources Report). Therefore, cultivated land resources are in no optimistic condition.
6.2.1.2. Analysis of changes in cultivated land area per capita, grain per capita and grain output per unit

Calculate the arable land per capita, grain output per capita and grain output per unit by using total population, cultivated land area, grain output and grain seeding area and transform the figures based on initial number, we can obtain the indices on cultivated land per capita, grain output per capita and grain output per unit. Figure 9-9 shows their changing trend.
Figure 9-10 shows big differences in the changing trend of cultivated land per capita, grain output per capita and grain output per unit from 1949 to 2005 in Gansu.

Figure 9-10 Changing trend of cultivated land per capita, grain output per capita and grain output per unit from 1949 to 2005 in Gansu
(Source: 2006 Gansu Land Resources Report)

Figure 9-10 shows big differences in the changing trend of cultivated land per capita, grain output per capita and grain output per unit. First, grain output per unit has been increasing rapidly in spite of fluctuations, especially after 1963. Compared with 1949, the figure grew by over 3 times in 2005 compared with 1949, reaching 215.65kg/mu. Second, grain output per capita has been growing slowly during fluctuations, with its growth rate smaller than that of output per unit of land. In 1949, the figure was 212.71kg/person, while in 2005, the number increased by 0.5 times to 317.65kg/person, far lower than the growth rate of total output. 1960 registered the lowest amount, with 161.22kg/person, while 1998 was the highest, reaching 346.10kg/person. Third, cultivated land area in per capita terms has been going downward. In 1949, the amount was 5.19 mu/person, while that in 2005 was 1.95 mu/person, down by 62.4%.

Although cultivated land area per capita is 1.95 mu, 1.31 times of the national average of 1.49 mu/person, the grain output per mu is only 215.56kg, 70% of the national average of 310 kg/mu, revealing the fact that land comprehensive productivity in Gansu is quite low. Grain output per capita is 317.65 kg/person, only 86% of the national average of 370 kg/person in 2005.
6.2.2. Analysis of changes in population, grain output and cultivated land area in different ecological zones

6.2.2.1. Changes in total population of different ecological zones

From 1994 to 2005, total population in different ecological zones has changed greatly, although at different rate. To have a better idea of the changes, total population index is calculated based on original figure, and Figure 9-10 shows the trend of change.

Figure 9-11 shows that total population growth rate in different ecological zones differ from each other. The growth rates in Gannan, Longdong and Longzhong are almost the same, increasing by 1.88, 1.79 and 1.87 times respectively in 2005 compared with 1949. Hexi ranks second with 1.51 times of growth, while Tianshui district in Longnan has the smallest growth, up by 1.06 times. Pressure of total population over cultivated land resources is different in different areas.

![Figure 9-11 Total population changes in different ecological zones](Source: Gansu Statistics Yearbook: 1990-2006)

6.2.2.2. Changes in cultivated land area of different ecological zones

In the five ecological zones in Gansu, cultivated land composition varies widely, as shown in table 9-14.

| Table 9-14 Composition of cultivated land in different ecological zones in Gansu |
|---------------------------------|-----------------|-----------------|----------------|----------------|----------------|
| type |
| degree |

<table>
<thead>
<tr>
<th>Longdong</th>
<th>Longzhong</th>
<th>Longnan</th>
<th>Gannan</th>
<th>Hexi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
<6º | 45.17% | 43.66% | 21.64% | 35.72% | 83.76%
6-15º | 25.84% | 32.34% | 24.30% | 11.87% | 11.43%
15-25º | 24.79% | 22.27% | 34.36% | 41.18% | 4.32%
>25º | 4.20% | 1.73% | 19.70% | 11.23% | 0.48%

Note: ① including terraces

Table 9-14 shows that a large part of the grain in Gansu is produced in terraces, where soil quality is low and water and soil loss is serious. Different ecological zones have wide differences from each other. In terms of gradient, land quality in Hexi is highest, with 83.76% less than 6º, next to it are Longdong and Longzhong, while Longnan and Gannan have high gradient, with 19.70% and 11.23% of the land over >25º.

Figure 9-12 Change of cultivated land area in different ecological zones (unit: 1000 hm²)
(Source: Gansu Statistics Yearbook: 1990-2006)

Figure 9-12 shows that (1) from 1949 to 1963, cultivated land area increased and then decreased, recording great changes. Since 1963, the arable land in Longdong and Longnan Tianshui decreased greatly while that in Longzhong, Hexi and Gannan bore no obvious change; (2) during 2000-2005, the arable land in Longzhong, Longnan Tianshui and Longdong went down substantially while the change in Hexi and Gannan was small.

6.2.2.3. Changes of grain output in different ecological zones
The same method is applied to grain output in different ecological zones to get grain output indices, which show a changing trend in Figure 9-13.
Changes in the indices show that from 1949 to 2005, grain output in different zones has been increasing at different rate. First, difference in fluctuations. Fluctuations are big in Gannan but small in other areas. Second, different growth rates. Gannan registers the greatest growth rate, with grain output in 2005 9.67 times than that of 1949. Growth rate in Hexi is fast, with grain output in 2005 6.14 times that of 1949. Growth rates in Longzhong, Longdong and Longnan Tianshui were the slowest. Compared with 1949, the volume grew by 1.85, 1.3 and 3.3 times respectively.

6.2.2.4. Changes in cultivated land area per capita in different ecological zones

With growing population and spiraling down cultivated land area, land area per capita has changed tremendously. Compare the data in 1949 and 2005, the changes are self evident. See Figure 9-14.
Figure 9-14 Change of cultivated land area per capita in different ecological zones
(Unit: mu/person)
(Source: Gansu Statistics Yearbook: 1990-2006)

Figure 9-14 shows that from 1949 to 2005, cultivated land area per capita has decreased a lot in different ecological zones. Longdong has the biggest decrease, with the volume down from 8.12 mu/person in 1949 to 2.59 mu/person in 2005, or 68%. Gannan has the smallest decrease of 37%, down from 2.39 mu/person in 1949 to 1.50 mu/person in 2005. In 2005, cultivated land area per capita in Longdong, Hexi, Longzhong, Longnan Tianshui and Gannan are 2.59 mu/person, 2.06 mu/person, 1.67 mu/person and 1.50 mu/person respectively.

6.2.2.5. Change of grain output per unit

Figure 9-15 Change of grain output per unit in different ecological zones
(Unit: kg/mu)
(Source: Gansu Statistics Yearbook: 1990-2006)

Figure 9-15 shows (1) from 1949 to 2005, grain output per unit has grown quite a lot. The number in Gannan increased from 45.59 kg/mu in 1949 to 152.34 kg/mu, up by 2.3 times. The number for Longnan Tianshui increased from 51.13 kg/mu to 181.01 kg/mu, up by 2.5 times. That in Longzhong grew from 46.80 kg/mu to 181.38 kg/mu, up by 2.9 times, that in Longdong, up by 2.7 times. The number in Longdong grew from 47.80 kg/mu to 176.60 kg/mu, an increase of 2.7 times and that in Hexi, up by 4.3 times from 84.88 to 448.22 kg/mu, registering the biggest growth rate. Second, grain output per unit in different zones varies widely. From 1949 to 2005, Gannan has the lowest output per unit while Hexi has the highest. In 2005, output per unit in Hexi (448.22 kg/mu) was 2.6 times the average of Gannan, Longnan Tianshui, Longzhong and Longdong.
6.2.2.6. Changes in grain output per capita in different ecological zones

Grain output per capita during 1949 to 2005 has shown the following changes: First, overall growth; Second, wide fluctuations; Third, differences in different zones in terms of total amount and growth rate. Hexi has grown quite rapidly, with Gannan, Longnan Tianshui, Longzhong and Longdong increasing a little in spite of fluctuations. In 2005, grain output per capita in Hexi, Longdong, Longnan Tianshui, Longzhong and Gannan were 522.74kg/person, 398.55kg/person, 280.43kg/person, 229.72kg/person and 142.42kg/person respectively. According to the standards of 250-300kg as poverty, 300-350kg as subsistence, 350-400kg as plenty, and above 400kg as moderate prosperity, only Hexi has reached the standard of moderate prosperity, Longdong is in the category of plenty, while all other districts are in poverty. If the standards for subsistence, moderate prosperity and wealthy are 400kg/person, 450kg/person and 550kg/person respectively (based on national per capita grain demand plan and FAO and Chinese experts nutrition plan), only Hexi has reached subsistence level, Longdong is close, while all other districts are far below the standard for subsistence.

6.2.3. Analysis and forecast of cultivated land resources in Gansu

With worsening conflicts between human beings and land, how to coordinate the two is an impressive task. Studying land bearing capacity, which is a comprehensive index for population and land in the
region, can provide basis and background material for regional economic development strategy, agricultural development strategy, and agricultural and population policy-making.

The cultivated land area in 2005 in Gansu was 3.42105 million hm², with 2.58719 hm² for grain. The total grain output was 8.3689 million tons, output per unit was 215.65 kg/mu, total population was 26.3459 million, while the grain output per capita was 317.65 kg/person.

6.2.3.1. Grain output forecast in different periods

Based on the time sequence of grain output from 1970 to 2005, GM (1, 1) model is established

\[ X_{t+1} = 20192.5e^{0.020814t} - 19780.4 \]  

(5)

Formula (5) is used to forecast grain output in Gansu for the next 15 years, see table 9-15.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total grain output</th>
<th>Year</th>
<th>Total grain output</th>
<th>Year</th>
<th>Total grain output</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>879.97</td>
<td>2011</td>
<td>976.48</td>
<td>2016</td>
<td>1083.58</td>
</tr>
<tr>
<td>2007</td>
<td>898.47</td>
<td>2011</td>
<td>997.02</td>
<td>2017</td>
<td>1106.37</td>
</tr>
<tr>
<td>2008</td>
<td>917.37</td>
<td>2011</td>
<td>1017.99</td>
<td>2018</td>
<td>1129.64</td>
</tr>
<tr>
<td>2009</td>
<td>936.67</td>
<td>2011</td>
<td>1039.4</td>
<td>2019</td>
<td>1153.4</td>
</tr>
<tr>
<td>2010</td>
<td>956.37</td>
<td>2011</td>
<td>1061.26</td>
<td>2020</td>
<td>1177.66</td>
</tr>
</tbody>
</table>

GM (1, 1) model forecasted data could be considered as a normal year output. However, grain output in Gansu fluctuates greatly every year. From 1970 to 2005, the fluctuation coefficient is +7% and -7%. The average grain output after being adjusted by ±7% is used as the output in good and bad year (see table 9-16).

Table 10-27 shows the forecast for normal year, good year and bad year. Normal year is the volume in line with the trend, and can be considered as the average for 5 years, including the forested year, two years ahead and two years after. The output of good year and bad year are the maximum and minimum amount during these 5 years, 7% higher or lower than the normal year.

<table>
<thead>
<tr>
<th>Year 2010</th>
<th>Year 2015</th>
<th>Year 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good year</td>
<td>Normal year</td>
<td>Bad year</td>
</tr>
<tr>
<td>Good year</td>
<td>Normal year</td>
<td>Bad year</td>
</tr>
<tr>
<td>Good year</td>
<td>Normal year</td>
<td>Bad year</td>
</tr>
</tbody>
</table>
6.2.3.2. Total population forecast

The "Gansu Population Development Strategy Research" devoted its first part on population research and adopted China Population Projection System (CPPS) to make projections of future population in Gansu by low, medium and high levels. This research adopts the data at medium level, as in table 9-17

Table 9-17 Total population in Gansu as in the medium level projection

<table>
<thead>
<tr>
<th>Year</th>
<th>Total population</th>
<th>Year</th>
<th>Total population</th>
<th>Year</th>
<th>Total population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2689.74</td>
<td>2011</td>
<td>2813.70</td>
<td>2016</td>
<td>2948.57</td>
</tr>
<tr>
<td>2007</td>
<td>2711.83</td>
<td>2012</td>
<td>2841.64</td>
<td>2017</td>
<td>2972.07</td>
</tr>
<tr>
<td>2008</td>
<td>2735.01</td>
<td>2013</td>
<td>2869.67</td>
<td>2018</td>
<td>2992.41</td>
</tr>
<tr>
<td>2009</td>
<td>2760.23</td>
<td>2014</td>
<td>2897.33</td>
<td>2019</td>
<td>3012.54</td>
</tr>
<tr>
<td>2010</td>
<td>2786.13</td>
<td>2015</td>
<td>2923.53</td>
<td>2020</td>
<td>3027.42</td>
</tr>
</tbody>
</table>

6.2.3.3. Forecast of the population bearing capacity cultivated land resources in Gansu

6.2.3.3.1. Identifying average consumption level

Plan I, according to land bearing capacity researches in Gansu Land Resources, the amount of grain in different consumption levels are: 250-300kg/person as poverty, 300-350kg as subsistence, 350-400kg as plenty and above 400kg as moderate prosperity.

Plan II, based on national per capita grain demand plan and FAO and Chinese experts nutrition plan, three categories are identified, which are subsistence, moderate prosperity and wealthy, with consumption of 400kg/person, 450kg/person and 550kg/person respectively.

6.2.3.3.2. Forecast of the population bearing capacity of cultivated land resources

Based on the forecast of total population and grain output, the land population bearing capacity in 2010, 2015 and 2020 is evaluated according to plan I and plan II respectively, and the normal year figure of grain output is adopted. The results are listed in table 9-18 and 9-19.

Table 9-18 Forecast of Cultivated land resource population bearing capacity in Gansu----plan I
Forecasted results reveal that in 2010, grain output bearing capacity can only meet the standard for subsistence. By the standard of plenty, there is 0.5364 million excessive population, and by the standard of moderate prosperity, there is 3.9521 million excessive population. It indicates that only low level subsistence can be ensured before 2010. The bearing capacity could reach plenty in 2015 and 2020. If evaluated by moderate prosperity, there will be 2.7038 million and 0.8327 million excessive population in 2015 and 2020 respectively.

**Table 9-19 Forecas of cultivated land resources population bearing capacity in Gansu----plan II**

<table>
<thead>
<tr>
<th>Category</th>
<th>Year 2010</th>
<th>Year 2015</th>
<th>Year 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Forecasted bearing population</td>
<td>Balance of population</td>
<td>Forecasted bearing population</td>
</tr>
<tr>
<td>Subsistence</td>
<td>3187.9</td>
<td>401.77</td>
<td>3537.53</td>
</tr>
<tr>
<td>Plenty</td>
<td>2732.49</td>
<td>-53.64</td>
<td>3032.17</td>
</tr>
<tr>
<td>Moderate prosperity</td>
<td>2390.93</td>
<td>-395.21</td>
<td>2653.15</td>
</tr>
</tbody>
</table>

Note: balance of population: + means more population can be tolerated, - means there is an excessive population already

Forecast shows that from 2010 to 2020, overloading is quite serious. Calculated by moderate prosperity standard, there will be 6.6086 million, 5.6517 million and 4.1040 million excessive population in 2010, 2015 and 2020 respectively. Different ecological zones vary widely in bearing capacity, with Longzhong, Longnan Tianshui and Gannan seriously overburdened, while Hexi still left with some room.
Section 7 Thoughts and Focus on Eco-environment Construction and Protection in Gansu

7.1. Basic thoughts

7.1.1. Ecological economy, ecological society and ecological awareness should be the three breakthrough points. The main direction should be minimization, greenization and ecologilization and delinking of economic growth from environment degradation. Efforts should be made to focus on the ecological transformation of industrialization, urbanization and modernization model, and realize the strategic transformation of ecological management from “emergency response” to “innovative precaution”. While restricting ecological environment degradation and making up for the damaged ecological system, we should also reduce and eliminate new environment damages during modernization. To this end, measures should be taken to proactively change the route dependence of traditional economic and social development; take an innovative approach for development; proactively push forward route innovation, model innovation, strategy innovation, and policy innovation; make every efforts to enhance knowledge, realize minimization, greenization and ecologicalization; combine “industrial strong province”, “develop through projects” and “poverty alleviation” with ecological improvements, resources saving and environment friendly development, so as to realize reciprocal development of economy and ecological environment.

7.1.2. In line with the requirements of Scientific Outlook on Development and “five overall planning”, we should construct a space structure of harmony between human and nature, and consolidate the relations between population, resources, environment and socio-economic development. Build an ecological network combining key ecological function area, nature conservation zones and ecological corridors, including Gannan Yellow River Water Sources Replenishment Zone, Qilian Mountain Hexi Continental River Source Conservation District and Longnan Yangtze River Water Source Conservation Zone, and rationalize ecological layout. Foster in the West Longhai-Lanxin economic belt, Lanzhou-Xining urban belt and Xi’an-Tianshui urban belt several growth polars for economic development and population concentration. Through labor division and cooperation and tapping complementarities in economic and ecological space, gradually realize the orderly, optimum and balanced development of land, and formulate major functional zones. Through transfer of payment, support public services, ecological environment protection, featured industries development and social management in key ecological functional zones and ecological vulnerable zones, so as to safeguard
regional and national ecological security.

7.1.3. Step up eco-economic system comprehensive management of the continental river drainage areas with water resources as the core. The eco-economic system management in continental river drainage area should be combined with rational utilization of water resources and drainage area ecological comprehensive management. First, based on the planned management of drainage area water resources, build a water right system, clarify water right relations, develop water right trading market, set water quota and water prices for civil, industrial and ecological use in a scientific way, apply progressive rate for water use above the quota. Within the identified water rights, the users or the districts can carry out free trading on the principle of resources compensation out of their free will and provide resources and ecological remedies to the users and districts that save water through water trading. Second, the state should provide support to Hexi continental river drainage area in terms of land rectification, industrial restructuring and industrial transformation, facilitate geographical division of labor in modern economy based on water resources, accelerate the implementation of land management strategy of “protecting the upper reaches, rectifying the middle reaches and salvaging the lower reaches”, encourage the migration of population in Qilian Mountain and deserts in north of Gansu to move to the oasis in middle reaches in an orderly way. Third, combine ecological remedy with plantation based on local conditions, protect and establish forests, shrubs, grassland and desert system in line with arid and semi-arid region ecological system. Plantation restoration should be adapted to local conditions to plant trees, shrubs, grass, or leave the land deserted according to local conditions. Do not drill for well or plant trees in deserts in an irrational manner. Fourth, combine forest or grassland rehabilitation with migration and speed up urbanization. Migrate the people living in ecological vulnerable areas and places not suitable for long term living. Through overall planning of regional development, exploit a small part of the land with high efficiency while protect a large part as well as promote concentration of population and industries.

7.1.4. Implement virtual water strategy. Virtual water strategy refers to that the countries or regions lacking water purchase water intensive agricultural products from water abundant countries or regions to ensure water and food safety. Now most oases in Hexi continental river drainage area undertake the task of providing commercial grain for the state. However, grains are high water consumption crops, 1 kilogram of grain needs 1 square meter of water. Therefore, moving grain out of this region equals to move water out of it. In order to protect the ecological environment of continental river drainage area, commercial grain production should be reduced, virtual water strategy should be phased in, industrial restructuring should be pushed forward through policy and funding remedy, and efficient industrial
system restricted both by market and water resources should be linked with optimized allocation of water resources through industrial restructuring, so that the limited water resources can be used in industries with good economic returns and low water consumption.

7.1.5. Establish a state guided ecological construction remedy system. Gansu has an important status in ecology, and ecological construction is not only related with sustainable development of the province, but also with national ecological security. However, due to backward social and ecological development, intense conflict between survival, development, competition and ecological protection and construction, and weak provincial capacity of ecological remedy, the degradation of key ecological functional zones under the threats of human activities is still a prominent problem. Therefore, the state should initiate a western ecological construction remedy policy system, which is organized by the provincial government and with wide social participation. The policy system should include laws and regulations, public finance transfer payment, key ecological projects, ecological fees and tax system and market trading system. The policy goals should be consistent with sustainable development strategy, the Western Development Program and the goal of building a harmonious society.

Form an ecological remedy basic policy framework with ecological construction remedy policy and regulations as the basis, major functional zones as the foundation, transfer payment and big ecological construction and protection projects as the channel, green GDP evaluation and eco-economic development capacity as the support. Innovate on new mechanisms and models of drainage area ecological construction remedy, encourage water right trading in Hexi continental river drainage areas, and middle reaches area should provide remedies to upper and lower reaches areas for industrial land use and excessive use of water resources. Combine “blood transfusion” remedies with “blood producing” remedies, so that the remedy recipients can really become wealthy from protecting environment. The goal of providing remedies is to step up development capacity of the backward regions, form blood producing capacity and independent development mechanism, so that external remedies can transform into their own ability for accumulation and development. Attach importance to the development of alternative industries, alternative energy, farmers’ education, recycling economy industrial zone, and ecological migration projects in the ecological environment key protection zones.

7.1.6. Promote ecological construction and protection, transform to ecological moderately prosperous
society. From the realities of Gansu, we can tell that poverty is the root to ecological destruction. The key of ecological protection lies in the rural areas, pasturing areas and forests, while the major players are farmers and herdmen. If the people are poor, ecological protection is difficult. Therefore, it is necessary to push forward ecological construction and protection as well as transformation to ecological moderately prosperous society, and implement the strategies of “ecological moderately prosperous society enriching projects”, “farming and pasturing zone intensive and high efficient development strategy”, “labor export strategy” and “village-wide poverty alleviation strategy”, so as to increase farmers’ income and upgrade their independent development capacity. Step up construction of basic farmlands and pastures, infrastructure, human and animal drinking water projects in grasslands, good quality seeding and breeding, efficient animal husbandry projects, projects of fencing off mountains and forbidding pasturing, forbidding or suspending pasturing in grasslands, and ecological migration from seriously ecological degraded areas and regions inappropriate for living. Formulate and standardize ecological migration policies, implement urbanization policies, accelerate construction of ecological friendly towns and labor intensive industries. Formulate agriculture restructuring policies in ecological vulnerable zones and poor areas, support labor export, development in other provinces, and development capacity building. Strengthen community management according to the principle of putting people first and promote the harmonious development among people, arable land, grain and ecology. Focus on management quality upgrading of nature conservation zones, instead of simple expansion in number, support the mutual construction and mutual management of communities, so that nature conservation zones, which take up 22.8% of the Gansu’s land area, can develop in a sustainable way.

7.1.7. Push forward the building of water saving society. According to the requirements of building a resource saving society, push forward water saving in production and consumption and promote the fundamental transformation of ecological growth mode through social management. Popularize the construction of water saving demonstration zones, guide the development of water saving and efficient industries based on improved farm land irrigation rate. Promote the construction of water saving society with water rights system reform as the core, and safeguard water rights for ecological system. Based on water resources bearing capacity and with water system reform as the key, build a reasonable mechanism of water saving agriculture, water saving industry and water saving society. Determine economic scales, industrial structure and layout with water as the gauge to formulate a long term mechanism of saving water. Exercise strict market quota management of water resources, set basic water quota according to industrial features, and set progressive prices for the amount above the
quota. Encourage and promote water rights transfer and trading between different economic sectors, improve water utilization efficiency and economic output, build a water saving society. Evaluate the amount of water needed for ecological safety in a scientific way, guarantee ecological water use rights, so as to ensure the restoration and security of ecological system.

7.1.8. Promote ecological construction and protection capacity building. Step up environment capacity of governments, ecological vulnerable communities and enterprises, attach importance to rational resources exploitation and spread environment protection knowledge and technology, so as to build cultural and social ecological system that can develop in a sustainable way. Combine ecological construction with enriching the people, and develop new alternative industries. Take ecological protection as the basis, human resources development, knowledge economy development, behavior model and development model transformation as the breakthrough, ecological construction and protection capacity building as the focus to promote land utilization structure optimization and ecological economic structure formation.

7.2. Eco-environment construction and protection goals

7.2.1. Short term goals (2010): strictly curb new ecological damages due to human factors and prevent ecological aggravation and environment pollution to some extent. Carry out regional ecological system health evaluation, complete provincial functional zones positioning, formulate long-term plan for ecological protection and construction, and create conditions for national key functional zones planning and policies. Make initial success in management of continental river lower reaches, Qilian Mountainous area, Gannan plateau, Loess Plateau and Longnan mountainous area, where water and soil loss desertification is extremely serious. Steadily expand pilot water saving counties, and establish a system framework or technology system for building water saving society in Hexi. Formulate ecological system comprehensive management notions, establish an ecological economic system of mountainous areas-oases-deserts in Hexi continental river drainage area, Loess Plateau small drainage area comprehensive management for creating wealth system, Longnan mountainous area featured industries development and mountainous area ecological protection system, quitting pasturing for more income and intensive animal husbandry comprehensive management mechanism. Build precautionary monitoring and protection system in key ecological regions and upgrade construction and management capacity of nature conservation zones. Develop and apply key technologies for ecological construction and restoration, build several ecological restoration and reconstruction
demonstration zones, rectify 10,000 km² of land with water and soil loss and fence off 5000 km² for ecological restoration. Push forward energy saving and emission reduction as well as clean production in key industries, effectively control water pollution in key reaches and air pollution in the urban area and obviously ameliorate environment pollution. To coordinate with ecological construction, water and soil resource protection and exploitation should be carried out in the near term:

7.2.1.1. Water resources development targets

Solve drinking water difficulty in rural areas; build water saving and pollution prevention society; strike a balance in water supply and demand; target water optimized allocation in exploitation of water resources, strengthen drainage area and regional water resources coordinated management, strengthen unified utilization of surface water and underground water, so that water resources can be developed effectively and utilized efficiently. Transform traditional water resources management to modern management and promote the harmonious development of human, resources, environment and economy. During the 11th FYP, address drinking water security problem for 3.5 million rural population, increase tap water coverage to 40% in the rural areas, ensure that 1/3 of the population without access to safe drinking water no longer have to drink water with high content of fluorine, arsenic, bitterness and salt or pollution.

Drinking water sources for rural areas are effectively protected. Management of Shiyang River and Hei River drainage area in the recent years has been quite effective. The inflow of Shiyang River Minqinqi cross section is no less than 300 million m³, the annual outflow of Zhengyixia cross section of Hei River is 950 million m³. Newly added supply capacity is 300 million m³, with a total water supply capacity of over 14 billion m³, rural and urban civil water supply reaching 1.2 billion m³ and industrial supply reaching 2 billion m³. Make every effort to realize “zero growth” of rural agricultural water consumption, increase agriculture efficiency and farmers’ income, further optimize water utilization structure. Proactively promote the construction of water saving society, and build Hexi Corridor into water saving demonstration belt, and make new progress in water saving society construction in Heidong district.

7.2.1.2. Land resources development targets

Strictly control non-agriculture land use, pay attention to land management and reclamation, renovate medium and low yield farm lands, reclaim deserted land in a rational way, guarantee a dynamic
balance of arable land; adjust land utilization structure, adapt to the needs of market economy, urban
development and ecological construction, reasonably exploit deserted mountains, Gobi and other land
resources so as to push forward the sustainable development of land resources. Add another 1 million
mu of land for irrigation during the 11th FYP, build 3 million mu of terraces, and construct 0.1 million
mu of irrigated grassland and artificial grassland.

7.2.2. Long term goals (2020): improve ecological environment apparently, formulate the basic pattern
for ecological moderate prosperity. Build a batch of ecological moderate prosperity demonstration
districts and counties, restore ecological system in places with serious land degradation; ecological
environment management projects have entered a virtuous cycle, which include protecting natural
forest, forest and grassland rehabilitation, “three north” shelter forest construction, nature conservation
zones, key ecological functional zones, wetland protection and geological disaster prevention and
management. Total amount of key pollutant emission is controlled, great improvements are seen in
urban and rural environment quality, and obvious achievements are witnessed in pollution rectification
of key rivers, including the Yellow River. Water saving agriculture in arid areas and oasis is widely
adopted, and seriously degraded grasslands are basically rectified and restored. Win-win pattern in
economy and ecology is forming.

Section 8 Countermeasures and Suggestions

8.1. Strengthen planning and management of provincial functional regions, optimize
land development protection structure

Functional region planning is strategic, fundamental and restrictive. It is the basis for geographical
layout of national economic and social development planning, population planning, regional planning,
urban planning, land use planning, environment protection planning, ecological construction planning,
Drainage area comprehensive planning, water resources planning, and disaster prevention and
mitigation planning. The provincial functional zone designing should link with the national functional
zones in positioning, policies, laws and regulations and in management. In this way, the province can
guide economic layout and population layout, so that they might accommodate to resource and
environment bearing capacity, and ecological environment deterioration might be reversed. Build an
ecological network with important ecological functional areas comprised of Gannan Plateau, Qilian
Mountainous area, Hexi Corridor and Longnan Mountainous area, natural conservation zones and
ecological corridors as the framework. Build industrial and urban systems with rational layout, coordinated structure, moderate scale, and special features, and enhance the concentration of industries and cities. Develop non-agricultural industries, find more channels for labor export, push forward ecological migration, lower the dependence of economic and social development over natural resources, and accommodate economic scale and population to resource and environment bearing capacity. Support public services, ecological environment protection, featured industries development and social management in the ecological functional zones and ecological vulnerable zones through transfer payment, so as to ensure ecological security.

8.2. Build a water conserving society & improve water utilization efficiency

Promote the construction of a water conserving society with water right system as the core, and consider it a fundamental strategy in addressing lack of water. Improve water resources management system and gradually build a water conserving mechanism with government control, market guidance and public participation, so as to promote the construction of water conserving society. Focus on water right reform based on water resources bearing capacity and build a rational mechanism comprised of water conserving agriculture, water conserving industry, and water conserving society. Determine economic scale and industrial structure according to the amount of water resources, and formulate a long term mechanism for water conservation. Evaluate the amount of water needed to ensure ecological system safety, protect water for ecological use according to the law, and in this way safeguard the safety of ecological system. Build Hexi Sunglight Green Agriculture Base with High Water Efficiency, so as to optimize water utilization efficiency and structure.

8.3. Conserve energy and reduce consumption & develop recycling economy

Strengthen industrial energy conservation, and focus on key industries including iron and steel, non-ferrous metal, coal, electricity, chemical industry and construction materials, as well as key enterprises. Promote energy saving in construction and transportation industry, guide energy saving in commercial and civil use, promote rural energy saving, develop rural household bio-gas and animal farm bio-gas project. Further push forward recycling economy pilot projects in Jiayuguan, Wuwei, Baiyin, Kongtong district of Pingliang city and Xigu district of Lanzhou city, and the recycling economy projects in resource based enterprises, including Jinchuan Company, Baiyin company, Jiugang Group, Lanzhou Aluminum Company and Liancheng Aluminum company. Strengthen
8.4. **Build an ecological protection innovation and demonstration system to enhance the technology guarantee for ecological construction upgrading**

Ecological protection innovation system includes innovation in mechanism, model, perception, technology and culture. The present technology innovation should strengthen the technology system for ecological dynamic monitoring, evaluation and early warning; technology demonstration and service system of plantation restoration in arid and semi-arid district; rectification of natural grassland ecological environment, rectification of high efficiency animal husbandry technology demonstration service system; natural forest protection and restoration technology; comprehensive management technology demonstration system in debris flow and landslide frequent zones; soil secondary salinization prevention and alkaline soil development demonstration system; water resource rational utilization and protection system and water conservation and pollution prevention demonstration system; optimization and demonstration model for arid district rain irrigation ecological system; optimization and demonstration model of oasis water conserving agriculture system; cloud water resource utilization technology; urban ecological environment comprehensive management and demonstration engineering. Focus on the combining of technology and system, model innovation and culture innovation, so as to lift ecological construction technology guarantee. Combine production development with ecological environment construction, protection and fostering resources, so as to protect the environment, facilitating economy and enriching the people with a win-win senario.

8.5. **Put people first, respect nature and promote ecological restoration and environment rectification in a scientific way**

In line with the principle of adapting measures to local conditions during ecological construction and protection, plant trees, shrubs, grass, or leave the land deserted or even as desert according to local
conditions. Plantation in arid district and semi-arid district should be fenced off for protection, and pasturing should be stopped. Districts with an annual precipitation of less than 400mm should concentrate on planting shrubs and grass, and fully utilize the self rehabilitation capacity of the grassland ecological system. Amend or improve local practices implementing the policy of forest rehabilitation, focus on the practices that are not following objective laws or local facts. Prevent disruption from development. Consider sustainable development of neighborhoods, improve ecological protection policies, and combine ecological protection and rectification with community development, so that local residents can really become the major players in ecological construction.

8.6. Protect cultivated land & strike grain supply and demand balance based on local conditions

Protecting cultivated land, especially high-quality cultivated land is the foundation for food safety. Except for Hexi district, all the other districts have very low grain yield per mu. Efforts should be made to renovate low and medium output land, further promote the transfer of the two fold structure of grain and cash crop to a three fold structure of grain, cash crop and grass, so as to enhance the comprehensive productivity of cultivated land. Consider water resources and water efficiency in a comprehensive way. Gansu should not overemphasize the self sufficiency of crops and the role of commercial grain base in Hexi, but should gradually implement “virtual water strategy” to ensure grain supply and demand balance based on local conditions.

8.7. Implement the strategy of ecological migration and salvage important ecological system in grave danger

To the special and important ecological zones that are in ecological disaster because of human factors, population should be strictly controlled, and ecological migration should be implemented to reduce population and address the problem of overpopulation and over development of water resources. The measures of ecological migration, treatment and water saving technology application should be combined to save the important ecosystems in danger. As to Minqin oasis in the lower reaches of Shiyang River, which is in serious ecological plight, the northern lake district should be completely fenced off, 1/3 of the population should be migrated out, and all the motor-pumped wells for irrigation must be shut down to gradually recover underground water and restore ecological system.
8.8. Proactively utilize cloud water resources and upgrade the level of artificial precipitation

Aridity and lack of rain is a big constraint to Gansu’s ecological construction and socio-economic development. Fully utilizing cloud water resources is an important way to increase ground water. Artificial precipitation in western mountainous region of the US and in Israel has reached good results. Since Gansu started artificial precipitation by plane in 1991, remarkable achievements have also been witnessed every year. Cloud water resources should be actively utilized by organizing more artificial precipitation in a cross region and cross season manner to increase effective precipitation every year. Launch the construction of artificial precipitation base as early as possible, establish unified guiding and coordinated operation, improve technology and standard, so as to greatly increase the effects of artificial precipitation.

8.9. Stimulate the enthusiasm of farmers in ecological construction and make them important player

Respect the willingness of farmers in ecological construction, combine top-down ecological policies with bottom-up eco-economic development, strengthen farmers’ key role in ecological construction, and enhance the construction of rural grassroots government, villagers’ self ruling system and villagers organizing committee mechanism in the ecological construction areas. Plan and allocate land resources of these zones in a scientific and rational way, standardize the contracting provisions and operation rights of land for ecological use. To address the problem of low participation of farmers in ecological construction, adopt a participation mechanism to give full play to the farmers’ enthusiasm, local knowledge, experience and skills, foster and enhance farmers’ major role and gradually increase farmers’ participation in planning. The related authorities in the ecological construction zones should coordinate with and support each other, improve remedies for ecological construction, establish a coordinated interaction mechanism and promote regional ecological construction and sustainable development of social economy. Attach importance to the farmers' capability of self remedy. Establish farmers’ associations in the ecological construction areas, and develop a routine training system with state funding, so as to enhance farmers’ skills and adaptability to the market.
8.10. Establish a coordination mechanism for the population, resources and environment departments and a long-term mechanism for ecological environment construction

Strengthen the coordination mechanism for the population, resources and environment departments; further improve environment quality target responsibility management system, and build legal and regulatory restrictive mechanism; promote the adoption of Green GDP; build community capacities in environment protection.

Section 9 Ecological Environment Policies Needing State Support

9.1. Step up national subsidy in ecological construction & increase the number of key restoration projects

Add the following as key restoration projects apart from the Yellow River water resource restoration ecological functional zones and Shiyang River drainage area comprehensive management project.

9.1.1. Add subsidy for water conserving irrigation projects. Support the irrigation facilities featured with water conservation and renovate the 15 large irrigation zones including Jingdian Project phase I, 10 medium-sized irrigation zones including Liuchuan as well as 36 small irrigation zones with a land area over 10,000 mu. During the 11th FYP, efforts should be made to build Hexi Corridor into a demonstration zone for water conservation and build more demonstration zones in Hedong. The state should provide financial support to building water saving society, and make it the fundamental and most effective strategy in solving water deficiency in Gansu. Based on the success of Zhangye in its pilot project of building a water saving society, efforts should be made to continue to promote the construction of 43 pilot counties, and focus should be placed on promoting the construction of agriculture water saving demonstration zones, high efficiency water saving demonstration zones, and promote the adjustment of agriculture plantation structure and irrigation model, so as to achieve the goal of water saving and effective utilization.

9.1.2. Increase coordinated project for forest and grassland rehabilitation. Gansu has 40.67 million mu
of cultivated land suitable for forest rehabilitation, among which 11.58 million mu are over 25 degrees, 21.84 million mu are 15-25 degrees vulnerable region, and 7.25 million mu are seriously desertified land. All these indicate the formidable task ahead. Therefore, on the one hand, we should stick to the policy of returning cultivated land to forest and grass; while on the other hand, measures should be taken to step up the coordinated projects for grassland rehabilitation. Facts have proven that the project is simple in content, with no follow-up industries fostered. According to the plan, the project should take only 8 years, but since the project involves many complicated conflicts and problems, such as production, lifestyle, culture and ethnic customs, and because the pilot counties are most state-level poor counties, there are great difficulties in providing coordinated construction, including providing drinking water for human and animals, building up animal pens, foraging grass base, popularizing high quality seed and relocation of farmers. It is suggested that the state should increase farm land, step up labor force training, non-agricultural development, animal pen construction, forage grass base building and good quality seed popularization, and provide project monitoring fees and management fees, so as to successfully realize the goal of “returning the cultivated land, stabilizing the achievement and enriching the farmers”.

9.1.3. Reduce the local share of funding in grassland rehabilitation. Because the provinces and districts implementing this project are mostly underdeveloped areas suffering financial difficulties, it is difficult for local government to pay its share of the funding. To ensure the smooth progress of the project and motivate all parties to restore the degraded grassland as soon as possible, it is suggested that the state should reduce the local share of funding in this project.

9.1.4. Increase drainage area comprehensive management projects

----Shule River comprehensive management project. Now Shule River drainage area is suffering serious salinization, wetland degradation and desertification. Some regions have already been turned into key sand sources, threatening the ecological security of Hexi Corridor and national west passage. It is suggested that Shule River drainage area comprehensive management project should be added to the 12th FYP.

----Hei River drainage area water resources development, utilization and protection project. This project aims at further consolidate and expand the effects of managing the Hei River in the recent years, and ensure the water distribution plan for the long term. Implementation of the project can further strengthen natural forest protection in the upper reaches and windbreak forest in the middle reaches, improve water conditions in the middle reaches, better guarantee irrigation, increase the
The major content of the project includes the following four areas: (1) construction of water saving society system. (2) Construction of ecological system. The Sunan county ecological project in the upper reaches include ecological construction of the pasturing forbidding zones, non-forbidding zones, forest, ecological migration and water and soil retaining project. In the middle reaches, ecological construction includes grassland rehabilitation of 0.22 million mu and fencing off 0.2 million mu of grassland in the non-forbidding zone. (3) Hei River trunk engineering system. (4) Non-engineering system construction. The total investment is RMB1.457 billion, with 1.311 billion from the central government and 146 million locally invested.

----Wei River drainage area key management project. Wei River drainage area comprehensive management project aims at addressing problems of water shortage, water and soil loss, water pollution and high risks of flooding, promoting the sustainable socio-economic development in this area, and accelerating the management and development of Yellow River. The main contents of the project include: water saving and coordinated renovation of the irrigation zones, water resource allocation project, flood prevention project, water and soil retention and water resource protection. It covers 26 counties (districts) in Gansu, with an estimated investment of RMB5.138 billion.

----Channeling Haerteng to Dang project. The project aims at addressing water shortages in Dunhuang, Subei, Akesai and Anxi, and improve local ecological environment. The water of Haerteng River mainly comes from melted snow and springs. The estimated investment is RMB980 million, among which 784 million is expected to come from the central government, 196 million from local governments.

9.2. Carry out capacity building in poor areas and key ecological functional regions and add earmarked funds for human resource upgrading

Because Gansu has a large poor area, large poor population, overpopulated land and low development capability of ecological functional zones, it is suggested that the central budget should include earmarked funds to upgrade human resources, mainly including:
9.2.1. Improve basic education and vocational education investment in the poor areas, promote the development of modern agriculture and animal husbandry, non-agricultural industries and labor export. Increase the sustainable development capability of the poor areas and key functional zones through prioritizing investment in human resources.

9.2.2. Support the neighborhood development in Qilian Mountain, Baishui River and other zones forbidden from development. Promote neighborhood mutual management of natural conservation zones and key ecological functional zones through micro credit, skill training, new energy construction in agricultural and pasturing zones, and ecological migration.

9.2.3. Encourage normal students and students with agriculture, forestry and animal husbandry majors to work in poor and remote areas. The central budget should pay for the tuition and salaries for these students.

9.3. **Support industrial transformation and resources comprehensive utilization & encourage the key enterprises and urban to develop recycling economy**

Support Baiyin, Jinchang, Yumen, Jiayuguan, Lanzhou and other resource oriented cities and resources processing oriented cities to achieve industrial transformation, provide subsidies to these cities in terms of industrial policy, energy saving, technology innovation and new industry development. Encourage the enterprises and cities to develop recycling economy.

9.4. **Support geological disaster prevention and rectification**

The focus should be the prevention and rectification of debris flow and land slide, and comprehensive environment management of the mining districts in the Yangtze River drainage area.
Reference


Regional Development of the US

ZHANG Fan
Abstract

New development theory believes that a low-growth trap is caused by the lack of sufficient initial impetus, which is the result of influence by multi-factors. California is a successfully developing state with poor natural conditions in the US. Going through two great inspirations---the Gold Rush in the 19th Century and the Silicon Valley in the 20th Century, California has developed a series of laws and systems to distribute scarce resources. Due to isolated market and the lack of free labor flow, the economy in the southern part of the US experienced a long-time stagnation, becoming a poor state in a rich country. It was a painful and long journey for the South to integrate into the institutional transformation of the national market. Market mechanism and intervention of the federal government finally put the isolation of the South to an end. By the end of last century, manufacturing cities declined, Las Vegas, the city relying mainly on the entertainment and service industry, set the way for the US cities to go. Real estate, financial support and all-round liberal legislation play an important role. Pittsburg, the former steel and iron center of the US, recently realized the industrial transformation from heavy industry to hi-tech and service industry. The experience can be boiled down to promote new and hi-tech industrialization with local universities as the center, combining with the enterprises.
This chapter will introduce the US experience in regional development, which is a revelation for the regional development in Gansu province. In the introduction, we will describe a lot about related historical development. By doing so, we aim to explain the similarities and differences between some regions in the US and those in Gansu. In this end, we must clarify the cause and effect of the US cases. Many differences between the two can be attributed to different historical paths they have embarked on. Those differences exit with their own logics. Only by keeping those differences in mind can we discover so many amazing similarities between the two.

**Section 1  Related theories**

In this sector, some latest theories of economic development related to the US cases of regional development will be introduced.

1. **1. Big Push Theory**

The initial stage of economic development plays an important role in follow-up development. If the initial driving force is powerful enough, the economy will continue developing. However, the initial stage of economic development is always full of difficulties, and it is hard to get sufficient driving force. Take the example of Gansu, because of the relatively low income level and the weak purchasing power of local residents; few enterprises would like to invest in Gansu, which aggregates the difficulties in raising the income level. Therefore, the economy can fall into a vicious cycle from the very initial stage of development, and be caught in the low-growth trap.

Many traditional theory of economic development can not explain the deficiency of initial push in development. But Big Push theory offers an explanation. It is put forward by Paul Rosenstein-Rodan. When he first raised the issue of vicious cycle in the initial stage of development, it did attract extensive attention. In 1989, Kevin Murphy, Andrei Shleifer and Robert Vishny published an essay to formulate the model, illuminating the logic of the Big Push with rigorous mathematical languages. Paul Krugman made the Big Push simple and easy in his essay in 1995, and finally transformed the Big Push into the classical model of new development theory.

A simple Big Push model assumes that labor is the only production factor. Production and labor market has two sectors: traditional and modern. The productivity and salary of the labor in modern sector are relatively high. A large amount of enterprises in modern sector entering the market will lead to higher salary of the labor and improved living standard of the whole society. While production in
the traditional sector has a constant Return on Scale, that in the modern sector has an increasing one. Let’s assume that the economy is closed, and in the initial stage, there is only traditional sector which is fully competitive. The decision of modern enterprises whether to enter the market or not is based on its own advantages in productivity and labor cost. There are three possible situations: Situation 1. Cost (refers to salary in this case) is low enough for modern enterprises to make profit, so they decide to enter the market. Situation 2: Cost is relatively high, so single modern enterprise can not make profit if entering the market alone. But enterprises can create mutual demands among themselves and get profitable if entering together. Therefore, there are two equilibriums in the Situation 2: either all or none modern enterprise enters the market. Situation 3: Cost is so high that it is impossible for enterprises to be profitable even if they enter the market at the same time, so no modern enterprise will do so. Our concern is the Situation 2, where two equilibriums might happen. Coordination failure is the cause of none enterprise entering the market. If everyone is in the wait-and-see attitude, a push from a third party is needed. Government may be the push, although the third party is not limited to the government.

The Big Push can be applied to many fields. For example: (1) investment. Higher productivity in phase 2 requires the investment in phase 1. Any investment is made for profit, which requires a large demand increase in phase 2. To realize it, a lot of enterprises need to invest at the same time in phase 1, which can never be guaranteed by the market mechanism.

(2) Urbanization. Rural economy is featured by relatively low productivity, while urbanization raises productivity and income level due to the development of manufacturing industry. However, a prerequisite for urbanization is to develop manufacturing industry. The modern industry should be established to meet the need of urban population, for example, processing crops into flour. However, processing industry is premature before the urban development, which turns into an impediment to urbanization. In this case, urbanization can only be realized when the government or foreign investors build a modern industry.

(3) Brain-drain is the reason behind deficiency of educational and training investment in some lagged-behind regions. Talents are precious in the initial stage of development; development is impossible without talents. The first step of development should be a nationwide universal and mandatory compulsory education.

In conclusion, the Big Push believes that enough driving force is needed in the initial stage of development. The initiator may be the coordination effect or synergy of various factors. Only when
the initiator is powerful enough, can development start.

1. 2 O-Ring Theory

O-Ring Theory, as put forward by Michael Kremer in 1990s, is an explanation for the formation of low-level development trap. The theory believes that tasks of modern production must be executed together for any of them is highly complementary to each other. If any of them goes wrong, the whole production may face the bottleneck as a result. The name of the theory comes from the 1986 Challenger shuttle disaster, a catastrophe caused by the failure of an o-ring seal.

The O-Ring theory assumes that production is broken down into n tasks. The skill of workers in each task can be denoted by q, 0 ≤ q ≤ 1. In order to simplify the analysis, we assume that there is only one worker in each of the two tasks in total. Then the function of O-Ring production can be denoted as F(qi, qj) = qi qj, which means that total output is determined by multiplying the output of each worker. One key feature of the production function is positive associated matching. The implication of the function is that high-skill labor will work together, and low-skill labor will do the same, because only by doing so can be most produced. We can observe this through a hypothetical four-person economy with two low skill workers and two high skill workers. The total output must be larger than that by pairing those with different skill levels. If we denote high skill by H, and low skill by L, then the equation is qHqH + qLqL > qHqL + qHqL. It turns out the same when any positive number is used in this equation.

In conclusion, under the assumption of the model, high-skill labor will be concentrated in advanced regions, and low-skill labor in less-advanced regions. In the model, each worker has an external effect over the whole society, therefore, in a hypothetical two-person production function, if the skill level of each person decreases by 50%, then the total output will reduce by 75%. Regional skill level also impacts on each worker’s incentive to improve the skill. In a high-skill region, each worker hopes to raise their own skill to the regional level. In a low-level region, there is a lack of incentive to raise individual skill.

O-Ring theory indicates the formation mechanism of low-level trap. Opening up to the outside world, e.g. external trade or attracting foreign capital, is a possible way to break the internal vicious cycle.
1. 3. Endogenous Growth Theory

According to the traditional economic growth theory, economic growth can be attributed to the interaction between external factors such as capital, labor and other production factors in the process of production. Because the diminishing marginal return of investment, economic growth will finally achieve a balanced state. The increase of growth rate is only a temporary phenomenon; the long-run growth rates of all countries tend towards convergence and will finally achieve a balanced state of zero-growth.

Traditional economic growth theory fails to explain the reality of world economic development. In fact, the growth rate of countries across the world did not tend to converge, but are quite different. In accordance with the traditional theory, comparatively speaking, the capital-labor ratio in developing countries is low, therefore, the marginal product of capital is high, and the growth is rapid. In reality, many developing countries are growing at a low rate, even at zero. Economists are trying to find the dynamism of economic growth from within the system.

Endogenous growth theory is a new growth theory since 1980s. The theory abandons the assumption of diminishing marginal productivity so that the productivity increase of different countries does not necessarily converge. Also, the theory assumes that capital not only include material capital, but also human capital. Due to the positive externality in human capital investment, the growth of production witnesses an increasing return on scale. Paul Romer systematically put forward the endogenous growth theory in series of essays from 1980s to 1990s, using rigorous mathematical methods.

The conclusions of endogenous growth theory are as follows: (1) the long-run rate of growth does not necessarily achieve equilibrium, so growth rates of different countries differ based on the different saving rates and skill levels. The stagnancy of one country may enlarge its income gap with other countries. (2) the high return on material capital investment that may exist in developing countries due to low capital-labor rate may be offset by the low human capital investment. Therefore, the increase of human capital investment may raise the return on material capital investment. The coordinated development of human capital and material capital investment can possibly benefit the society and individuals.

Section 2 California Take-off

Among US states, California is not blessed with favorable natural conditions, but is successful in
economic development. The growth of western US, represented by California, greatly changed the pattern of US economy from relying on eastern coastal areas to developing both eastern and western coastal areas. In the 19th Century, when US economy is in the trend of pioneering through the wild west, the economy of California, thousands of miles away from the advanced eastern coastal areas, triggered by incidental events and influenced by various factors, rapidly developed in a certain critical scale, as a result, California entered the mainstream economy of the US and has maintained the dynamism of sustained development. In the process of fighting for scarce resources, California set up a set of laws and systems, defining the role of each community and the government. The case will be presented in two parts: 2-4 will be focused on the opportunity, stimulation, expansion and re-stimulation of regional development; 5 and 6 will discuss about problems of resource, environment and the systems and laws formed in the process of responding to those problems, as well as the interaction between the society and the government.

2.1. Overview

2.1.1 Natural endowment and early history

California, covering an area of 410 000 sq km, is the third largest among 50 US states. Most of California is covered by mountains and desert; surrounded by the ranges is the long and narrow Central Valley; in the southern part of California is Mojave Desert. Population is concentrated along the coastal areas. Part of the ranges and deserts are not suitable for human habitation. Although mostly temperate, California suffers an arid climate and water scarcity.

California, with a population of 36 million, was the most populous state in US in 2005. It experienced indigenous stage, Spanish colonial stage, Mexico control, US take-over in 1846, and became the 31st State of the US in 1850.

2.1.2 California’s position in US economy

The output value in California was USD1.26 trillion in 2005, first among the US states. Per capita annual income in 2005 is USD32,000, 13th among all the US states.
The industrial structure of California went through continuous transformation, while the current pillar industries are agriculture, petroleum, aviation, filmmaking, tourism, real estate, etc.

| Table 10-1 Basic Situation of California (Compared with the US) in 2005 |
|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | Population      | Area            | Total output value | Per capita annual income | Per capita income rank |
|                 | (billions)      | (million sq km) | (trillion USD)     | (thousand USD)           |                           |
| The US          | 2964.1          | 9.16            | 12.40             | 30.5                       |
| California      | 361.3           | 0.411           | 1.62              | 32.2                       | 13                         |


2.2. Departure of economic development: the Gold Rush

The discovery of gold in California in 1848 started the Gold Rush, which attracted people from the east of the US and the other part of the world. That is the departure of California economic development. Incidental factors in economic growth may influence the developing procedure and pattern. The Gold Rush contributed to gathering of capital and human resources, and the coordinated effect generated thereby also boosted the rapid increase of population and investment. Labor, capital and product market in California achieved a critical scale in a short time. It is also quickly integrated into the mainstream US markets of capital, labor and product.

2.2.1 Opportunity of economic take-off

James Marshall, a carpenter, discovered gold in Sacramento East, California in January of 1848. Over years after the discovery of gold, gold rushers all over the world flooded into California. The state non-Indian population swelled from 10 thousand in 1848 to one million in 1980s. Immigrants came from all over the world, including the UK, Ireland, Australia, Mexico, South America and China. 25000 Chinese gold seekers traveled to California in 1852. (Rawls and Orsi, 1999, p5) In the first few years, gold seekers used manual labor and most gains were limited. A few years later, some people established companies, adopted mechanical production, and hired a lot of workers. The gold industry
witnessed considerable development. What is most important, the gold industry boosted a group of industries which employed a large number of workers, and set up a lot of plants, farms, stores, banks, transport and public utility companies. The companies were even more successful than the gold industry. Those successful entrepreneurs knew exactly that what is important is not gold rush per se but “seeking gold from the gold seekers”. Therefore, California didn’t limit itself to the gold industry but grow up rapidly after a gold-rush childhood.

2.2.2 Investment from the East

The development in western US relies mainly on large numbers of migrants and investment from the other regions of the US over the time, mainly the eastern areas. Large companies of the eastern part of US played a big role in the western development. Gold Rush is usually considered as the behavior of individual gold seekers, in fact, most gold rushers went to California as a company member. Many gold seekers established companies before they traveled to California. The rapid development of gold mining technology required a large scale of investment. Gold seekers established joint stock companies to raise fund, thus company rapidly developed as an organizational form. Some companies issued stocks to the public for fund, and made use of the media to attract investors. California mining companies got listed on the London Stock Exchange or the Paris Stock Exchange. Investors from New York, Boston and other countries purchased the mining companies’ stocks. By 1853, the UK investors input over USD10 million in those companies. San Francisco Mining Exchange was founded in 1862, and another 6 stock exchanges were established in 1863. Banks also developed quickly. (Jung 1999) Gold Rush is a procedure of attracting talents and capital from the east part to the west part of the US. Talents always follow capital.

2.2.3 Sell itself

Western development not only needs eastern entrepreneurship, but also self-promotion. Promotion is a prerequisite to attracting investment, a systematic program. In a sense, the US is among the first to overcome regional economic backwardness by developing tourism, and to take tourism as a critical part in the economic policy.

In the 19th century, California put forward resounding slogans: “Seeing and understanding our own land!”, “See America first!”, “American Switzerland”, “American Italy”, “The most American part of America.” Promotion changed people’s aesthetic view, and redefined beauty as the western landscape. “Have a look in the West” became a fad. Publicity was mostly undertaken by private enterprises.
Tourism became an important industry, a significant factor in creating a new economy. Some tourists changed from potential investors into real investors.

The key booster of large-scale migration is the unprecedented media report. It created a myth that each gold seeker turns into millionaire as long as they would like to bend for California is covered by gold. You could easily find books, pamphlets, maps and tour guide manuals about California. Some promotional materials were mailed to potential readers.

Thanks to competition, tourism in the West started to use the high standard of the East. Their opponents were the tourism in the East of the US and then the European one. By the modern standard, the 19th century tourism in the West already obtained many basic factors of the 20th century national tourism of the US. Many luxury hotels and cheaper boarding-houses, travel agents were built in the West. Along with the cost decrease of transport, different prices, travel program portfolios, long-distance fare reductions, family discounts, farm and factory tours were launched for various groups of consumers.

2.2.4 Conditions for Western development: Transport and legal regime

Western development is closely related with booming of tourism and railway construction. In 1950s, there were a few railway routes connecting the East of US with California; it took half a year to sail round the southern tip of South America, and 3-4 months to cross over the US from coast to coast. The Union Pacific Railroad completed in 1868 was a main artery connecting the East and the West. Large-scale promotion for the West tourism started in 1869, just before the Union Pacific Railroad was put into use.

The organizational development of company improved the legal protection of IPR. The introduction of laws about mining and resources became the foundation for the development of the mining industry. Many of the laws were set spontaneously by the gold miners in different areas. Various laws about gold mining generally regulated two requirements for gold miners to claim the ownership of one piece of land: A. be the first to discover it; B. continue working on the land.

2.3. Industrialization and Post-industrialization

California accomplished industrialization in the early 20th Century. The gathering of population and wealth created a huge market demand, which promoted California industry to expand deeply and extensively. Not only traditional industries such as manufacturing and mining industry was developed,
a batch of post-industrialized industries were also started early, and large-scale filmmaking and entertainment industry were created there. Over more than one hundred years, California industrial structure was in the process of continuous upgrading.

2.3.1 Mining of oil and other mineral resources

The mountainous area of California is blessed with rich resources. Its terrestrial and marine reserve of crude oil accounts for 15% of the national total. (CALPIRG, 1997) California ranks the third among all the US states in terms of oil products. Natural resources are a valuable endowment of production. The mining industry developed rapidly based on the tradition of gold rush. After oil was found in the surrounding area of Los Angles in 1920s, oil mining became an important industry in southern California. Rare minerals mining such as boron and mercury became the follow-up of gold mining. California government provided huge subsidies for the mining industry.

2.3.2 Aviation

Southern California is “a Detroit of the aircraft industry”. Aviation industry originated in the Eastern America, but most of the industry finally landed in the area around Los Angles. Comparing with the decline of other manufacturing industries, aviation enjoys a long-term stable development. Factors that may influence on the aviation industry include war, governmental procurement, higher education and research in the surrounding universities, labor market, etc.

California private aviation enterprises mainly adopt the make-to-order production for governmental procurement. Governmental military orders contributed greatly to the early booming of aviation industry. The expansion of civil aviation market played a key role in the sustained development of aviation products. Aircraft manufacturing industry drove the development of spare parts enterprises and promoted local employment and consumption. Aviation technology also improved the technological level of other civil products.

2.3.3 Entertainment and Film Industry

The developing step of California didn’t stop at the traditional industrialization period. When some pillar industries were in their prime time, the entertainment and film industry has already stepped onto the stage in the 20th Century of post-industrialization. Vast consumer market was the reason for
post-industrial industries to develop ahead of its time in California. It was also an important driving force for the progress of all the other industries. The large scale production stimulated specialization and high efficiency, forming its advantage on the US and global market.

Hollywood is not the birthplace of film industry, but New York is. A small hotel and a piece of land on Sunset Boulevard rented by an eastern film company in 1991 was the cradle of Hollywood. Various factors facilitated the transfer of the film industry from the east to the west of the US, for example, the importance of landscape shots (mountains, desert, and beaches) and the market of specialists and technicians.

Populous California is a huge market of entertainment industry. The market magnitude is the incentive for the fast booming of California entertainment industry. Walt Disney Company started their business with film industry, and expanded to the entertainment. The first Disney Land was built near Hollywood in the Southern California. At present, Disney was transformed into a multinational company with businesses covering filmmaking, media and entertainment industry.

2.4. The Second Booster

Silicon Valley represented the second wave of California gold rush in the 20th Century, indicating the role of technological progress in economic development. It was the second booster for California economy. Silicon Valley created a new mode combining research institutes and industries in modern times.

2.4.1 Birth and growth of Silicon Valley

Silicon Valley is the southern part of the San Francisco Bay Area in Northern California, near Stanford University. The term originally referred to the region’s large number of silicon chip innovators and manufacturers. The term “Silicon Valley” was coined by a journalist called Ralph Vaerst in a series of articles about the area in 1971. After World War II, to increase revenue and to provide employment opportunities for graduating students, Stanford University leased a part of Stanford’s land for use as an office park for high technology companies, named the Stanford Industrial Park. Hewlett-Packard (HP in short) which was founded by Stanford graduates became a successful case in the early period, and has become the largest personal computer manufacturer in the world. HP moved into the Stanford Industrial Park in 1953. Since 1970s, there were many software and internet companies in Silicon Valley, among which the most renowned with the headquarters located in Silicon
Valley are Apple Computer, Intel, eBay and Yahoo.

Silicon Valley created the mode of technology-industry Park, which mainly included the following ingredients: (1) university-industry synergy, providing regulated office-manufacturing buildings for rent around universities; (2) aggregation of human capital from universities and industrial communities; (3) favorable and open governmental policies for technological industrialization; (4) follow-up and support of venture capital. The Silicon Valley model has already bloomed and been fruitful around the world.

2.4.2 Inspiration from Silicon Valley

First of all, California has the people and tradition of entrepreneurship, the social environment and culture to start business. California people are ready to innovate at any moment. In a sense, personal computer was offspring of innovation and dedication by pc lovers, which was born out of a home garage of a high-school student. It was an excellent result of the combination of innovation and market demand. US have the organizational model of mass production, sales and service. The production line of Fort, supermarkets, and highways are good examples. In the meantime, large quantities of small workshop R&D are also an US tradition. There is no lack of precedents for Apple Computer founded by two kids. Wright brothers’ work that led to the first aircraft was done in a bicycle shop, after which dozens of small factories manufactured aircrafts over decades (Bilstein 1996, p11). A few large companies survived the competition. Things are quite similar in the automobile industry. As for the computer operation system software, there were numerous competitors against Microsoft back in 1975. Among the 19 companies which made advertisements on the magazine InfoWorld in 1979, 17 no longer exist. The only survivor except for Microsoft was MicroDoctor, a computer repairing company never involved in the software business, for which it survived. (Cringely 1992, p99-100)

Secondly, California has flexible and liberal systems. Improved financial system and venture capital provide inevitable support to small companies. The development of Silicon Valley is related to universities; at least, it grew on the margin land of universities. The policies on the land use in the surrounding area of universities are paramount to the Silicon Valley development.

2.5. Agriculture and water resource

The total agricultural output in California ranks the first among all the US states. Many kinds of agro-products are produced in California, including orange, grape, diary product, cotton, sugar beet,
etc. Because the mountainous California is in short of water resources, water solution is the prerequisite for agricultural development. Basic construction and institutional innovation are necessary to solving the water shortage.

Water resources are unevenly distributed in California. Most surface water resource has been found in the North California, for the annual precipitation in the north is above 50 inches (one inch equals to 2.54 cm), while that in the south is only 4 inches. Owens Valley in the East California is located in the edge of Central Valley; therefore, it is blessed with huge precipitation. Rivers in California can be divided into two parts geologically. Rivers in the south are mainly the Corolado River and some brooks. California’s groundwater basins store about 850 million acre-feet of water (one acre-feet equals to 43.56 cubic feet). About 30% has been used. California is the state using most of the groundwater in US. The distribution of groundwater is uneven. Most is located in the Central Valley. Overexploitation of groundwater is very severe there. (Bullock et al. 2001, (2))

Annual water demand in California is about 3.8 million acre-feet. (Bullock 2001, (7)) 80% of the water is used in agriculture, 16% in cities, 4% in entertainment and other utilities. Due to the population growth, it is estimated that the major use of water in the future will be shifted from agriculture to urban use. As a result of long-term drought in California, the water used in agriculture and urban development will have to be reduced by a large margin. In the past, the Federal and state government granted farmers with subsidies for irrigating water, which aggregated the irrational water allocation.

2.5.1 War of water resource

Water resource is the condition for agricultural development. California is in short of water resource. The metropolitan development in the 20th Century needed a large amount of water resource, which led to the contest over water resource between urban and rural areas. People fought for water resource. A series of laws and systems formed in the endless battle.

Since the beginning of the 20th Century, California built a set of large hydraulic projects including reservoirs, aqueducts, pumping station and so on, the most well-known of which are LA Aqueduct, Hoover Dam (located in the Nevada State, providing water and power to California). Those projects, funded by all levels of governments, met the water demand in urban and rural areas, but also led to environmental problems in the meantime.
Sierra Nevada The battle for water resource caused the conflict between urban and rural areas, between demander and supplier of water resource. The conflict was taken a very vehement form. Water in Los Angeles was partially originated in the Owens Valley, east of California. The valley is bounded by White Mountains and the Sierra Nevada, and belongs to Los Angeles. Owens Valley supplies water for 15 million people in LA through a 240-mile water aqueduct. The residents in Owens Valley have unremittingly fought against supplying water for LA. The idea of diverting water from Owens Valley to LA was proposed from 1904 to 1905. The idea of building dams and exploring water in large quantity was resisted by the Owens Valley residents to protect local agriculture, their home and natural environment. Their legitimate protest (including writing letters to the US president) was failed. The aqueduct project was started anyway for the benefit of the majority, and finished in 1913, without granting substantive compensation to the residents. Protest rose again in 1920s. The protesters adopted violence including occupying and bombing the Aqueduct, which rouse the attention nationwide. The court judged the protest as violating the law by force which ended it in failure. Later Los Angeles took control of most land and water resource in Owens Valley, and forced a large number of residents to leave the area. Another legitimate protest started in 1970s in the theme of environmental protection. Main local requirements were proposed in the form of litigation, and was extensively participated and supported by the government. Owens Valley survived along with Los Angeles as a small community. Agreements were achieved that LA and Owens Valley community jointly manage the Aqueduct. Owens Valley residents got some material compensation. (Walton 1992)

2.5.2 Distribution system of water resource

The distribution of water resource refers to fairly allocating scarce resources between urban and rural areas, among regions and individuals. The water resource is a paramount issue in California. The related public policies stimulated vehement arguments. In the beginning of 20th Century, the judgment on water disputes was more than any other judgment made by California court. (Bullock et al. 2001) Disputes over water resource were mainly solved through civil courts.

According to the traditional non-official rules, the rights of water users include the riparian right and the prior appropriation right. The riparian right entitles residents on the riverside the right to have free access to and use of the water without changing the direction and flux of the river or polluting it. The purpose includes irrigation, industrial use and so on. According to the rule, property ownership (e.g. ownership of houses and factories along the river) is the only determinant for the right of water use;
however, the property owners never got the ownership of the whole river(s). The riparian right was recognized by the court in 1850. The general principle of the prior appropriation right is that the first person to occupy the water resource has the most right to use that quantity of water, or first in time, first in right. If the resource is abundant, the prior appropriation right does not exclude others to use the same water resource; if water is in short, the right belongs to the first person that occupies the resource. It was a self-made rule among the gold rushers and was made a legal principle by the California Supreme Court in 1855. The riparian right and the prior appropriation right form the foundation of the California legal system of water resource. California required the prior appropriation right owner to apply for the water amount permit since 1914. People who got the prior appropriation right before 1914 were not required to do so. As a result, almost half of the water for use in California is controlled by permits.

California’s laws regulate the rights about groundwater rather late. The Supreme Court of California regulated in 1903 that the landowners had the rights to the groundwater. (Correlative rights doctrine, Bullock et al. 2001, (5)) The Court granted each groundwater user with the right to use it in 1949 (doctrine of mutual prescription, Bullock et al. 2001, (5)), and set a formula to calculate the amount of right to the use of water within five years. The water amount used declined to the safety level in five years. The problem of this doctrine is that people would use as much water as possible under the upper limit. The modern water resource in California has been formed gradually based on the folk tradition. The law formed in that way is not systematic enough; some even harm the efficient use of water resource.

Part of the California’s law on water resource is involved with the problem of irrigation. Write Act passed in 1887 authorized the establishment of public irrigation districts. The cost of irrigation equipments was covered by tax. In that way, taxpayers needed to pay the bill for irrigation works. The legislation by the California Parliament in 1992 granted farmers with interest-free loans for the irrigation works construction (the Newlands Reclamation Act). The law led to the construction of the Central Valley Project in 1930 which irrigated 3 million acres of farms and supplied water for 2 million urban residents.

Due to the importance of water resource, water agencies became the most powerful institution in California and played and important role in the California politics, which attracted various interest groups to attempt to make an influence. Metropolitan Water District and San Diego County Water Authority, among the largest water agencies, took charge of cross-region supply and transport of water
used in both urban and rural area, with multiple functions. Metropolitan Water District was in fact a water agency for Los Angeles and several other South California cities.

Since the foundation in 1928, it was a cross-region institution integrating policy-making, infrastructure construction, administration and sales. Its original mission was the administration of the Los Angeles Aqueduct. The current area under its administration covers 65% of its population. However, problems exist in the aspects of financial management and public supervision (Bullock et al. 2001).

The short of water resource requires the continuous innovation of the distribution system and legislation. Water rights transfer market was created for the rational use of water resource in California. The California laws forbid the transfer of the right to water use in the past, and caused the waste of water resource. In 1980s, California made a series of laws to promote the transfer of water resource. Governor Pete Wilson established the Drought Water Bank under the administration of California Department of Water Resource in 1991. The owner of water resource (mainly farmers) sold water resource to the Water Bank, which would sell it to consumers who needed it more badly (80% of the consumers were municipal users in South California and San Francisco), which was a more effective way to use water resource. In the practice on California water resource market, a set of laws formed to promote the normal operation of water resource market, which can be learned by other areas.

2.6. Government

2.6.1. Government growing together with communities

California developed from a barren land to thickly populated area in decades. The government formed gradually together with the growth of communities in this process. The government is the outcome of interaction between the public and the leaders of the community, and also generated from the collective behavior of society members.

Although California government was established from scratch on a piece of barren land, Californian politicians can learn from the governmental organization of the east part of the US. Similar with the other state governments of the US, the Californian government includes three branches: the executive, legislative and judicial. The executive branch is headed by the State Governor, including departments of commerce, education, environment, health care, labor, tourism and so on. The legislative branch is
bicameral, comprising the House of Representatives and the Senate. The administration of the government is based on the Constitution of California State, interpreted by the California Supreme Court, whose judges are appointed by the Governor.

(Wikipedia 2007) The California government assumes a lot of functions. California has a strong government shouldering more responsibilities than the other states in the US. In the beginning of 21st Century, California was criticized as unfriendly to business, and one of the major reasons given was that it “overregulates” everything. For instance, the California Department of Consumer Affairs has 40 separate regulatory entities that regulate over 2.3 million professionals working in over 230 different professions, including acupuncturists, barbers and hairdressers, electronic and appliance repair technicians, guide dog trainers, cemetery owners and so on. (Wikipedia 2007)

During the process of development, different conflicts occurred between the government and the public, and between governmental departments at different levels in various regions. An example is the conflict for water resource between Los Angeles and the Owens Valley residents. Although the residents resorted to violence in the conflicts, surrounded by the environment of the rule of law, both sides gradually learned in the conflict to solve problems in legitimate approaches. Through the court proceedings, media, and public discussions, the government and the public finally compromised with one another to appropriately solve problems. The government offered a number of collective actions as solutions, including following the laws and traditional rules. The government properly solved the conflicts between the public participation and the government authority.

2.6.2. Strategic choice in the development

In the process of development, the government of California made some strategic decisions which influenced development, including: investment on major infrastructure construction, establishment and improvement of water resource use system, rigid pollution treatment system, etc. California is the state suffering the heaviest air pollution in the US. As early as 1950s, California started paying attention to the air pollution caused automobile emission. California implemented the most rigid automobile emission standard in comparison with the other states in the US. (Bertney and Stevens 2004, pp111-114) Those decisions played an important role in the long-term development in the state.

In all, California is a piece of blessed land. Its development origins in strong primary inspiration and re-boost, then fully enjoys the mass effect generated from huge demand. During the development, California use the arms of law, rationally solved the distribution problem of scarce natural resources
Section 3 The Lasting Stagnation in the Southern US.

Although the Southern US is endowed with good natural conditions, its economic development remained very unsuccessful for a long time. The separation of the local economy and the national one, especially that of the labor market led to the backwardness in this area between 1860 and 1940. Due to the great discrepancy between ethnic groups, cultures, and economies, the developing model of the Southern US economy was remarkably different from that of the mainstream US economy. Civil War forced the transformation of its developing pattern. However, the transformation was extremely tough. Due to the inherent logic of the economic structure per se, the South has been long excluded from the mainstream US economy since 1860, and became the low-income in the high-income area, or the poor in the rich country. Along with the changes in economic structure and governmental intervention, the situation ended with the South merging into the mainstream economy after the WW II. With a speed higher than average national growth rate, the gap between the South and the North narrowed down quickly. It also meant that the independent economy of the Southern US finally disappeared. The case of the Southern US shows a diversion of developing path caused by external force; it is about a group of people expelled from the mainstream economy and returned after a long time suffering. Part of the case can be referred to Gavin Wright’s “Old South, New South.”

3.1. Overview

3.1.1 Natural condition and population

The Southern US can be defined by different methods geologically. In this case, it includes South Carolina, Georgia, Alabama, Mississippi and Louisiana, Arkansas, Florida, Texas and Oklahoma, and other nine states. The area is blessed with good natural conditions, fertile farmland accounting for one third of the national total, the land receiving over 1000 mm of rainfall, which accounting for two thirds of the national one. The coal and iron reserves in the Southern US are also very abundant.

In the Southern US, a considerable proportion of the population is blacks. Southern people have their own unique culture. In the history, slavery was introduced in the region, and serious conflict existed between different ethnic groups.

Compared with the North, per capita income in the South is relatively low. Since 1940s, the income
gap between the North and the South quickly narrowed down, but the current per capita income in the six southern states still ranks among the bottom 11 out of all the US states. Two of them are Mississippi and Louisiana, which ranked bottom two in 2005.

<table>
<thead>
<tr>
<th></th>
<th>population (10 thousand)</th>
<th>area (10 thousand square kilometers)</th>
<th>GDP (trillion USD)</th>
<th>Per capita annual income (10 thousand USD)</th>
<th>Per capita income rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>29641</td>
<td>916</td>
<td>12.40</td>
<td>3.05</td>
<td></td>
</tr>
<tr>
<td>Alabama</td>
<td>456</td>
<td>13.4</td>
<td>0.15</td>
<td>2.63</td>
<td>41</td>
</tr>
<tr>
<td>Arkansas</td>
<td>278</td>
<td>13.8</td>
<td>0.09</td>
<td>2.43</td>
<td>48</td>
</tr>
<tr>
<td>Florida</td>
<td>1779</td>
<td>15.1</td>
<td>0.67</td>
<td>2.98</td>
<td>21</td>
</tr>
<tr>
<td>Georgia</td>
<td>907</td>
<td>15.3</td>
<td>0.36</td>
<td>2.76</td>
<td>36</td>
</tr>
<tr>
<td>Louisiana</td>
<td>452</td>
<td>12.4</td>
<td>0.17</td>
<td>2.28</td>
<td>50</td>
</tr>
<tr>
<td>Mississippi</td>
<td>292</td>
<td>12.4</td>
<td>0.08</td>
<td>2.32</td>
<td>49</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>355</td>
<td>18.1</td>
<td>0.12</td>
<td>2.64</td>
<td>39</td>
</tr>
<tr>
<td>South Carolina</td>
<td>425</td>
<td>8.1</td>
<td>0.14</td>
<td>2.56</td>
<td>42</td>
</tr>
<tr>
<td>Texas</td>
<td>2286</td>
<td>69.1</td>
<td>0.98</td>
<td>2.96</td>
<td>23</td>
</tr>
</tbody>
</table>


3.1.2 Comparison with Gansu

In terms of natural conditions, the southern states of the US is better than Gansu, however, the two are similar in terms of the relative developing level in the whole country for a long time. The southern states of the US were excluded from the mainstream US economy, and became a subsidiary or “colonial” of the North, a de facto marginalized economy. Such a status is also similar with the position of Gansu.
3.2. The early plantation agriculture

In the history, the South and the North formed totally different economic systems. The northeastern US successfully realized industrialization, while the South maintained slavery and plantation agriculture until the end of Civil War. The southern states experienced Indigenous American period and European Colonial Period, and then became respectively part of the US.

The combination of the early plantation agriculture and slavery in the early period used to be very successful; as a result, the living standard in the South was once higher than that in the North. The early plantation agriculture included three factors: plantation, slavery and triangular trade. For a long time, the Southern US economy was dominated by plantation agriculture, which mainly produced several exotic commodities, including cotton and tobacco, for export. Before the Civil War, plantations used a lot of slaves as labor, who were the basis of large-scale plantation economy. Investment by using slaves as property is quite different from other ways of investment, because of the greater liquidity of slave property, slave owners neither cared about material capital investment, nor mining (even if gold was discovered as what happened in California, the South would never mine it), nor the development of local economy or basic construction. Due to the liquidity of plantation agriculture, slave owners did not pay attention to the protection of land resources, leading to massive water and soil erosion, which seriously affected the economy and living then and also the economic development afterwards. The railway construction in the South lagged far behind the North. In 1860, there were 62 nukes railways per 1000 square miles in the seven North States, and only 22 in the seven South States. (Wright 1996, p 22. Seven North States include Massachusetts, New York, Pennsylvania, New Jersey, Ohio, Indiana and Illinois. Seven Southern States include Virginia, North Carolina, Georgia, South Carolina, Alabama, Mississippi, and Louisiana) In 1860, the value of slaves accounted for 60% of the agricultural property in five cotton US states (Alabama, Georgia, Louisiana, Mississippi and South Carolina). (Ransom and Sutch, 1977, p19) The urbanization and industrialization process in the South was also much slower than the North.

In order to maintain the existing value of slave property, slave owners stopped the inflow of new slaves, and hoped to keep the labor market in the South relatively independent, which explained the relative isolation of the labor market and slow growth of population in the South. In terms of the natural birth rate, there was no significant difference between the North and the South, but immigrant population in the South was way smaller than that in the South. The labor market in the South is regional one, relatively independent from those in the other parts of the US.
3.3. Civil War and Lasting Post-WW II Stagnation

Civil War reflects the fundamental conflict in the US society. Civil War abolished slavery and emancipated millions of black slaves, but problems left by the slavery did not disappear. The Civil War forced the Southern US to transform from one established developing path to another. However, the structural transformation was rather tough and slow. The Southern economy had been self-isolated for a long time after the war, and the South remained a quasi nation. The economic gap between the South and the North did not narrow down but enlarged.

3.3.1 Civil War and Slave Liberation

The Civil War (1861-1865) ended with the defeat of the South. The result of the Civil War led to the abolition of slavery and emancipation of slaves. Plantation agriculture survived from the Civil War, for planters (the original slave owners) maintained land ownership. They needed to find a new form of system to handle the relations with today’s free men who were slaves in the past. The system was a coexistence of sharecropping with wage labor. Planters divided the land by sharecropping farmland and the land for wage labor to keep and farm on. Wage labor earns wages.

The Civil War caused infrastructure damage. Plantation agriculture started declining after the Civil War. The abolition of slavery destroyed the foundation of loan, which were slaves, and caused fund shortage. Wage default was common.

3.3.2 Lasting Post-War Stagnation

Lasting post-war stagnation in the South could be reflected by indices such as output value. Because the growth rate of population in the South was higher than that in the North, per capita cultivated land in the South declined while that in the North increased. A trend of splitting up occurred between the North and the South in terms of that index.

3.3.2.1. Rural Economy in the South

The economic system in the rural South transformed from slavery to an economic system combining
planters, sharecroppers and wage labors. Outputs of plantation changed from multi-products including corn to the single cash crop, cotton. The yield per unit of cotton was much higher than corn, which meant a further commercialization of agricultural production. The US cotton dominated the global market then, controlling the price on the global market. Southern farmers’ income was mainly influenced by the fluctuation of demand on the global market, instead of the increase of productivity. More cotton output may lower the global market price, and in turn impact on the income of farmers. On the meanwhile of the series of internal transformation, the Southern agriculture continued to maintain its independence.

3.3.2.2. Industry in the South

After the Civil War, manufacturing industry in the South witnessed some development, thanks to the labor flow from agricultural to industrial sectors. Significant industries included cotton processing, textile, fertilizer, coal and iron ore mining, etc.

| Table 10-3 Per Capita Manufacturing Output in Eight Southern US States |
|-----------------|------|------|
| Year            | 1850 | 1880 | 1910 |
| Ratio of 8 Southern States to 9 Northeastern States | 9.8% | 7.0% | 15.2% |


The manufacturing industry in the South is labor-intensive. There is a lack of external capital inflow. The relationship that “the North capital and technology plus the South labor” is called “colonial relationship”. The South economy could never develop without the colonial relationship. However, the South is devoid of that very relationship. (Wright 1996, p62) Not only the capital inflow is deficient in the South, but also businesspeople, entrepreneurs and technicians. In other parts of the US, e.g. California, the capital inflow was originally from the outside; after a period of talents inflowing and settling down, capital inflow quickly lost its outside identity and owned by home-state residents.
In contrast, because of the lack of labor inflow, the capital did not lose its “outside” identity.

Since the Civil War, the textile industry in the North started transiting to the South due to the cheap labor in the South. In 1900, salary for textile workers in the South was only half of that in the New England area in the North. (Wright 1996, p130) Textile industry developed in the South and North Carolina, Georgia, and Alabama since 1875. Thanks for the isolation in the labor market, agriculture and textile industry were fighting for labor, therefore, a large number of labors would return to farmland once the demand for cotton in the world market increased. As a result, the South could neither supply enough labor for the textile industry, nor obtain labor from the North market or the international market. The Southern textile industry suffered severe labor shortages after 1900. The South textile mills hired workers from increasingly distant places. Some mills drew labor from a distance of 250 miles after 1900. Some sent people to hire workers in the mountain areas. (Wright 1996, p136) Restricted by the labor shortage, the Southern textile industry developed slowly. Because it was hard to attract large investment from the North, the investment in the Southern textile industry was of small number and mainly relied on local residents. Another reason for the labor-intensive products in the South was the lack of experience of the textile workers and managers; from 1880 to 1920, textile products by the South and the North were of different level.

<table>
<thead>
<tr>
<th>Table 10-4 Employment of the Textile Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>1840</td>
</tr>
<tr>
<td>1880</td>
</tr>
<tr>
<td>4 States in the North</td>
</tr>
<tr>
<td>45 158</td>
</tr>
<tr>
<td>113 299</td>
</tr>
<tr>
<td>6 States in the South</td>
</tr>
<tr>
<td>5 206</td>
</tr>
<tr>
<td>15 013</td>
</tr>
</tbody>
</table>

4 States in the North are Massachusetts, Rhode Island, New Hampshire, and Connecticut; 6 States in the South are Alabama, Georgia, North Carolina, South Carolina, Tennessee, and Virginia.

Source: Weight 1986, p127

After 1900, salary increased in the textile industry through long-term development, and exceeded that in agriculture, forming a dual economic model featured by a separation of industry and agriculture. In 1920s, a lot of textile mills in the New England area in the North US went bankrupt, which was caused, as considered by many Northern people, by low cost and unfair competition of the South textile industry. The Southern textile industry established its position in the US domestic market. Since then, the industry started to transform to capital intensive one. Basically speaking, the role that the Southern textile industry played when the Southerners were getting rich ended in 1930s. The
long-time tariff protection on the textile market kept the cost of US textile industry relatively high, and led to the later difficulties when competed with Japan and other countries on the global market.

After 1880, the Southern mining and logging industry has considerable development. Before 1920s, the largest industry in the South was lumber and timber products. (Write 1986, p159) Up until 1920, forest resources was close to exhausted, thus the logging industry was going down. Since 1860, the Southern iron and steel industry witnessed some development in States including Alabama and Virginia, and was placed great hope. However, because of the competition in the North iron and steel industry, scarce experience of the Southern workers, relatively high cost of iron and coal mining, and the relatively small market, the Southern iron and steel industry was developing with difficulties.

3.3.2.3. Southern labor market

As mentioned above, the Southern labor market was separated from the national market. For a period of time, the Southern salary is lower than the Northern. According to statistics, from 1860s to 1930s, huge salary gap for agricultural labor remained between the North and the South. Comparing salary for agricultural labor in the Northern State Ohio and that in the Southern State Mississippi, the gap expanded from 20 cents per day in 1880 to 80 cents in 1914. (Wright 1996, p66) Some analysis showed that the gap was not caused by living expenditure, for there is no big difference in that regard. (Coelho & Shepherd 1979) The South had its own labor market, which only functioned in balancing the flow of the internal labor, and adjusting the income level of the South. At the same time, a lot of migrants came to the Northern US from Europe, which was of greater distance than from the Southern US, and formed an Atlantic labor market. More than half of the male workers in the 15 out of 19 industries in the US were born abroad from 1907-08. (Nelson 1974, p80) It not only included the labor market in the North, but also the international labor market in the Northern US and Europe. Before WW I, de facto salary in the Northern US and that in Europe were fairly close. European supply of labor (migrants to the US) was extremely elastic, changing with the US industrial output. (Phelps-Brown 1968, cited by Write 1996, Chapter 3, Note 31) The South was isolated from the market, and turned to the low-income area in the high-income country. The separation of labor market between the South and the North was not caused by geological distance, but the explanation lay in the realm of social institutions and social choices. European immigrants needed to earn as much money as possible in a short time. The long-distance labor markets operate through informal channels, such as word-of-mouth talk within ethnic groups (comparatively, maids in Beijing market came from the same county in Anhui province back in 1980s), and the information was generally accurate. The geographic
choice by migrants was a collective behavior of rational decision-making. In a crucial period of European immigrants swarming into the US, the South could hardly attract them for the low salary and decreasing cotton price. Even if immigrants entered the South, they would not stay. The favorable measures by the government and employers to attract immigrants did not take much effect, so the only way was to hire people from the place where salary was even lower. Fewer than 2% of the Southern population in the US were born overseas in 1910. (Wright 1986, p77) The birth rate in the South has been higher than that in the North. Because the increase of the birth rate was faster than that of the productivity, the South was increasingly entrapped into poverty. Before the War, the planters favored expensive labors, for which were their properties; after the War, due to the abolition of slavery, they demanded cheap labors. Since 1870, the Southern US became the low.

3.3.2.4. Colonial economy

Without its own technologies or technicians, the South could only use the external technologies, and its choice was labor-intensive ones. The textile industry did not purchase automatic machines until 1930s. Due to severe brain-drain of technicians, the Southern investment in education did not pay back; as a result, investors were unwilling to invest in it. Until 1940s, the Southern investment in education was still lower than its income level. (Wright 1986, p80)

The South developed “colonial economy”. The South bought almost all the industrial products and part of the crops from the North, so most of its infrastructure and modern industry was controlled by external capital, and profits were taken away instead of reinvested in the local area. Due to the isolation of labor market, capital inflow did not bring labor inflow. The colonial nature of the Southern economy made politicians worry about the exploitation by the North. To maintain relative independence of the South, the Southern politicians (e.g. parliaments) would not accept the financial support from the Federal Government.

3.4 Economic restructuring

After World War I, the economy of the South started going through a phase of transition from plantation economy and industrialization. This change was a result of the gradual cumulative influence of market force and the instrumentality of the federal government.
3.4.1. Gradual unification of the national labor market

The World War I greatly decimated the flow of European immigrants and drove up the demand of wood and cotton cloth. At the same time, urgent labor demand and high salary accelerated migration of black Southerners to the North. From 1915 to 1920, 500,000 black Southerners moved their homes to the North as northern factories went to the South and hired a large number of workers. The first migrating wave of laborers was mainly experienced industrial workers such as those from the iron and steel factories in Alabama, followed by a large scale of unskilled workers. This phenomenon of great migration was the first step of the process as the southern economy was integrated into the unified national market. To echo the northward migration, the South also saw its own labor force flowing into industry from agriculture.

Table 10-5 Southern Migrants in 1870-80 to 1940-50

(10,000 people)

<table>
<thead>
<tr>
<th>Decade</th>
<th>Local white southerners</th>
<th>Blacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1870-80</td>
<td>9.1</td>
<td>-6.8</td>
</tr>
<tr>
<td>1880-90</td>
<td>-27.1</td>
<td>8.8</td>
</tr>
<tr>
<td>1890-1900</td>
<td>-3</td>
<td>-18.5</td>
</tr>
<tr>
<td>1900-1910</td>
<td>-6.9</td>
<td>-19.4</td>
</tr>
<tr>
<td>1910-20</td>
<td>-66.3</td>
<td>-55.5</td>
</tr>
<tr>
<td>1920-30</td>
<td>-70.4</td>
<td>-90.3</td>
</tr>
<tr>
<td>1930-40</td>
<td>-55.8</td>
<td>-48</td>
</tr>
<tr>
<td>1940-50</td>
<td>-86.6</td>
<td>-158.1</td>
</tr>
</tbody>
</table>

Note: minus figures represent emigration out of the South.


Industrial development put pressure on the South to raise its salary (to catch up with the rest of the country). The equalization of production material prices among different areas finally exerted its influence. In the late 1930s, unskilled workers migrated to the North on a large scale as agriculture
and the land could no longer offer social security and lost farmers to opportunities from the outside. Rising salary in the South made it impossible for southern industries to absorb labor surplus in the countryside and the farmers had to leave. The massive out-migration of labor during this period was an instrumental chapter in the history of the African-American economy, and a crucial link for the southern economy to integrate into the national market.

In this context, since it was hard to benefit from the fight for independence of the South, in order to boost the economy and protect local industries and businesses, southern political leadership no longer had strong interests in regional isolation or refuse attracting federal funds to their states. The political ecology of the South made a fundamental shift.

3.4.2. Federal legislation’s role in unifying the national labor market

In the 1930s, a series of federal legislation headed by the law of minimum wage raised the minimum wage in the South, which closed the salary gap between the South and North, creating favorable conditions for the formation of a national labor market. In July 1933, President Roosevelt announced the President’s Re-employment Agreement that set the minimum wage at 40 cents per hour. In 1938, Congress passed the Fair Labor Standards Act with a special focus on the South. It stipulated that the minimum wage would increase by 5 cents annually from 25 cents per hour till reaching 40 cents (Write pp. 216-219). This act had its impact mainly on the southern workers for the salary level in the North had already risen above 40 cents. Political force in support of the minimum wage act mobilized southern workers for its passing and enforcement, while the businesses in the North, worried about the comparative advantage of the South for its cheap labor and the southward migration of northern industries, also advocated the act. Southern businesses suffered damage, but they were not putting up a successful fight because they were not united enough. In general, the law of minimum wage had a bigger impact on industries with low salaries as well as the South.

Rising salaries crushed tenant farming and the domestic system in rural areas, transforming tenants into rural laborers who received regular salary. As a result of the law of minimum wage, there were rising unemployment rates and an exodus of laborers to the North. The increase in salary brought up the costs as the minimum wage act imposed severe difficulties in front of the southern industries. Nevertheless, the majority survived.

**Table 10-6 Impact of the Re-deployment Agreement on the South and North in Terms of Salary:**

<table>
<thead>
<tr>
<th>Average Hourly Salary</th>
</tr>
</thead>
</table>

837
The federal legislation that encouraged union activities and protection of workers’ rights further drove up their salaries. By the 1940s, unions were much more active and more in numbers than the past.

The gradual cumulative influence of market force and the instrumentality of the federal government finally disaggregated the isolated southern economy in the 1940s.

### 3.5 New economy in the South

Ever since the 1940s, a new southern economy gradually took shape as it transformed from a world-oriented agricultural economy to an industrialized economy with its eyes on the domestic market. This was not an updated version of the old southern economy, but a brand new breed that effectively wiped out the previously isolated southern economy by integrating into the national market.

#### 3.5.1. Takeoff

Since the 1940s, the growth rates of the southern economy were constantly higher than the national average. The second World War provided opportunities for the South as its politicians took pains to fight for their fair share in the national defense budget. Local cheap labor dried up, and as a result, the South changed its attitude towards external investment and labor force.

### Table 10-7 Comparison of National and Southern Gross Individual Incomes

<table>
<thead>
<tr>
<th>Industry</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture</td>
<td>0.633</td>
<td>0.864</td>
</tr>
<tr>
<td>Iron and steel</td>
<td>0.617</td>
<td>0.715</td>
</tr>
<tr>
<td>Cotton and textiles</td>
<td>0.738</td>
<td>0.817</td>
</tr>
<tr>
<td>Paint</td>
<td>0.786</td>
<td>0.830</td>
</tr>
<tr>
<td>Wood</td>
<td>0.437</td>
<td>0.547</td>
</tr>
<tr>
<td>Tobacco</td>
<td>0.734</td>
<td>0.879</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>1929</th>
<th>1940</th>
<th>1960</th>
<th>1980</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>85.0</td>
<td>78.3</td>
<td>408.4</td>
<td>2298.3</td>
<td>8422.1</td>
</tr>
<tr>
<td>South</td>
<td>8.8</td>
<td>8.9</td>
<td>50.3</td>
<td>441.3</td>
<td>1791.1</td>
</tr>
</tbody>
</table>

Source: Calculated by the author based on the data on www.bea.gov.

The South includes Oklahoma, Texas, Arkansas, Louisiana, Mississippi, Alabama, South Carolina, Georgia and Florida.

After WWII ended, a Sunbelt was grown in the South. Many industries, such as electronics and aerospace, enjoyed rapid development in the warm sunlight. Individuals and the federal government invested huge amounts of money in this new economic attraction.

### 3.5.2. Labor market in the South

Laborers were emancipated from their traditional agricultural economy as farmers’ incomes kept rising. During WWII, the population of the labor force employed in agriculture was reduced by 3 million, or 22%. Shortage of rural laborers and rising salaries made it possible for women and children to seek jobs too (Wright 1996, p. 241). Out-migration of labor force compelled the South to put more focus on the education of the blacks, further alleviating racial inequality.

Agriculture was mechanized, and its ultimate realization was due to the unification of the national labor market of unskilled labor force which raised the labor costs in the South. The mechanizing process encountered enormous resistance in some areas, such as the tobacco industry where merging of the lands was strongly protest by individual farmers due to the rather small size of their farming. It wasn’t until the 1970s that agriculture finished the last chapter of this process.

Farmers who left their land poured into the cities, which helped accelerating industrialization and urbanization.

A national labor market gradually came into shape in the US, where the differences of regional salaries were basically in proportion of local living costs. A unified labor market tuned the inflow and
outflow of laborers in the South with its demand and supply mechanism. Before the 1960s, there was a net outflow of labor force from the South, but the situation completely reversed itself after that. People were moving freely in and out of the South for their own reasons.

3.5.3. Attraction of external investment

Governments and enterprises in the South adopted all kinds of measures to attract investment from the outside. Since investment usually goes hand in hand with human migration, the political map in the South experienced a fundamental shift with politicians who had been resisting external investment finally letting down their guard.

Business leaders and government officials were not selective in their ways of attracting money: lower corporate tax rates, long-term tax exemptions, establishment of hi-tech zones, etc., all as part of the new salesmanship in attracting new industry into the South. A survey showed that the expenses of printing and advertisement for development projects in Florida, Mississippi, Arkansas and North Carolina ranked respectively 2nd, 3rd, 4th and 5th among all the 31 states the survey was conducted in.

Table 10-8 State Expenditure on Printing and Advertising for Development Projects

<table>
<thead>
<tr>
<th>1950 – August 15, 1964</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount</td>
</tr>
<tr>
<td>Average of 31 states reported</td>
</tr>
<tr>
<td>Average of 9 southern states reported</td>
</tr>
</tbody>
</table>

Note: 9 southern states include Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina and Tennessee.


Long-term tax exemptions were put in place for the new manufacturing industry. Corporations invested a great deal in advertising, recruitment, building technology research centers and science parks. Corporate tax rates fell by a large margin, with their median value dropping to 13% lower than the national median after decades from 1950 to 1978 when they were 85% higher than the latter (Wright 1986, p. 259).

Since the 1940s, the South received an increasing amount of federal funds, and their proportion in the country rose as well.
Table 10-9 Comparative Federal Expenditure Per Capita

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>US nationwide</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>New England</td>
<td>103</td>
<td>124</td>
<td>112</td>
<td>109</td>
<td>117</td>
</tr>
<tr>
<td>Great Lakes</td>
<td>96</td>
<td>79</td>
<td>73</td>
<td>79</td>
<td>87</td>
</tr>
<tr>
<td>West</td>
<td>131</td>
<td>136</td>
<td>128</td>
<td>120</td>
<td>95</td>
</tr>
<tr>
<td>South</td>
<td>83</td>
<td>88</td>
<td>96</td>
<td>97</td>
<td>92</td>
</tr>
</tbody>
</table>


The southern economy had long been isolated from the national market. It was a distinct situation where production materials weren’t allowed to flow freely. This was particularly true with the labor force. Structural differences between the South and other parts of the US were the reason for the separation of the market, and they were the powerful, unavoidable legacy of history. Economic restructuring was a long, even painful process. The gradual cumulative influence of market force and the instrumentality of the federal government finally opened up the South and integrated it into the unified national market.

**Section 4 Las Vegas Entertainment, Gambling and Tourism**

Las Vegas, located in the landlocked state of Nevada, has a population of 2.42 million and massive desert areas. In 2005, the gross product of the state was 95.4 billion dollars with an income per capita at 32,800 dollars, the 15th highest in the country. Mining and transportation were traditional economic pillars of Nevada, which made it increasingly hard for the state to compete with others by the end of the 19th century.

The metropolis of Las Vegas (Clark County) had a population of 1.71 million in 2006, with an income per capita of 33,000 dollars. Since the 1930s, industries including entertainment, gambling and tourism enjoyed vigorous growth, successfully transforming the city into one of the capitals of entertainment of the US.
Las Vegas is a city surrounded by the desert, far away from any other major cities. It doesn’t have the privilege of favorable natural conditions, including high temperatures that could reach 45 degrees Celsius on a July day. Entering a car left in the sun for some time is like going into an oven, and the safety belt would burn the hands of the person trying to buckle it. Every day, hundreds of gallons of water are siphoned out of Lake Mead by power pumps to supply for the city, and the lands around it have no agricultural values at all. It is truly a human miracle to have erected a modern metropolis in such an atrocious natural environment.

<table>
<thead>
<tr>
<th>Table 10-10 Data of Nevada and Las Vegas, 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>US</td>
</tr>
<tr>
<td>Nevada</td>
</tr>
<tr>
<td>Metropolis of Las Vegas (Clark County)</td>
</tr>
</tbody>
</table>


* Data from 2004.

4.1 Early History

In the 19th century, the main production in Nevada was mining, especially gold mining. The small town of Las Vegas was a Utah-California transportation hub. Gold mines were discovered near the town in 1960, which caused a modest wave of gold rush into Nevada.

In 1905, Las Vegas officially became a city, and in 1909, it became the county seat of Clark County. At that time, transportation, storage services and trade of mining equipment were major economic activities in the city which was covered by tents and dirt roads. Gambling was legal at first, but with the campaigns by the reformists, an anti-gambling law was passed in 1910. Nonetheless, illegal gambling was still alive and well.
4.2 Loosening of legislation and Federal Advocacy

Before the 1930s, Nevada and Las Vegas had been crawling as far as their economic development was concerned. Compared to the neighboring California, they were backward and poor in many aspects. In 1920, there were only 4,859 people in Clark County. Until the 1920s, no one had ever believed this remote town with virtually no resources could embark upon a fast track of economic growth.

It was the federal government that got the economic snowball rolling for the state and the city. Actually, it was largely financially responsible for the emergence of a series of cities along the Sunbelt, such as Atlanta, Houston and Phoenix.

Two US senators from Nevada were instrumental in the forming of decision of federal funds. With the campaigning of Senator Tasker Oddie and Senator Key Pittman, in 1928, Congress passed a law to build the largest dam in the world on the Colorado River, Boulder Dam which is now the Hoover Dam. The federal government put in millions of dollars. Open, nationwide recruitment attracted a large number of workers. During the busiest period of the project, 5,000 workers were working on the construction site. As a result, the population of Clark County nearly doubled. The construction brought water, power, population, capital and consumer demand, greatly galvanizing the growth of the Nevada. The federal government paid the workers monthly salary worth 500,000 dollars which turned into tremendous consumer demand. The local government also did their part, upgrading infrastructure, providing sanitary services and building sewage and schools. Even though the federal money was used to erect another new city - Boulder City - near the construction site, Las Vegas, 20 miles from the dam, still benefited a great deal from the support. The construction of the dam stimulated local storage services and transportation, and attracted hordes of tourists as well. In 1932, 100,000 tourists visited the dam, and 200,000 traveled in Las Vegas – it seems that one needed to go through the city to reach the dam. In the 1930s, 250,000 tourists came to Las Vegas every year, but the local population was only 8,000 in 1940 (Gottdiener et al. 1999, p.10). The construction also drew a large number of jobseekers as well as investors who built many houses across the city. All these spurred the local hotel and gambling business.

Seeing the huge potential of gambling, local enterprises successfully persuaded the state house to lift the ban on gambling. The economic takeoff of Nevada and Las Vegas was rooted in the loosening of legislation. The lawmakers of Nevada had a strategy to legalize everything illegal in California in
order to draw in everything and everyone unwelcome by their richer neighbor. Actually this was a strategy to be different. Nevada temporarily amended the law banning gambling and allowed its existence. The plan at that time was to tighten the grip on gambling after the economy improved, but it was never banned again. As a result, investors began opening small casinos in the places near the dam in the city. In 1932, the first “luxury” hotel was built in the center of Las Vegas, a three-story building with the first-ever elevator in the city.

The 1930s saw the entire country in the shadow of the Depression, and Las Vegas was no exception. In the 1940s, the US entered the War, a brand new opportunity for the city because of the government’s enormous war expenses. Massive desert areas and sunny weather in the state was a dream place for the US Air Force which set up bases and aviation schools, bringing new business opportunities and demand for the state. The federal government also built a magnesium plant to the southeast of the city that hired 10,000 workers (the population of Clark County in 1940 was only 16,414). Money flowing from the federal government was crucial in Nevada’s booming economy.

4.3 Venture capital and real estate investment

The history of Las Vegas could be roughly divided into three phases: 1930s to the end of WWII, post-war period till the 1960s, and after the 1960s. If the first phase (1930s to 1945) was mainly about federal investment, the second (1945 to 1960s) was about individual investment in the gambling industry. Venture capital played an essential part in the development of Las Vegas.

Gambling was legal in California, but in 1938, Los Angeles imposed a ban on it. This forced investors to find new spots, and Las Vegas was their first choice. As a result, huge amounts of excessive funds left over from the war were moved to Las Vegas.

To evade tax and government regulations, investors chose to build their venues along the main road from the south of Las Vegas to southern California, which came to be known as the famous “Strip.” It was as if Las Vegas was sliding on the strip, about to take off. Investors were extremely innovative, and the most important creation was the resort casino combining casino operations with a large resort hotel. In 1941, Thomas Hull built the Spanish-style resort casino El Rancho along the Strip with 50 rooms surrounding the hall and the pool. In 1946, Benjamin Siegel from the local mob erected the Flamingo resort casino also along the Strip that boasted of 100 rooms, blended European-style gambling with Miami beach resorts, and brought in Hollywood movie stars with his ties in Los Angeles.
Real estate played an important part in the history of Las Vegas. Traditionally, American investment alternates between industry and real estate. After the Second World War, the shrinking of military industry drove large amounts of money into real estate, including Las Vegas. In the 1940s, there were 4 world class resort casinos along the Strip, and 4 or 5 more were built over the next decade. The nine-story Riviera was the first high-rising building on the Strip; the Dunes hosted Ali Baba/Arabian Nights; the Stardust hotel with its 1,000 rooms had the biggest neon-light that could be seen 60 miles away. State performance was imported from Paris.

Means of investment were being improved too. Howard Hughes started investing in the city since the 1960s. He bought many resort casinos within a short time becoming the biggest real estate owner in Las Vegas. He changed the ways of casino investment, introduced global investment fund and invested money from manufacturing of goods for military use and Hollywood funds.

Gambling growth offered a push for the exhibition business as well. In 1959, an independent exhibition center was built on the Strip. By 1970, it hosted 269 exhibitions on average annually, and 270,000 visitors came and spent 64 million dollars; the figures rose to 449, 660,000 and 230 million by 1980.

Before 1969, real estate investment for the most part came from sources outside mainstream industries and businesses, such as small local banks, teamster unions, criminal gangs and small entrepreneurs. That year, Nevada passed the Corporate Gaming Act that loosened the rules to permit listed companies to own casinos, which prompted large hotel chains such as Hilton Hotels to invest in Las Vegas. The law also allowed local casinos to invest in the gambling industry outside the city. The third phase of Las Vegas history was thus opened.

The 1970s and 1980s were regarded as the watershed of the US economy. Before, the economic engines were Pittsburgh, Detroit and other major cities of manufacturing, while Las Vegas riding on the back of the blossoming gambling industry was a striking exception. However, as manufacturing quickly slid down the hill during the 1970s and 1980s, those former engines ran into high hurdles and they had to be forced to shift gears to diversity and services (See Chapter V). Las Vegas became the epitome of what metropolises should become in the future.

Along this transitional process, many major American conglomerates divert their investment from manufacturing to a broad spectrum of services including gambling. Heavyweight hotel chains such as Hilton Hotels began pouring their money into Las Vegas, propelling the gambling business to a
resort-entertainment industry with rich and colorful services. In 1987, Americans splurged 210 billion dollars on gambling (Holmstrom 1993, p. 8). Participation of conglomerates brought new development, as real estate developers racked their brains to create new attractions in the form of resort casinos that kept growing larger and taller. Stepping into the grand hall of the 3,000-room, 29-story hotel/casino Mirage, and one would feel as if one suddenly took a journey into the tropical rain forests, with a volcano that erupted every 15 minutes outside the gate. The hotel/casino Excalibur started in 1990 boasted of 4,000 rooms, the largest size in the world at that moment. This Mediterranean-style hotel drew in 11 million tourists in its first year. The Luxor Hotel was a pyramid built after the capital of ancient Egypt with a 10-story tall Sphinx and the hanging gardens of Babylon. 9 Boeing 747s could be crammed into the pyramid. The MGM Grand opened 1993 had 5,000 rooms, taking the number one spot in the world. It consisted of 4 30-story buildings, a 270,000-square-foot exhibition center and a 5,000-seat stadium. The New York New York Hotel & Casino moved the city of New York, Statue of Liberty, Brooklyn Bridge and the Stock Exchange to Las Vegas. The restaurants of Bellagio invited world-famous chefs from the most renowned restaurants across the globe. The Venetian Resort, Hotel and Casino even built a canal through the entire compound with gondolas shuttling up and down the man-made river.

Starting from the 1990s, the gambling industry in Las Vegas adopted diversified financing strategies. 1) Joint ventures, where different companies pooled their money to develop a project. For example, Monte Carlo Resort & Casino had its compound provided by the Mirage, financially supported and designed by Circus Circus. 2) Corporate collateral financing. The Mirage followed this model and built the 3,000-room, 35-story Italian-style Bellagio. 3) Real estate investment trust. This is mainly carried out by small investors, where corporate income tax could be exempt provided 95% of the income was paid as dividends. 4) Junk bonds. This was a low-credit-rating, high-risk thus high-yield bond, which used to be the main model for the financing of the Mirage in the 1980s.

4.4 Government roles

As stated above, federal funds in the 1930s were crucial in the initial takeoff of Nevada and Las Vegas and created the first wave of tourists for the gambling industry. With the push from the federal government, gambling-tourism became Nevada’s economic pillars.

Local policies also played an important role in the development of Nevada and Las Vegas. The
legislation and regulations of the gambling industry in the state was looser than most other states in America, and most counties in the state didn’t have a tight grip on adult services either. All these conditions attracted great numbers of people to move or travel to Nevada.

The state also had looser laws on enterprises and financial institutes than most states. Tax laws in Nevada were drafted with an aim to attract residents and companies. It didn’t impose personal income tax, corporate income tax or inheritance and gift tax. Compared to California, Nevada was fostering a much favorable investment climate.

<table>
<thead>
<tr>
<th>Tax</th>
<th>California</th>
<th>Nevada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate income tax</td>
<td>8.84%</td>
<td>None</td>
</tr>
<tr>
<td>Personal income tax</td>
<td>1.0-9.3%</td>
<td>None</td>
</tr>
<tr>
<td>Payroll tax</td>
<td>1.5%</td>
<td>0.63%</td>
</tr>
<tr>
<td>Real property tax</td>
<td>1.1%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Franchise tax</td>
<td>Yes</td>
<td>None</td>
</tr>
<tr>
<td>Capital gains tax</td>
<td>Up to 9.3%</td>
<td>None</td>
</tr>
</tbody>
</table>


The loose legal regulations in Nevada and Las Vegas stirred up a great many controversies. People were worried that they would encourage criminal activities. The state has long been trying to reinforce the rule of law and exterminate crimes.
4.5 Problems arising from rapid urbanization

Las Vegas was a city built from scratch in the desert, and the population in the metropolis soared from tens of thousands to above a million within 70 years. Many problems arose during this process, creating various disputes and conflicts among different interest groups.


Since the corporate world, especially gambling, brought huge profits for the city, the government was putting most of its focus on economic growth and feedback from the enterprises while neglecting the interests of the residents. In some way, gambling was in control of the politics in Las Vegas. The local population cared more about transportation, education, tax, crime and other problems near their daily life. They were complaining that the gambling business jammed the traffic and tried to squeeze more students into local schools than they could handle, and they opposed the plan to open up new casinos near the residential areas. “Who pays for the growth?” this question was the center of the debates. Every group had their own answers. To catch up with the rapid urbanization, infrastructure construction needed an enormous amount of money. Real estate developers supported financing the projects with sales tax, but owners of casinos and resorts voiced their opposition due to their own concerns.
The municipal government gradually came into shape following the economic development. The bureaucratic structure and size often couldn’t keep pace with the fast growth. Traditional creeds of the state tried to put a limit on the size of the government, and as a result, the mayor and city council members were part-time elected officials. For example, in 1998, the council member representing the 1st congressional district was a police officer, and it was a real estate agency clerk for the 2nd and a barber for the 3rd; only the 4th had a full-time council member. The then mayor Jan Laverty Jones was also a part-time official. For a large metropolis like Law Vegas with a population above one million, such a part-time administration wasn’t able to satisfy the needs in many aspects. This part-time system also involved conflict of interests between the public and private enterprises (e.g. whether the mayor represented the city or the company he/she worked for part-time). This particular problem causes widespread concerns and consequent discussions (Gotttdiener 1999, pp. 258-259).

4.6 Conclusion

Since the 1980s, the US economy went through a process of de-industrialization as many cities (such as Pittsburgh and Detroit) relying on manufacturing slid into recession. The previously striking exception that was Las Vegas supported by entertainment and services became a shining beacon for all other cities in their future development, many of whom began loosening controls of gambling. In a certain sense, the US was imitating Las Vegas, or increasingly Las Vegas’ sized. From the history of the city, the following conclusion can be drawn:

First, services instead of manufacturing became the first industry choice as labor costs rose.

Second, real estate development was instrumental in building a services-oriented city.

Third, financial support for real estate investment was essential. Before 1969 when the Corporate Gaming Act was enacted, funds mainly came from non-mainstream industries. It was only after that year that big corporations became major investors in gambling.

Nevada was a special case where a small backward sate adopted the strategy to be different as it endeavored to leverage its regional advantages in order to catch up. Nevada’s strategy was most unique in its all-round loose legislation. In order to attract tourists, residents and investment, the state passed laws much tolerant than most states ranging from enterprise, financial institute regulations to
Section 5 Pittsburgh’s Transformation from Resource-Intensive to Hi-tech

The city of Pittsburgh is located in the mountainous state of Pennsylvania in the northeast region of the US. In 2005, the state population was 12.43 million, and its gross product was 490 billion dollars, or 30,800 dollars per capita, the 18th highest in the US. Pennsylvania’s economy took off early and its main power engines were agriculture, mining and manufacturing, resource-intensive coal and steel industries in particular.

Pittsburgh is the second biggest city in the state, after Philadelphia. It resides in the southwest part of the state, and its population in 2006 was 310,000 and 2.39 million in the entire metropolis. In 2004, the annual income per capital of the metropolis was 34,700 dollars and 20% of the population was living below the poverty line.

<table>
<thead>
<tr>
<th>Table 10-12 Data of Pennsylvania and Metropolis of Pittsburgh, 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
</tr>
<tr>
<td>(10,000 people)</td>
</tr>
<tr>
<td>US</td>
</tr>
<tr>
<td>Pennsylvania</td>
</tr>
<tr>
<td>Metropolis of Pittsburgh</td>
</tr>
<tr>
<td>Pittsburgh</td>
</tr>
</tbody>
</table>


* Data from 2004.

5.1 Old industrial structure centered on iron and steel

Pittsburgh became the center of US iron and steel industry towards the end of the 19th century. It was the home to the headquarters of the largest steel companies such as the Carnegie Steel Company and
US Steel Corporation. During the first half of the century, enormous amounts of iron, copper, tin and glass were produced by the city. The growth of the metallurgy industry helped the enlargement of the city, drawing in a great number of immigrants from Europe. In 1875, Andrew Carnegie established a steel production factory J. Edgar Steel Works which would become the Carnegie Steel Company in 1892. America’s steel production surpassed Britain in 1889, and two years later J.P. Morgan and Elbert H. Gary bought it and merged it with Federal Steel Company to form the United States Steel Corporation. Railway corporations not included, it was the largest company then in the world, owning 213 manufacturing factories and 41 mines. In 1901, US Steel’s steel production accounted for 66% of the total in the country and 30% in the world. In 1911, Pittsburgh’s production of various steel products took up one third to half of the nation. The booming steel industry lit the entire city with flames and think smoke that choked its population. During WWII, the city produced 95 million tons of steel. Workers in manufacturing centered on steel were enjoying high salaries.

The expansion of heavy industry wiped out other ones and made Pittsburgh’s economy dangerously monotonous, relying only on one industry for survival. Worldwide recession of heavy industry during the 1970s and 1980s raised the salary and costs, and the US was facing fierce competitions from Europe and Japan. It collapsed almost instantly. Factories were closed. Workers lost their jobs. 150,000 were fired from the steel industry in 1981-1982. The crash, plus the migration from the urban areas to the suburbs, shrank the population of the city of Pittsburgh which fell by 50%.

5.2 Transition to hi-tech and diversity

Faced with extreme economic obstacles, the city government and business leaders were forced to take drastic measures as they embarked upon a long, winding road of industrial transition. At the federal level, policies of tax deductions and competition incentives in the 1980s by the Reagan administration created a favorable external environment for all kinds of SMEs in the city; and at the local level, local government offered tax incentives and financial support to SMEs, especially those in the hi-tech industry.

Pittsburgh took great pains to achieve industrial transformation from a monotonous structure to diversity. Today, it boasts of booming industries such as hi-tech, medical care, education, tourism and finance, the most famous being robotics. Steel factories are nowhere to be found today, but manufacturing remains a crucial pillar of the economy, only that it is no longer the only industry in the
city. At the moment, private companies with the largest employee numbers are the Medical Center of University of Pittsburgh (26,000) and University of Pittsburgh (11,000).

The city’s hi-tech industry has basically come into shape. Compared to 5 other similar cities (Baltimore, Indianapolis, Phoenix, Seattle and St. Louis), even though Pittsburgh is low in terms of employment and production of the hi-tech industry, there is an encouraging sign seen in the high growth rate of the industry’s gross product.

<table>
<thead>
<tr>
<th>Item</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hi-tech employment (10,000 people)</td>
<td>6.27</td>
</tr>
<tr>
<td>Percentage of hi-tech employment of the total</td>
<td>6.4</td>
</tr>
<tr>
<td>Hi-tech GDP (100 million dollars)</td>
<td>75</td>
</tr>
<tr>
<td>High-tech productivity (1990 as the base)</td>
<td>112%</td>
</tr>
<tr>
<td>Overall productivity (1990 as the base)</td>
<td>44%</td>
</tr>
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</table>


5.3 Commercialization and manufacturing of scientific and technological achievements centered on universities

The lift cycle of a product falls into phases including development, commercialization, manufacturing and sales drop. For new products, the crucial link lies in the phase of commercialization of research fruits. New knowledge is the basis of the hi-tech industry, and universities and research institutes are the production bases of new knowledge, which dictates that the growth of the industry must be centering on those organizations, carriers of new knowledge. Commercialization of research achievements is crucial for new knowledge to serve society and realize self-fulfillment.

The industrial transition of Pittsburgh provides a valuable success story, where universities and research institutes led the hi-tech industry with their knowledge as they gradually integrated themselves with local enterprises the speed up the pace of commercialization and manufacturing of the hi-tech industry.
There are several universities in the city, the most renowned being Carnegie Mellon University and University of Pittsburgh. The former is one of the top science and engineering schools in the country. A list by *US News and World Report* ranked its engineering doctoral program the ninth in the country and its computer engineering the second. The college website reports that more than 70 new companies in the Pittsburgh region were based on the research by the faculty and students. The latter is well-known for its life sciences research, prestigious in virus research and organ transplantation. Professor Thomas Starzl is revered as the “father of organ transplantation.”

Pittsburgh is also a place where many major corporations are based. 7 out of the Fortune 500 companies have their headquarters in the city, a key force in the commercialization of local hi-tech research. Among these seven, one has incomes higher than the average value of the top 500 companies in the country, and four higher than the national median. Alcoa ranks 86th and US Steel 209th. These major corporations with their powerful research capacity are also playing a key role in the commercialization of research achievements.

The city government took a series measures to accelerate the process for schools and enterprises. The industry and business development center of the city development authority increased financial support and services, including: 1) loan programs for small business, namely gap financing by working in conjunction with private equity; 2) management assistance, such as helping make business plans, financial programs, and support for the business by leveraging the center’s large network (including with universities); 3) professional services by the hi-tech development zone for businesses within the zone, including tax deductions and low-interest loans.

Visible achievements of the commercialization process can be seen in the fact that the numbers of patent filed and issued are among the highest in 5 similar cities (metropolis area), second only to Baltimore (where Johns Hopkins is). From 1996 to 2003, Pittsburgh’s patents files kept increasing, while patents issued had been growing before 2001 and dropped ever since. Among 6 cities, Pittsburgh has the third biggest research budget. However, its percentage of investment at early stages is 64%, the highest of them all.

<table>
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<tr>
<th></th>
<th>Pittsburgh</th>
<th>Baltimore</th>
<th>Indianapolis</th>
<th>Phoenix</th>
<th>Seattle</th>
<th>St. Louis</th>
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<tbody>
<tr>
<td>University patents filed</td>
<td>917</td>
<td>3024</td>
<td>342</td>
<td>512</td>
<td>874</td>
<td>532</td>
</tr>
<tr>
<td>University patents issued</td>
<td>366</td>
<td>717</td>
<td>154</td>
<td>101</td>
<td>335</td>
<td>349</td>
</tr>
<tr>
<td>University research budget</td>
<td>45</td>
<td>112</td>
<td>20</td>
<td>5</td>
<td>49</td>
<td>30</td>
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<td>(100 million dollars)</td>
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<tr>
<td>University investment at early stages</td>
<td>64</td>
<td>50</td>
<td>13</td>
<td>17</td>
<td>51</td>
<td>14</td>
</tr>
</tbody>
</table>


Despite the huge progress, the city’s transition to a hi-tech economy is still incomplete with bumps along the road. Pittsburgh hasn’t been able to prevent massive out-migration, seen in the shrinking of population even in recent years. Compared to other cities, Pittsburgh still lags behind the country in terms of hi-tech assets and businesses.

The case of Pittsburgh’s transition explains: 1) with rising labor costs, outdated technology and depreciating equipment, heavy industry might lose its competitive advantages unless it grasps the opportunities to make a transition; 2) it’s risky to have the local economy dependent on only one industry while the risks might be averted with diversity; 3) modern hi-tech industry is based on knowledge, and universities and research institutes are the carriers of knowledge; high-tech must center on the universities integrated with enterprises based on the theory of the product life cycle in order to plan and realize the commercialization of hi-tech research.
Section 6 What We Learned from the American Experiences

China is distantly different from the US in natural conditions and economic structure, making it hard to find a state or region in the US that has similar situations with Gansu. The US possesses rich natural resources and a comfortable population density on average. Its current economic map is the evolution result of the American history. Gansu, on the other hand, is at the other end of the world from the US in terms of meager resources, heavy population burdens and a quite different social institutions and culture. It’s impossible for the inland province to tread the same path the US has walked on. Actually, it’s almost impossible to find an almost identical case in world history with Gansu. Nevertheless, different cultures and historical paths still have a lot in common. The US is as diversified as it is vast, there’re many things that can be found in Gansu. We need to identify and pay equal attention to the similarities and differences between the two sides. The American success stories are not universal, but they are unique references as long as we bear the differences in mind.

California’s economy took off fast, utilizing all the factors in harmony and successfully breaking into the mainstream economy. In the case of the South, economic transition moved at a slow pace due to institutional hurdles, making it difficult to enter the national market. Las Vegas got on a fast track by developing entertainment, tourism and gambling. And Pittsburgh transformed from resource-intensive manufacturing to diversified hi-tech industries. From all these cases following points can be drawn.

- Natural conditions are important, but not defining for economic development. When the South was in the shadow of slavery, even if gold mines were discovered, no one would be interested since what people only cared about was the slaves as their property. Economic structure, particularly those of the labor, capital and product markets exert a huge influence on the trajectory of the economy.
- California’s economic takeoff owed it to accidental stimulants and media campaigns. If initial stimulation can push the accumulation of labor and capital to a certain level with all factors functioning in harmony, the economy is able to integrate fast into the national market as it enjoys the scale effect of labor, capital and the product market. Media campaigns amply the initial momentum and they are a key business that shouldn’t be neglected.
- The uniqueness of the economic structure and especially the labor market in the South had long been isolating itself from the national market, which is the fundamental reason the southern economy suffered from an insistent stagnation where production materials couldn’t flow freely. During a certain stage in history, the North had closer ties with Europe than with their southern compatriots as they formed a transatlantic labor market while the South shut itself out. In this sense, the economic
territories of the US were for a long time didn’t include the South that wasn’t considered America. However, the only way to develop southern economy was for it to join the national market, which it finally did, thanks to the gradual evolution and federal instrumentality with the massive out-migration of labor force as the final blow. The economic history of the South is a reverse case that proves institutional transition will stagnate if elements of production cannot be coordinated enough to give the economy the first push.

- Las Vegas adopted loose policies to develop tourism and services in a city erected from scratch in the desert. After manufacturing declined, the city represented the new direction of American urbanization towards services, especially entertainment/tourism.
- Pittsburgh transformed from a capital of resource-intensive manufacturing to a diversified city featuring hi-tech and services. The most important story of this case is that commercialization of new technology is based on universities, the carrier of new knowledge.
- Economic trajectories in different regions of the US paint a picture of fierce competition. The paths taken basically determined the current situations. The choices now were born by the ones in the past, and the correct ones now will benefit the course tomorrow. However, development needs innovation as it sheds the shackles of history and path dependence for a brighter future.
Reference


Regional Development of Australia
Best Practice in Regional Economic Development
Abridged Version
An International Perspective

Robert Miles
Abstract


The report is structured to encompass: best practice principles that have emerged from global research, the contextualisation of regional economic development in Australia and Gansu Province and government roles in facilitating sustainable regional development. Case studies covering the economic, social and environmental dimensions are included with each section of the report having its own summary and key learning’s.

Best practice principles are discussed to gain a better understanding of the key inputs that make regional economic development successful. As these systemic issues are raised repeatedly in global research they are regarded as underpinning prerequisites for sustainable regional development.

The key learning’s draw significantly on a Triple Bottom Line approach that involves the reporting of social, economic and environmental outcomes against benchmarks that clarify governance structures, identifies problems and informs development of practical, achievable goals that identify the needs of stakeholders and improves the government’s ability to promote economic development.

Regional economic development requires a world class investment environment and the support of research and development into factors that attract businesses such as a flexible labour market, switched on management, a positive investment cycle, and competitive infrastructure (hard and soft).

As seventy per cent of investment comes from businesses within a region, policies should proactively support the three main types of growth generating businesses; existing business that exhibit growth potential, relocating and expanding businesses that have identified the regions potential for growth, and new start-up businesses.

Regional connectivity is seen as a global driver whereby diverse regional economies out perform robust technology sectors. International interdependencies of firms in clusters and regional communities and a multicultural population generate new energy and ideas and perspectives in society. Connectivity is dependent however on high quality and reliable telecommunications, airports, seaports, transportation and efficient cross regional social, cultural and economic exchange.

Practical approaches to regional economic development include strengthening well placed infrastructure, implementing legal and institutional changes, enhancing existing assets and industries including leveraging economic “anchors”, reducing economic
leakage from regions and develop industry/business networks and clusters to generate enhanced competitiveness in a global economy.

Regional liveability and lifestyle importantly attract and retain good quality professional and technical staff. Quality housing, vital regions with good neighbourhoods with access to transport, a wide range of soft infrastructure that supports liveability, community connectedness and lifestyle are critical determinates. Improvements to human capital through education directly contribute to increased productivity and economic growth.

Good governance which shifts the traditional government focus to a role of change agents of attitudinal and behavioural vision to provide leadership and vision with a view to increasing skills, education and training, embracing technological change and the development of critical infrastructure is preferred. Governments should become more flexible, transparent and business-minded to facilitate network development, leadership and entrepreneurial growth. This would facilitate better communication between businesses, governments and communities to manage the transition induced by global trends and drivers to ensure that competition within the local, regional and national markets are clearly articulated and transparent to encourage confidence for business investors.

Finally, as regions differ significantly what will work in one region may not always be directly transferable to another region. However the issues presented have such a common reference that they may be used as a guide to what are useful first principles of regional economic development.
This sub report draws upon case studies that illustrate the successful experience and lessons learned in regional development in some regions of Australia, America and other countries that have similar conditions as Gansu. Importantly the report raises critical questions that are designed to contribute to the regional development discussions and will assist in the decision making processes prior to the implementation of the regional strategy.

**Section 1: Best Practice Principles**

This section focuses on what the published literature report as the principles of best practice in regional economic development. These principles and practices are presented and discussed here to gain a better understanding of what are the considerations and inputs that make Regional Economic Development successful. It is these systemic issues that continue to be raised and as such appear to be underpinning prerequisites for consideration. It has to be acknowledged however, that regions differ significantly and what has been shown to work in one region may not always be directly transferable to another region. However the issues presented below have such a common reference that they may serve as a guide to what are useful first principles.

A useful study to set the scene strategically is the 2005, the British Government Regional Development Strategy. This document outlined the essential ingredients for high level sustainable regional development. These so termed *ingredients of best practice* are now regarded as essential elements for regional economic development. These are;

- the development of an evidence base of the region's current and future challenges and opportunities. These should be clearly set out based on robust social, economic and environmental data, trends, scenarios or analysis.

- the inclusion of stakeholder involvement. This would include regional stakeholders from social, economic and environmental interests.

- a shared, overarching and long-term vision for the future of the region that is clearly articulated and based on the region's challenges and opportunities, and which integrates the region's social, economic and environmental priorities.

- that clear aims and objectives are identified, which will help implement the shared vision for the region's future. These should attempt to reconcile strategic issues and conflicts facing the region.

- that targets are identified along with accompanying indicators and actions in order to address unsustainable activities / negative trends and meet the region's aims and objectives.
• that arrangements for monitoring progress and for reporting to regional stakeholders and the wider public.

• that coordination occur between sub regional and local levels to make the most of available opportunities.

• that a sustainability appraisal be conducted on the high-level strategy / strategies in line with available best practice that reflects the triple bottom line (TBL).

1.1 The triple bottom line approach

Triple bottom line (TBL) incorporates an integrated approach that involves among other things the public reporting of environmental, social and economic outcomes against established benchmarks. It springs from a consensus that the vitality of organisations and communities depends on positive environmental, social and financial outcomes. Successful TBL approaches can clarify a regions governance structures, identify problems with existing data collection and analysis practices, and inform the development of practical, achievable social, economic and environmental goals. It may also improve a regions capacity and ability to identify the needs of stakeholders as well as the government’s ability to promote economic development.

Over recent years a growing number of private sector organisations, government agencies and government business enterprises and now regions throughout the globe have adopted TBL approaches as an integral element of their business and governance strategies. The Australian Government as an example actively supports and encourages this trend by providing guidance and access to examples of good TBL approaches in government engagement, industry development and regional development strategies.

The triple bottom line approach is based on the recognition of the interdependence between a regions social capital (education, skills, values, attitudes and capacity etc), the economic capital (infrastructure, finance and enterprise, etc) and its natural capital (natural resources, environmental attributes, natural visual amenity etc). If any dimension is pursued at the expense of the other then the system will fail or at least not achieve the optimal outcome. Hence each dimension needs to be considered in balance to achieve sustainable regional development.
1.2 Key Principles for Sustainable Regional Development

One of the notable and often sited benchmark studies on regional development in the Australian published literature is the report titled “Lead Local Compete Global: Unlocking the Growth Potential of Australia’s Regions” (McKinsey 1994). This report articulated a number of the key principles of best practice for regional economic development. This study examined more than 1800 businesses in regions throughout Australia and consulted with 200 regional leaders. The study was undertaken in order to understand the drivers and constraints of economic growth within regional Australia and presents three main messages. Importantly, the three messages are framed within the understanding that for greater prosperity to occur, then Australia’s regional economies need to be strengthened by strategies that will increase business investment. The key to success was the quality of human capital and in particular the leadership within the region.

- The first message is that leadership is a vital ingredient at both the individual business level and at the regional level. Good leadership at both the local and regional level can be measured by the energy and commitment of the leaders. Successful businesses are investing in good leadership that is innovative and encourages new development both within and outside of their regions. McKinsey (1994) points out that seventy percent of all investment growth in regions comes from existing businesses that are growing. This growth then in turn tends to attract

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**Figure 11-1** The triple bottom line approach showing the interdependence of the three dimensions of sustainable regional development

- **Economic Capital**
- **Social Capital**
- **Environmental Capital**

**Interdependence**

**Integration and linkage**
new businesses which are attracted by the potential that can develop from the growing businesses and their associated increase in demand. The biggest constraint reported by business in regional areas is a lack of immediate demand. Overcoming this constraint is a key attribute of good leadership. Many of the challenges that confront local as well as regional businesses are best dealt with by committed and well resourced leaders that are able to apply innovative solutions to the factors that inhibit business investment.

• The second message from the McKinsey (1994) report is that the creation of learning environments is essential for leaders to flourish. Appropriate learning environments for leadership are required to firstly assist the current leaders to improve their skill base and assist them in understanding the importance of the role. Secondly the learning environment enables the expansion of the number of committed leaders who can assist in driving economic development forward. Another very important challenge identified by McKinsey (1994) was the need for improved coordination and knowledge transfer from successes in one region to another. The two main challenges of regional leadership were stated as ‘learning what factors to focus scarce resources and effort on for maximum effect’ and learning how to effectively manage change across multi-organisational environments.

• The third key message highlights the changing role of government within the Australian environment. McKinsey (1994) concludes that governments have two main roles to secure sustainable economic development. One role is to provide the framework for a stable, world competitive environment for business success by providing the basic legislative rules for fair and equitable commerce. The second role is to facilitate and manage change. By acting as change leaders governments can facilitate the wealth creating sector of regions and attract competitive investment from other regions and countries.

One of the key complicating issues facing attempts to achieve sustainable regional development is that some regions have periods of growth while others go through periods of decline. The cause of this variance is not always apparent. Governments need to monitor and distinguish between two underlying causes of decline in regional areas. The two commonly sited causes are (a) the gradual decline of natural resource based communities and (b) regions that are declining due to government policy or lack of government initiatives.
If a region is going through a gradual decline that can be associated with a cause such as a declining resource based then strategies can be put in place to counter and help cushion the adjustments required for the region and to help the region re-align itself to take advantage of new competitive opportunities. The lessons learned in Australia in
communities such as Elizabeth, Latrobe and Wollongong\textsuperscript{44} was that the major industries in those areas resisted change and over a period of time found themselves to be highly uncompetitive with other global industrial players. Clearly in today’s global economy all businesses, regional leaders and governments need to maintain an international focus and benchmark against world best practice. Regional adjustment should be a gradual, continuous process of micro-adjustments that hopefully avoid the major shock syndrome. The work of McKinsey (1994) highlighted the diversity of regions within Australia and also the importance of regions to economic development within Australia, this diversity and importance is mirrored in China and the Gansu Province. If regions are to prosper in a dynamic and competitive world then there is an imperative for them to significantly influence the factors that drive investment. The important factor behind this imperative is that 70 percent of investment in a region comes from businesses already located within the region. Therefore regions should be encouraged to proactively support the three main types of growth generating businesses (a) existing business that exhibit growth potential, (b) relocating and expanding businesses that have identified the regions potential for growth, and (c) new start-up businesses. 

Existing businesses in a region have a number of distinct advantages which include pre-existing networks of business contacts which can be expanded to develop new opportunities. Existing businesses also have the advantage of being known within a region, with the particular merit of the business image for marketing. 

There are normally two types of relocating and expanding businesses; there are those businesses that following research identify growing populations and potential markets and invest for future profits. These businesses are often national or international businesses such as major supermarket chains and other retail and wholesaler providers such as the large franchise businesses that extend nationally and internationally. The other type of relocating or expanding business tends to be ‘footloose businesses’ which are attracted by market potential and the benefits of improved lifestyle. In Australia this can be witnessed by the number of businesses that move to the coastal regions attracted by the ‘sea changers’ and retirees who are attracted to healthier lifestyles along the coast. Regions need to identify the key locational factors that attract relocating and expanding businesses and attempt to systematically provide the attractors and communicate the benefits to potential investors.

In Australia’s experience only two per cent of investment in regional areas comes from new or start-up businesses, however new or start-up businesses have an enormous future potential for long term growth. Globally there are a number of new areas such as education, information and bio-technologies, software, entertainment and complex manufacturing. New or start-up businesses normally differ from existing business in that they require strong local support for what is usually a high business investment risk. A key factor in survival for these businesses is the quality of the management and the possibility of skill shortfalls. There are a number of Australian initiatives that attempt to

\textsuperscript{44} Elizabeth, Latrobe and Wollongong are regional industrial centres that experienced the effects of industry re-structuring
alleviate these problems such as local training initiatives, the use of retired business people as training mentors and the creation of small business ‘incubators’ which are designed to support and enable new businesses to get a start.

Regions need to aggressively support research into identifying the key factors that will act as attractors to existing, relocating and expanding, and to new start-up businesses. McKinsey (1994) identified three key initiatives to assist regions in Australia in the task of improving business investment:

- Encouraging regional leadership in a proactive way
- Focusing on the key growth opportunities specific to each region
- That all businesses and regions pursue a learning agenda that seeks out best practice investment and growth initiatives from around the world as well as adopting a continuous learning and improvement process.

1.2.1 World Class Investment Environment

In addition, existing, relocating and expanding, and start-up businesses will be attracted to a region and have a better chance of success if there is a world class investment environment in which they can develop. A world class investment environment typically contains four main elements;

1. *A flexible labour market* – There are a number of significant elements to a flexible labour market beyond the direct wages issue, such as the on-costs that increase the costs of employing labour like payroll tax and insurance. Issues such as the retention and attraction of skilled labour and the problem of skill shortages would appear more critical for businesses to succeed and create a world class investment environment. Businesses need a degree of flexibility to maintain competitiveness and to increase productivity. To maintain productivity, working relationships with employees need to encourage and motivate both the employees and the employer. A positive approach and a motivated attitude will assist productivity to increase. These are important factors especially as the nature of labour markets are changing globally with the relative decline in the demand for unskilled labour and increased demand for specialised and skilled labour. Flexibility in the skilled labour market can impact upon both the employer and the employee, with employers looking for more flexible hiring hours and flexible pay rates. Employees on the other hand have the flexibility to shift employment to market their skills were there is the most demand and increased reward.

2. *Switched on management* – The attitudes and skills of business owners and managers is a vital element in the overall success of a business and a region. Switched on management require managers to increase their skill base and to update their knowledge on a regular basis. The Australian experience indicates that busy managers require training that accommodates their busy schedules. A
busy manager is going to find it difficult to regularly attend external training sessions; therefore ‘just in time’ training that is work based or available online and tailored to the specific business is preferable. A specific issue in Australia has been to train managers to become more export focused and to assist managers to develop their capabilities to advance to higher management levels.

Another important aspect of switched on management is the ability to harness the power of the media and to promote the positive contributions individuals, organisations and particularly regions make. Regional media can help promote a positive and confident region and can assist in building awareness of the region and build confidence for local and external investors. Engaging the media should become part of the overall networking strategy for switched on managers who need to create lasting and productive networks.

One example of the benefits of a productive network is the formation of small business incubators. The small business incubator typically requires considerable support which can be harnessed through productive networks. The incubators play an extremely important part in the process of developing the skills of local entrepreneurs and should be nurtured to reap the full benefits. The bottom line and the key rationale behind the development of switched on management is that the failure rate, internationally, of new start up business is relatively high and one of the main reasons is the lack of basic management skills. Reducing this failure rate and gaining a higher benefit from the investment in education as well as the investment in the business itself without compromising the competitive discipline of the market is worth addressing. It is of note that in most developed countries, 80% of small businesses fail due to lack of business acumen.

3. **A positive investment cycle** – Regions have the ability to shape the investment cycle in their area. The investment cycle which is characterised by the way in which new ideas are conceived, nurtured and brought to fruition as investments can impact upon the amount of investment attracted to a region. The investment cycle begins with the generation of ideas, which may include the brainstorming of new ideas or the refinement of existing processes. The source of ideas can be quite varied with businesses investing in internal or external research with links to universities and research centres. Other sources include business trips to other regions or overseas. One of the more important areas for new ideas is from customers and the stakeholders in industry chains. A positive investment cycle also needs to be supported by the community and by a ‘can do’ attitude. A positive ‘can do’ attitude in a community can help to alleviate investor concerns of perceived risks and weariness of an unknown business or region. The positive attitude also extends to government officers and processes. Excessive bureaucratic ‘red tape’ can dissuade investors, entrepreneurs and businesses from investing in a region. Excessive ‘red tape’ can be as simple as the time it takes to fill in application forms or an excessive number of approvals for a project to proceed.
But perhaps the more insidious form of ‘red tape’ that has surfaced in Australia in some areas is the attitude of government officers who adopt an ‘us versus them’ attitude which inhibits investment ventures. A positive investment cycle is also determined by the availability of finance. In the Australian experience access to finance particularly for small business has been a problem. For regional areas the problem seems to be that there is less venture capital in regional areas as opposed to urban areas. There is less access in regional areas to skilled commercial managers and banks are increasingly requiring more sophisticated business proposals before deciding whether to finance a business. There are number of key elements in Australia which act as impediments to the availability of suitable finance including: the lack of linkage between a mature marketplace for investors looking for new opportunities and businesses looking for investment. Currently this largely occurs either through the share market, a business broker or through media advertisements. There also exists a lack of skills on the behalf of both lenders and businesses, with banks relying more and more upon the business plan and presentation as opposed to market research, and businesses struggling to present credible strategic business plans. For new or start-up businesses the risky nature of the investment severely limits the number of finance sources and also increases the cost. Regions also need to guard against an overheated investment market where there is too much investment in too many small businesses. The problem may arise when too much money leads to bad investments and declining returns for investors. This can have a very negative effect on the region and result in potential negative growth. Regions need to accept a level of responsibility for investor perceptions. This should extend to regions articulating a galvanised vision for their region that is based on credible business data and instils certainty to the investor and business community alike. An integral part of instilling certainty is to ensure that risk management is a central part of the regional vision. Investment decisions are tied to a favourable risk-adjusted return; therefore to encourage a positive investment cycle consideration of risk management should be seen favourably. Resource certainty and a shared vision are the ingredients for a positive investment cycle.

4. **Competitive infrastructure** – A world class investment environment also requires both hard and soft infrastructure that will support current regional development as well as regional development in the immediate and distant future. Strategic plans should be in place to link projected development rates with infrastructure requirements. These plans need to adopt a triple bottom line approach to ensure that future needs are catered for across all areas. In the Australian environment hard infrastructure such as telecommunications, roads and energy and water rate very highly as a factor when businesses are choosing a location to invest in.
Almost as important however are a number of soft infrastructure factors such as lifestyle, the environment, access to education, health care and sport and recreation. Liveability is emerging as a key issue driving investment decisions in most developed economies. The real challenge for regions is to encourage investment in both hard and soft infrastructure in a balanced and prioritised way that has a constant positive influence on the investment environment. For example investment in domestic and international airports can increase the connectivity with export markets as well as support a tourism industry thus expanding the customer base within the region and increase the liveability of the region for locals who wish to travel. Hard infrastructure which underpins the export efforts of business should be developed in a rational way that is evidence based. For example for some locations the logic of building an international airport is non existent however developing world class feeder infrastructure may be the answer.

The problem of infrastructure development is complex as shown by an Australian ‘Task Force on Regional Development’\(^{45}\) which concluded that it is hard to evaluate infrastructure using traditional accounting tools as the decision making for infrastructure development in Australia can involve all three tiers of government and subsequently can become fragmented. There is a concern that if there is no publicly communicated infrastructure vision then regional infrastructure coordination will require more than simply refinement. The lesson from Australia is that regional infrastructure issues should be widely debated and through that discussion the infrastructure requirements should be prioritised and gain the support of the region.

### 1.2.2 Regional Infrastructure Coordination

Developing world’s best practice in regional infrastructure requires a coordinated approach in which all of the stakeholders can clearly articulate the infrastructure proposals and align their proposal in a coordinated fashion. However agreement on infrastructure spending priorities across all parties is not easy to reach. This is partly due to the general failure of regions to communicate a unified and agreed vision for the future. Three main actions were recommended by McKinsey (1994) to counter this;

1. Development of best practice infrastructure assessment methodology

2. Regional infrastructure priorities should be developed and rigorously assessed using an agreed best practice methodology

3. Forums should be held every two years to review and to establish the national infrastructure priorities

Hard infrastructure developments lend themselves to a coordinated process, historically because of the time and organisation required to plan and execute the developments. It is

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\(^{45}\) See McKinsey 1994
envisaged however, that in the future the priority is likely to change and the emphasis will shift towards a number of soft infrastructure areas such as education and liveability. One of the main challenges for regional development is that coordinating the development of soft infrastructure will have to contend with a decrease in development and implementation time and an increase in diversity of appropriate approaches.

An excellent example of this is the Australian Higher Education system, which has embraced a multi-campus, multi-delivery approach to the marketisation of higher education. The traditional market focus of Australian universities has shifted in many cases from a singular or narrow focus on a domestic elite to embracing a broader market focus that includes competing with other universities for students in a global market via cooperative joint ventures and the rapid expansion of internet based learning modules and electronic learning management systems.

Within this framework there is a diversity of approaches and arrangements which are increasingly difficult to coordinate in the traditional sense. Instead the approach is to further develop specialist whose role is to track and forecast developments. An important aspect of the developments in Australia is that universities have been encouraged to expand their market presence in regional areas as well as internationally. This in turn has meant that universities have had to become more adaptable and responsive to the requirements of the new market areas. One of the key requirements for universities then, is to identify the barriers to educational access and to work to remove the barriers to gain a competitive edge in the regional and international markets.

1.2.3 Regional Investment constraints

McKinsey’s (1994) study looked at the constraints to investment in regional areas and found the key constraint for existing businesses to be a lack of sales or demand and made recommendations to increase demand by increasing exports and thus expanding the global market. There were five main areas of action recommended:

- **Sharing best practice** – the Regional Best Practice Program should support a selection of regional initiatives such as a regional exporting network and commercial sister region arrangements.

- **Maintaining the development of an export culture** – the shift to an export culture in some Australian regions is more advanced than others, therefore support from governments was recommended to encourage all regions to further develop their export culture. This encouragement could be undertaken by a number of regional stakeholders and at a state and national level. Governments could use their existing communication and business networks and the media could assist by focusing on the successes that occur. Regional leaders should be encouraged to establish strong relationships with other regions and to promote incentive schemes and exchange programs. Long term relationship building is extremely important to strengthen the ties and to increase market loyalty. Overseas business
trips are very beneficial for developing closer relationships and programs such as student exchange schemes and business trade fairs have been beneficial.

- **Tracking regional performance** – The establishment of good robust data to assist the decision making process is vital to a successful export program. As an encouragement to regional competition comparative data can also be produced.

- **Government agencies should have representatives in the regions** – Austrade which is the government agency charged with assisting business with exporting and trade issues should work closely with regional businesses to help them overcome any barriers of access and regional isolation. Government programs to assist business should be simple and straight forward with a minimum of duplication.

- **Increasing value through industry chains**- Industry chains such as food chains are extremely useful for value adding to products. Industry chains facilitate communication between agricultural producers, exporters, wholesalers, retailers and consumers which can result in added value and profits by improved production, processing/packaging and marketing. For example the Tasmanian crayfish which are exported to Japan and are worth five to six times the price if they are kept alive. Accessing this information and coordinating the export process to cater for the specific requirements of the wholesalers, retailers and ultimately the consumers can increase value.

### 1.2.4 Establishing a regional best practice program

McKinsey (1994) has identified two key dimensions of best practice, the ‘what’ and the ‘how’ of regional development. Specifically, what changes do regions need to make to increase investment and create a world class investment environment, and how do regions instigate changes within a multi-organisational - multi-tiered environment that is normally competing for scarce resources both with organisations and between them. The following aims are presented as a broad guide for all regions:

- Encourage regional leaders to experiment with and pursue innovative approaches to regional development

- Provide opportunities for regions to share these experiences and learn from each other, thus increasing their knowledge and capability

- Widely communicate these best practice activities in the media to encourage interest and excitement in regional leadership issues

- Regional development best practice programs should link with other best practice programs
The regional best practice programs should include a number of key features which include regions adopting a ‘can do’ attitude and accepting the responsibility to carry out self-diagnostics on their region and to develop evidence based proposals. Best practice also dictates that proposal selection and funding initiatives be open to critique by government, business, community and regional development leaders and be justified in reference to the strategic visions agreed to by the region. The funded initiatives require clear objectives with accountable key performance indicators and timetables. The projects should be monitored for accountability against the key performance indicators and timelines and the outcomes disseminated to create a learning environment of success and failure so that the important success lessons can be further developed and adapted and the failures noted and the mistakes avoided.
1.2.5 Key Considerations & Conclusions

- In the pursuit of best practice in regional development there is a need to develop an evidence base of the region's current and future challenges and opportunities. These should clearly set out a robust appraisal of the social, economic and environmental data, trends, scenarios and analysis.

- Sustainable Regional Development requires the active inclusion of stakeholders and their direct involvement in the process. Stakeholders need to include key regional community and business members and sectoral interest groups from social, economic and environmental interests.

- There needs to be a shared, overarching and long-term vision for the future of the region that is clearly articulated, collectively agreed to and based on the region's challenges and opportunities, and which integrates and reflects the region's social, economic and environmental priorities.

- Clear aims and objectives must be identified, as these will help implement the shared vision for the region's future. These should attempt to reconcile strategic issues and conflicts facing the region.

- Realistic practical and applied targets must be identified along with accompanying indicators and actions in order to address unsustainable activities / negative trends and meet the region's aims and objectives.

- Arrangements for monitoring progress and for reporting to regional stakeholders and the wider public is a critical component to ensure progress and sustainability.

- Sustainability appraisals should be conducted at a high-level that reflects best practice and the triple bottom line (TBL) approach.

- Leadership and business acumen as well as leadership development are vital ingredients at both the individual business level and at the regional level.
• The creation of learning environments is an essential prerequisite for leaders to flourish. Appropriate learning environments for leadership and the development of business acumen are required to firstly assist the current leaders to improve their skill base and assist them in understanding the importance of the role.

• There are considerable benefits to be gained by improving coordination and knowledge transfer from the successes and experiences in one region to another.

• Governments have two main roles to secure sustainable economic development.
  ➢ One role is to provide the framework for a stable, world competitive environment for business success by providing the basic legislative rules for fair and equitable commerce.
  ➢ The second role is to facilitate and manage change.

• Governments need to monitor and distinguish between two underlying causes of decline in regional areas. The two commonly sited causes are (a) the gradual decline of natural resource based communities and (b) regions that are declining due to government policy or lack of government initiatives.

• Seventy percent of all investment growth in regions comes from existing businesses that are growing. This growth in turn attracts new businesses which are attracted by the potential that can develop from the growing businesses and their associated increase in demand.

• Regions should be encouraged to proactively support the three main types of growth generating businesses (a) existing business that exhibit growth potential, (b) relocating and expanding businesses that have identified the regions potential for growth, and (c) new start-up businesses.

• Regions need to identify the key locational factors that attract relocating and expanding businesses and attempt to systematically provide the attractors and communicate the benefits to potential investors.
• In Australia’s experience only two per cent of investment in regional areas comes from new or start-up businesses, however new or start-up businesses have an enormous future potential for long term growth. Globally there are a number of new areas such as education, information and bio-technologies, software, entertainment and complex manufacturing. New or start-up businesses normally differ from existing business in that they require strong local support for what is usually a high business investment risk.

• A world class investment environment typically contains four main elements (a) a flexible labour market (b) switched on management (c) a positive investment cycle and (d) competitive infrastructure.

• Hard infrastructure developments lend themselves to a coordinated process, historically because of the time and organisation required to plan and execute the development. It is envisaged however, that in the future the priority is likely to change and the emphasis will shift towards a number of soft infrastructure areas such as education and liveability.

• Strong and sustained regional growth requires the development of an export culture. Support from governments is needed to assist regions develop their export culture.

• Government agencies should have representatives in the regions charged with assisting business with exporting and trade issues and to work closely with regional businesses to help them overcome any barriers of access and regional isolation. Government programs to assist business should be simple and straight forward with a minimum of duplication.

• Industry chains such as food chains are extremely useful for value adding to products. Industry chains facilitate communication between agricultural producers, exporters, wholesalers, retailers and consumers which can result in added value and profits by improved production, processing/packaging and marketing.

• The regional best practice programs should include a number of key features which include regions adopting a ‘can do’ attitude and accepting the responsibility to carry out self-diagnostics on their region and to develop evidence based proposals.
3 Practical approaches to regional development: An illustration

Recent research undertaken by the Institute for Sustainable Regional Development (ISRD) aimed at enabling mid to senior level mine management from an Australian company to engage with other industry, State and Federal Government, Councils and community leaders (specifically including the indigenous community) to jointly review, identify and implement strategies, investments and practices that would help realise a sustainable future for the region offers a useful insight into the practical application of the broader points outlined so far. The research included strategic planning, articulating new processes and activities with existing community approaches, fostering community ownership and partnership with industry and government at all levels, and joint action to enhance business, community and regional development.

The research incorporated a wide range of approaches that could be used to set goals and strategies that related, in this case, to a post mine economic transition in a relatively isolated region of Australia. The main points illustrated are however readily transferable to many regional development situations and offer an example of worlds best practice.

The future development challenges and the major issues and opportunities for the sustained economic development and community vitality for their region were derived from extensive consultation with the three tiers of Government, the local industry (mining, grazing, tourism and fishing), the community (indigenous and non-indigenous) and the civic leaders and planners of the region. The information provided formed the basis of deriving the options for the pathway forward, and it was regarded as especially valuable information as it was derived from local knowledge and experience and met the intent of an engaged community.

The information gathered clearly showed that economic development of the region was, like most areas of regional development, complex. The complexity demonstrated the need for the development of a range of integrated strategies to achieve holistic and balanced development of the region. The options for economic development that were identified from the field work fell into several general categories:

- Underpinning prerequisites – infrastructure, legal and institutional changes, etc.
- Enhancing existing assets and industries including leveraging from economic “anchors”
- Reducing economic leakage
- Attracting new industry
- Better capturing dollars brought into the community
- Increasing the efficiency and capacity of existing firms
• Improving community capacity for economic development

• Utilising existing mine infrastructure

• Targeting new business

• Managing particular issues and barriers to economic development

The options described for the post mine economic development in the region were categorised under broad development strategies such as improving the efficiency of existing firms and reducing leakage. This is a well researched and tested regional development approach that is largely based on the work of Pulver (1979); Shaffer and Pulver (1995); and Shaffer et al. (2004). Additional work such as Beer et al. (2003) outlines a typical strategic planning approach to regional development which includes establishment of an organisation to conduct development activities, priority setting and action planning. Mueller and Schwartz (1998) and Nightingale and Holcomb (1997) add further insight and describe strategies for economic development in disadvantaged communities including job creation, direct employment assistance, training and education, wage subsidies and public employment strategies. Luther and Wall (1998) outlined 20 “clues” to rural community development such as transition of power to younger generations, willingness to seek help from “outside”, and conviction for local people to have control. These relate closely to the strategies of Shaffer et al. (2004) which include:

• developing a group of committed local people

• having decision making address symptoms as well as problems

• broad citizen participation

• incorporating local values

• access to local and external resources

• a commitment to action

Another approach was to develop a view of a functional post mine economy involving new ventures such as tourism, local small business etc. and to “backward map” the necessary strategies and actions to achieve it. These “generic” approaches were considered in the development of an integrated and tailored framework for the region. Many of the strategies identified for the economic transition for the region were interrelated, that is, the progress on particular activities needed to go hand in hand with other efforts. For example, the development of housing infrastructure would be needed to better attract skilled workers who are then in a position to mentor others. Improved housing and roads are also needed to foster new industries such as tourism and improve the efficiency of existing industries. The integrated framework proposed in the research incorporated some of these
interactions between the specific strategies to give an integrated overview of approaches that can foster a post mine economy (Figure 1.2). The model emphasises that three interrelated areas need to be addressed together – underpinning prerequisites, development of specific business opportunities, and fostering individual and community capacity (Figure 1.2). The triangular nature of the model is underpinned by the fact that appropriate support is required at all stages to ensure that these areas lead to “on the ground” change.

There was a range of post-mine economic opportunities such as tourism, pastoral development, and small business that were canvassed. These options were dependant on the “hard” infrastructure of roads and services, and the “soft” social infrastructure that includes personal motivation, cooperation and ownership. All three aspects of economic development require the support of organisations and networks in the region.

Figure 11-2 A framework for progressing a post mine economy.

This framework corresponds broadly with the strategies outlined by Blair and Reed (1995) and includes the following categories:
- Infrastructure
- Quality of Life
- Organisational
- Local support
- Industrial/Community Promotion
- Business Development

The proposed framework built upon the strategies outlined by Blair and Reed (1995) and attempted to take into account the particular circumstances of the region. Most economic development processes assume functional organisations, effective power, motivation and capacity. They rarely consider issues of remoteness, lack of basic
infrastructure, small local markets and the possible need for alternative business models. The emphasis on infrastructure, support and capacity in Figure 1.2 is aimed at addressing these issues. In effect, it combines the entrepreneurial model, program model and government planning model of Beer et al. (2003) and the “community centred” and “program centred” approaches of Sears and Reid (1995).

Each component of the framework is a “cluster” of specific strategies derived from those highlighted in community feedback. They also appear to be the approaches that:

- would add most value to the transition to a post mine economy;
- build on existing economic development activities; and
- are most likely to be achievable.

The clusters for each segment of the framework are as follows.

Cluster one – Underpinning Prerequisites
- Enhancing road infrastructure
- Housing and accommodation
- Attracting and retaining skilled labour
- Access to venture capital
- Native Title issues
- Indigenous community transition (DOGITS)

Cluster two – Community Capacity for Economic Development
- Enhancing attitudes, motivation and life skills
- Community ownership and participation
- Organisation
- Personal development pathways
- Leadership

Cluster three – Business Development
- Building economic development in the pastoral industry
- Developing tourism
- Small business development
- Service and efficiency
- Reducing leakage
- Using mine infrastructure
- Alternative business models

Cluster four - Support
- Coordination and partnerships
- Training and skilling
- Building allies
- Freight reduction
Each of the strategies within the four clusters involves activities in several stages as follows:

1. **Pre-economic:** activities that are required to provide a necessary situation for economic development (i.e. background work needed to be undertaken before specific action)

2. **Activities:** broad activities required to progress each strategy

3. **Specific action to be conducted.**

Recommended actions in these three stages are shown for each cluster of strategies in Table 1.1 (Underpinning Prerequisites), Table 1.2 (Community Capacity) Table 1.3 (Business Development) and Table 1.4 (Support). While these tables (Table 1.1 to 1.4) are operationally focused for this particular case study they do provide a useful construct and model on how such issues can be operationalised and community engagement secured.
### Table 11-1  Recommended activities for enhancing the underpinning prerequisites for a post mine economy.

<table>
<thead>
<tr>
<th>Underpinning Prerequisites</th>
<th>Activities</th>
<th>Pre-economic</th>
<th>Specific Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enhancing road infrastructure</strong></td>
<td>Negotiation of partnerships for a ten year road development program based on incremental improvement to pre bitumen standard</td>
<td>Development of a business case for road improvement to pre bitumen standard</td>
<td>Negotiation between Mining Company, Councils and State and Federal government.</td>
</tr>
<tr>
<td></td>
<td>Development of a commercial crushing plant and a haulage business based on the road base material available at the century mine</td>
<td>Scoping for a commercial partner in the development of the crushing plant. Investigate “Bulk Haulage” as a business model</td>
<td>Progress of training and business development of the crushing plant as a priority</td>
</tr>
<tr>
<td><strong>Housing and accommodation</strong></td>
<td>Development of more housing appropriate for single people</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Housing ownership as a priority in the transition from mining town</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Attracting and retaining skilled labour</strong></td>
<td>Expand pathways for local people to gain skills and employment.</td>
<td></td>
<td>Continue Mining Company scholarship program If possible, develop situations where indigenous people go together to access training outside their community to reduce isolation.</td>
</tr>
<tr>
<td></td>
<td>Build the attraction of the region for professionals</td>
<td>Assess situations of image change such as the Northern Territory, Logan City etc.</td>
<td>Advertising campaign in public sector and other professional circles</td>
</tr>
<tr>
<td></td>
<td>Develop a suite of support services for skilled workers such as professional development, cultural support, and improved supervision</td>
<td>Improve the quality of housing and rental accommodation for professionals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improved succession planning to improve the continuity of professional services</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Access to venture capital</strong></td>
<td>Expand the ADBT model as a locally controlled source of venture capital</td>
<td></td>
<td>Consider an appropriate expansion of the ADBT business development budget</td>
</tr>
<tr>
<td>Native Title issues</td>
<td>Progress of native title issues in the region</td>
<td>Maintain momentum in existing legal processes to resolve native title issues</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Support for Indigenous Communities (DOGITS) to transition to a main stream of Local Government</td>
<td>Understanding of new arrangements</td>
<td>Training of councillors and staff in operating as a local government, access to funds etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enhancing governance and meeting accountability standards</td>
<td>Perhaps importing accountancy skills with the view to developing para-accountancy skills in councils</td>
<td></td>
</tr>
</tbody>
</table>
### Recommended activities for enhancing community capacity for economic development for a post mine economy.

**Community Capacity for Economic Development**

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Activities</th>
<th>Pre-economic</th>
<th>Specific Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhancing attitudes, motivation and life skills</td>
<td>Identifying and supporting community “drivers”</td>
<td></td>
<td>Local government and other groups actively “scouting” and supporting individuals. Creating opportunities for potential “drivers’ to informally meet and support each other. Ensure appropriate community recognition of small successes.</td>
</tr>
<tr>
<td></td>
<td>Extend training and development in basic life skills</td>
<td></td>
<td>ADBT to continue to offer training to groups of related people in basic life skills</td>
</tr>
<tr>
<td>Community ownership and participation</td>
<td>Develop appropriate partnerships as a pathway for local people to develop ownership</td>
<td>Identify potential partners in each local community</td>
<td>Consider ways to keep local community members informed of specific activities and progress</td>
</tr>
<tr>
<td></td>
<td>Maintain a high level of feedback to communities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisation</td>
<td>Improve representation on existing groups</td>
<td>Provide appropriate invitations and make it logistically easier for people to participate.</td>
<td>Provide greater background and information on the role of groups and expectations and benefits of representation.</td>
</tr>
</tbody>
</table>
Table 11-3  Recommended activities for business development for a post mine economy.

**Business Development**

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Activities</th>
<th>Pre-economic</th>
<th>Specific Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal development pathways</td>
<td>Improve community engagement</td>
<td></td>
<td>Increase feedback to communities of decisions and actions by existing organisations including greater exposure of “on the ground” activities.</td>
</tr>
<tr>
<td>Personal development pathways</td>
<td>Support employment pathways</td>
<td></td>
<td>Mining Company to continue to offer people achievable employed roles at the mine with people progressing to more challenging jobs.</td>
</tr>
<tr>
<td>Personal development pathways</td>
<td>Avoid “over-training” and have greater opportunities for training to lead to employment</td>
<td>Have CDEP better integrated with employment pathways</td>
<td>Mining Company to continue to recruit employees into specific employment areas such as the crushing plant including basic life skills training</td>
</tr>
<tr>
<td>Personal development pathways</td>
<td>Building the role of visitors and tourists as mentors</td>
<td></td>
<td>Consider how visitors to the region could provide skills and mentorship – a possibility is a volunteering program organised with caravanning groups.</td>
</tr>
<tr>
<td>Personal development pathways</td>
<td>Expand the personal development programs</td>
<td></td>
<td>Discuss how the program could be expanded</td>
</tr>
<tr>
<td>Leadership</td>
<td>Supporting young and emerging leaders</td>
<td></td>
<td>Engage emerging leaders to gain their view on how they feel they can be better supported</td>
</tr>
<tr>
<td>Leadership</td>
<td>Encouraging community leadership</td>
<td></td>
<td>Incorporate leadership as part of business development in funded projects</td>
</tr>
<tr>
<td>Leadership</td>
<td></td>
<td></td>
<td>Develop community mentoring relationships which could be facilitated by Community Liaison Officers</td>
</tr>
<tr>
<td>Strategies</td>
<td>Activities</td>
<td>Pre-economic</td>
<td>Specific Action</td>
</tr>
<tr>
<td>------------</td>
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<td>----------------</td>
</tr>
<tr>
<td>Building economic development in the pastoral industry</td>
<td>Enhance the involvement of the pastoral industry in life skills and employment programs</td>
<td>Expand life skills and employment programs, conducted by the Lawn Hill/Riversleigh pastoral operation to other pastoral properties</td>
<td>Liaise with ADBT about the applicability of the Lawn Hill approach</td>
</tr>
<tr>
<td></td>
<td>Expand the re-establishment of run-down pastoral properties as commercial business operations perhaps using the ADBT Lawn Hill model</td>
<td></td>
<td>Liaise with the pastoral industry to gauge interest in pastoral industry based business opportunities such as pastoral industry tourism</td>
</tr>
<tr>
<td></td>
<td>Developing pastoral industry based businesses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developing tourism</td>
<td>Development of tourism facilities</td>
<td>Work with existing accommodation providers to upgrade facilities and service.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Development of road infrastructure</td>
<td>Develop specific training and orientation for tourism related businesses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Development of tourism using mine infrastructure</td>
<td>Investigate the feasibility of using the mine airstrip and infrastructure for tourism</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attract “high end” tourists particularly from tourism ‘anchor’ cities</td>
<td>Investigate the feasibility of a four star accommodation facility in the region</td>
<td>Investigate the use of wildlife and environment to foster ecotourism.</td>
</tr>
<tr>
<td></td>
<td>Development of high standard travel and accommodation</td>
<td></td>
<td>Investigate the feasibility of tourism involving indigenous culture</td>
</tr>
<tr>
<td></td>
<td>Development of specific tourism businesses</td>
<td>Canvass for tourism development entrepreneurs with the view to supporting emerging businesses and/or an emerging tourism business cluster</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Continue the development and promotion of the regions tourist trails</td>
<td>Support Regional Development and others in promoting the region and fostering the cluster of businesses along the route.</td>
<td></td>
</tr>
<tr>
<td>Strategies</td>
<td>Activities</td>
<td>Pre-economic</td>
<td>Specific Action</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Small business development</td>
<td>Develop pathways for people to develop a business</td>
<td>Better access existing business support from sources such as Regional State Government</td>
<td>Develop a scheme where visitors to the area can provide business mentoring – this could be done through service club or caravanning networks.</td>
</tr>
<tr>
<td></td>
<td>Develop small businesses in specific sectors for import replacement</td>
<td>Enhance basic infrastructure to support small business such as banking, accountancy, telecommunications, roads, housing</td>
<td>Develop a business support network for people interested in starting a business</td>
</tr>
<tr>
<td></td>
<td>Attracting mine employees into local business</td>
<td></td>
<td>Liaise with people who have a home based business and offer to support and networking to make their enterprise commercial</td>
</tr>
<tr>
<td></td>
<td>Improving customer service and point of contact attitudes</td>
<td></td>
<td>Establish a business incubator for the Gulf</td>
</tr>
<tr>
<td></td>
<td>Improving business professionalism and acumen</td>
<td>Development of functional business groups such as Chambers of Commerce</td>
<td>Offer training and support for businesses in sectors such as health, finance, trades, and other “gaps” in the local economy.</td>
</tr>
<tr>
<td></td>
<td>Improve indigenous people’s understanding of business principles</td>
<td></td>
<td>Actively “prospect” for import replacement businesses from within or outside the region.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Investigate incentives and provide support to encourage mine employees to establish a local business after the closure of the mine.</td>
</tr>
<tr>
<td>Service, efficiency and business acumen</td>
<td></td>
<td></td>
<td>Conduct activities to raise business owners’ awareness of poor service such as expanding the mystery shopper program already done in the region and other methods of customer feedback.</td>
</tr>
<tr>
<td></td>
<td>Improving business professionalism and acumen</td>
<td></td>
<td>Conduct a business “fix it” program with business visits on a town by town basis by recognised successful business owners</td>
</tr>
<tr>
<td></td>
<td>Improve indigenous people’s understanding of business principles</td>
<td></td>
<td>Extend the “Money Story” and “Community Story” activities of DATSIP</td>
</tr>
</tbody>
</table>

888
<table>
<thead>
<tr>
<th>Strategies</th>
<th>Activities</th>
<th>Pre-economic</th>
<th>Specific Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using mine infrastructure</td>
<td>Development of tourism using mine infrastructure</td>
<td>Resolve maintenance issues for infrastructure post mine</td>
<td>Investigate the feasibility of using the mine airstrip and infrastructure for tourism</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Investigate the feasibility of using existing facilities for recreation</td>
</tr>
<tr>
<td>Alternative business models</td>
<td>Develop community owned enterprises</td>
<td></td>
<td>Investigate the feasibility of community owned enterprises for business development and conduct a trial of as community owned enterprise</td>
</tr>
<tr>
<td></td>
<td>Consider the development of a community foundation</td>
<td></td>
<td>Investigate the feasibility of a Community Foundation</td>
</tr>
</tbody>
</table>
|                                  | Expand partnerships as a means to establish and maintain businesses |                                                   | Continue with existing business development partnerships  
Investigate a range of other possible partnerships between Government, private enterprise and community members. |
Table 11-4  Recommended activities for supporting economic development activities for a post mine economy.

<table>
<thead>
<tr>
<th>Support</th>
<th>Strategies</th>
<th>Activities</th>
<th>Pre-economic</th>
<th>Specific Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordination and partnerships</td>
<td>Enhance cooperation between existing groups</td>
<td>Organise for different groups to meet and brief each other on activities.</td>
<td>Develop greater communication between RPAC, Regional Development groups, Local Government, Indigenous Groups etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Encourage broad partnerships where all appropriate groups have the opportunity to participate</td>
<td>Consider a regional protocol for the involvement of all appropriate groups in decisions and activities.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training and skilling</td>
<td>Increase local access to TAFE and other education providers</td>
<td>Liaise with TAFE and education providers about extending an appropriate local presence in the Gulf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building allies</td>
<td>Develop potential allies outside the region</td>
<td>Maximise the Queensland Government CEO community linkage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freight reduction</td>
<td>Reduce the cost of freight for Gulf businesses</td>
<td>Investigate the current situation with freight costs and freight subsidies Develop a freight subsidy business case to support lobbying</td>
<td>Lobby for appropriate freight subsidies.</td>
<td></td>
</tr>
</tbody>
</table>
The progressing of the actions was dependant on a number of key principles of community action. The regional communities needed to have ownership of the actions and be “ready” for local development. This involves having local enthusiasm and motivation for change, and the confidence and capacity to pursue opportunities. One way this can be fostered is by working with a small number of local leaders and “drivers”, seeing what other communities have done, and everyday challenging as well as encouraging people.

The best people to facilitate local development and action are those with established relationships and trust within each community. It may take a long time for people to trust and respect government agencies and “outside” organisations but investing in these relationships must precede “on the ground” action. This requires long term continuity of contact; follow up on commitments and frequent communication.

Support for local drivers is important without compromising their social standing. This may include training and skilling, but also encouragement and mentoring.

Progressing actions, engaging communities and building trust all largely depend on achieving small visible successes. A sustainable post mine economy as with other regional development projects is largely achieved by small incremental achievements that are recognised and celebrated.

The engagement of people themselves in identifying and progressing regional development strategies and actions is a crucial part of the process. While extensive community feedback has, in this case, identified ways to build a post mine economy, they cannot be implemented prescriptively. Community members and stakeholders need to be engaged in the planning, development and implementation of any regional development strategy.

Finally, expectations need to be realistic. There may only be passion and enthusiasm for a small number of initiatives and progress may be slow. It will be difficult and even inappropriate to attempt to engage all community members and stakeholders but it is important to have key drivers and stakeholders involved.
1.3.1 Governments as change leaders

As regions become more independent and expand the diversity of their markets the role of governments also changes and the expectations placed upon government also change. Governments in an increasingly global and mobile economy still have a direct influence over a number of very important areas, such as security, taxation, the operation of essential utilities, the provision of infrastructure and the creation of the legislative framework in which a world competitive market can thrive. The clear direction for governments is to ensure that the rules of competition within the local, regional and national markets are clearly articulated and transparent in order to encourage confidence for business investors. The expectation from business investors is that the risks associated with a particular investment will be able to be calculated and that a degree of stability will prevail.

The role of governments in a dynamic world’s best practice environment is as facilitators and as change leaders. This involves the government taking the lead in regional development by encouraging and facilitating initiatives that lead towards world’s best practice and that support the initiatives of others. To become a change leader requires governments to shift focus from the traditional role of ‘doer and director’ and accept the more challenging role of leaders of attitudinal and behavioural change. The Australian experience suggests six areas that are critical for change leaders to focus on:

- Providing leadership and vision
- Solving problems precisely and aligning incentive structures
- Providing data and measuring performance
- Communicating to reinforce change messages
- Building skills of change leaders
- Improving systems, processes and structures.

These areas of foci will assist governments and regional developers to continually monitor and review the key areas of a triple bottom line approach to economic regional development. As a minimum requirement to achieve a triple bottom line strategy the following areas need to be considered and addressed:
1.3.2 Key areas of a TBL strategy

*Regional comparative advantage*
A region’s development strategy should be based on its resource endowments and competitive advantages. Based on endowments, a region can specialize in the production of one or more products for which that region has a particular advantage. A region should seek to gain comparative advantages in national and global economy. Government policies should be adapted to regional conditions.

*Investment in physical capital*
Physical capital and infrastructure is one of the most important factors of production. Investment in physical capital and facilitative infrastructure is one of the major sources of regional economic development. Governments need to consider the reason for investment in infrastructure and the role they play relative to the investment that can and should be made by private investors (Rolfe et al 2005). Governments role in infrastructure investment fall under the general headings of investment type: (a) catalytic (triggers higher levels of economic and investment activity) (b) facilitative (smooths the pathway for further growth and development) (c) market failure (addresses key impediments to free market forces) (d) blockages (removes or address the blockages or impediments to growth).

*Investment in human capital and high tech*
Human capital (i.e. skills, capacity, education, creativity, leadership and access) is one of the most important factors of production. This is particularly relevant as industries move to smart, high tech and creative industries. Endogenous growth theory emphasizes the roles of human capital and technological change in economic growth. Education is one of the key issues in this area. The attraction and retention of skilled workforce has been shown to be a core challenge globally. Today’s workforce is highly mobile driven by factors such as liveability and lifestyle (Rolfe, Lockie and Ivanova 2005).

*Exports as a driving force of regional economic growth*
Exports are an engine of regional economic growth. Traditional theory postulates that the growth of exports is driven by regional labour and capital supplies. New international trade theory suggests that multiplier effects and externalities associated with exports are key sources for regional growth. There is a bidirectional relationship between exports and regional growth. In areas of large local populations import replacement is also used as a precursor to export development.

*Rural development and resource sustainability*
Globalization, free trade, phyto-sanctions, industrialization, urbanization and government intervention and environmental degradation have all impacted on and have resulted in a range of difficulties facing the rural sector. Reforms need to be continued to change the form of agricultural policies, especially agricultural subsidy. Poverty alleviation measures must be region-specific in their design and take a bottom up approach.
Deregulation, privatisation, institutional reform and development of the private sector
In the process of economic system transition, private sector plays an important role in job creation and economic growth.

Financial intermediaries and regional development
Financial intermediaries are hubs of local economy. The development of a financial centre is a precondition of the growth of the local economy.

The role of government
What functions should provincial and local government play in the transition process from a command economy to a market economy? How active a role should provincial and local government play in an environment of market economy? How does government respond to the market?

Environmental protection
Environmental protection and sustainable land use are emerging as drivers of global markets. These markets are increasingly being sensitized to the need for environmentally aligned production systems. It is likely that market access will be increasingly constrained to those products that meet defined environmental standards. These changes are driven by an increasing sensitivity to losses of biodiversity and land degradation, and health concerns (chemical and disease). Future access to global market will increasingly require environmental certification.

Urbanization
Urbanization and changing demographics has influenced the viability and functionality of rural and remote communities as well as providing considerable hardship for the rural/urban community. The rural impacts have included skills and labour shortages, loss of professionals and a loss of services. In the urban areas there are problems of culture, employment, the provision of social services as well as issues of community health and wellbeing.

These issues form part of an integrated whole and must be viewed within a systems framework and this is explored in more detail in the following section.

1.3.3. Key Considerations & Conclusions
In sustaining regional development consideration needs to be given to what are the underpinning prerequisites (infrastructure, legal and institutional changes) that are required to sustain the vision for the region. Consideration also needs to be given to enhancing existing assets and industries including leveraging from economic “anchors”, reducing economic leakage, better capturing dollars brought in to the region, increasing the efficiency and capacity of existing firms, improving community capacity for economic development and better utilising existing infrastructure.

As regions become more independent and expand the diversity of their markets the role of governments also changes and the expectations placed upon government also change. Governments must ensure that the rules of competition within the local, regional and national markets are clearly articulated and transparent to encourage confidence for business investors.

Governments must become change leaders and this requires governments to shift focus from the traditional role of ‘doer and director’ and accept the more challenging role of leaders of attitudinal and behavioural change.

A region’s development strategy should be based on its resource endowments and competitive advantages.

Investment in physical capital and facilitative infrastructure is one of the major sources of regional economic development.
• The Government’s role in infrastructure investment fall under the general headings of investment type: (a) catalytic (triggers higher levels of economic and investment activity) (b) facilitative (smooths the pathway for further growth and development) (c) market failure (addresses key impediments to free market forces) (d) blockages (removes or address the blockages or impediments to growth).

• Human capital (i.e. skills, capacity, education, creativity, leadership and access) is one of the most important factors of production. This is particularly relevant as industries move to smart, high tech and creative industries.

• Exports are an engine of regional economic growth and international trade theory suggests that multiplier effects and externalities associated with exports are key sources for regional growth. There is a bi-directional relationship between exports and regional growth. In areas of large local populations import replacement is also used as a precursor to export development.

• Globalization, free trade, phyto-sanctions, industrialization, urbanization and government intervention and environmental degradation have all impacted the rural sector. The effect of agricultural policies and subsidy need to be considered.

• Poverty alleviation measures must be region-specific in their design and take a bottom up approach.

• Environmental protection and sustainable land use are emerging as drivers of global markets. These markets are increasingly being sensitized to the need for environmentally aligned production systems. It is likely that market access will be increasingly constrained to those products that meet defined environmental standards.
1.4 Regional Economic Development

This section of the report provides an in-depth examination of a number of key economic regional development issues that have impacted upon Australia and have been identified as global trends. The lessons from this examination are useful as they represent a relatively mature level of debate and engage with lead researchers on the issues at hand. As with provincial China, Australia is facing enormous challenges and undergoing considerable change, much of which is driven by global market forces. Some of the pressures and drivers of change include the emergence of a global trading environment, free trade agreements, phyto-sanctions, quality assurance and improved environmental management and now the more insidious issues such as climate change (IPCC 2001). These global drivers of change are expected to continue with the rate of change expected to increase (Keniry et al 2003).

The liberalization of trade at the global level has embedded regions in a highly competitive global economy. Now regions as opposed to States are regarded as the economic drivers of the nation’s economy. The global connectivity and competitiveness of the region is paramount to their long term economic success and sustainability (Blakely 2004a).

In the Australian context local socio economic drivers are having a considerable influence on the community vitality, wellbeing and viability of the regions. These factors include demographic changes (primarily a loss of youth and an aging workforce) as well as lifestyle choices such as ‘tree’ and ‘sea change’. This has resulted in a declining population base in a number of regional centre’s, along with a number of the small centre’s progressively collapsing into larger regional service hubs (OESR 2005). These changes are in turn affecting the attraction and retention of professionals and with subsequent declines in services such as health and education (Miles et al 2004; SCORD 2004). The problem compounds itself as this complex array of issues has a high level of interdependence which in-turn influences the socio-economic capital of the region (Coleman 1988; Cavaye 1997).

The capacity of regions, their communities and enterprises to survive and thrive in today’s competitive environment was initially thought to be totally dependent on the social, economic and environmental capital of the region (Cavaye 1997). Today, however this has been disaggregated to focus on leadership, innovation, creativity, connectivity and business acumen as important subsets recognized as having a pivotal role to play and are emerging as some of the key ingredients for success and sustainability.

All Australian regions and regional communities are feeling the effects of these global, national and local trends (McKinsey 1994; Keniry et al (2003). Queensland regions are no exception. Driven by considerable community pressure, the Queensland Government stimulated by a request from the Peak Industry Body for Agriculture, Ag Force, decided to take action to create a 10 year blue print or strategy for Queensland’s regions in an attempt to address some of these concerns. The resultant strategic document was called
the ‘Blueprint for the Bush: Building a sustainable, liveable and prosperous rural Queensland’. Of note is that until now there was no national or state policy or framework for sustainable regional development. This absence of commitment by the Government made proactively managing these complex issues very difficult.

At a national level Australia has experienced a decade of sound economic management which has resulted in sustained growth with low interest rates, reduced national debt, and a dramatic fall in the unemployment rate. However, this is far from the case for many regions. At the same time, there have been significant population changes in a range of regions over the last ten years. While opportunities abound in some regions, in others new economic and new social challenges have occurred. In short, the regions have changed and new challenges are emerging.

These challenges were explored by Keniry et al (2003) who investigated and made recommendations on the options for encouraging growth and investment and included considered debate on the impediments to business growth, the effectiveness of current government assistance programs in regional Australia and international best practice. The recommendations made by Keniry et al (2003) were categorised under business, government, people and infrastructure. Of particular interest in this report is the identified need to deal with the attraction of skilled people to regional areas, increasing the commitment of skilled and unskilled people to regions and in the fostering of regional leadership.

As part of the Keniry et al (2003) investigations SGS Economics (2002) identified three areas of regional business development literature. These were the seminal literature, international practice and recent literature in regional business development. The seminal literature included the contributions made by Jacobs (1984), Romer (1986), Porter (1990) and subsequently Saxenian (1994), McKinsey & Company (1994), Florida (2003). However, many of these authors focused their research on regions in the USA and Europe. These regions have a large population base and a ready local market. However, in Australia many of the regions have sparse populations. Business development relies on industry’s ability to export. This is even more evident with inland regions. However, work by Kenyon (2005), Kenyon and Black (2001a, 2001b) support the community approach as adopted by the Blue Print for the Bush as the right approach regardless of population size and the need for a large local market.

Jacobs (1984) identified and argued for the need for cities to grow through import replacement and for regions as a whole to become more economically versatile and focus on the relationships between similar regions globally. However, it is of note that Jacobs’ (1984) also explains that supply regions distant from cities do not necessarily benefit from the various forces unleashed by cities undergoing import replacement activity. Jacobs (1984) concluded that only regions that can grow import-replacing cities will be prosperous in the long term. Regional economic expansion according to Jacobs (1984) stems from the ability of a region to provide goods and services for the region. Once a region can do this, it can use the lessons it learns from the process to build a more
sophisticated export base. This is supported in many ways by the work of Romer (1986) who suggests that regional growth is largely determined by technological change. Romer’s (1986) work is further supported by Saxenian (1994) who compared the development paths of two different high technology regions in the United States – Northern California’s Silicon Valley and Boston’s Route 128. Saxenian (1994) demonstrates how these two regions have taken different paths but have resulted in a similar end product in terms of global competitiveness. Lee et al (2000) however suggests that the Silicon Valley’s structure is a unique compilation of culture, a few key entrepreneurs, universities and infrastructure and that this mix cannot easily be replicated in another loci or geographic area in what is now a changed global environment. Porter (1990) argues that the competitiveness of a region is determined by a number of independent variables which differ between industries and even industry segments within a region. This is supported by Keniry’s et al (2003) work with the added focus on the need for well placed infrastructure and access to finance. In other work Porter (1996a, 1998) took this further and explored the development and need for clusters of firms in the same region to create synergies in production and economies of size and scale to generate enhanced competitiveness in a global economy. This model is supported in some Australian regions where a cluster of related industries exist – for example around mining and primary industries. Porter (1996b) also proposes that business must choose a positioning strategy in the market place to compete effectively. The business must deliver goods that are of consumer value competing on price or quality (differentiation) or a unique combination of the two. This is needed in order for the business to have a sustainable competitive advantage in the market place. This will usually only accrue to businesses that have a consistent development strategy and through ones which reinforce this through the organisation of their value adding activities.

1.4.1 Liveability and regional development

An alternative but very important perspective to regional development is illustrated by Florida (2003). Florida identified the importance of liveability and cultural tolerance and other social attributes. This was defined in the context of an important feature which provides for openness and variety of the region to act as a talent magnet in the presence of available technology. In this instance it is about the importance of soft infrastructure that supports liveability, community connectedness and lifestyle (Keniry et al 2003). Infrastructure provision, both hard and soft, is the key to the provision of an attractive environment for business to establish and grow in a region (Hugonnier, 1999). Florida (2000) describes the traditional economic development model as one of lifestyle and professional development benefits derived with companies that lead to attractive jobs. Florida’s position is supported by Miles et al (2004) in identifying the needs for
professional development in regional Queensland and Lee et al (2000) in asserting a need for a high quality of life. The balance between work and leisure and the liveability of a region are now critical determinates of where people will live and work (Miles et al 2004).

A common theme in much of the regional development literature is that of the role of technology, particularly ITC. Porter (1998) uses ITC and other high tech examples to demonstrate a point that, “Today there is no such thing as a low-tech industry. There are only low-tech companies”. In Porter’s words, “any company in any industry can be more productive and more competitive by using technology well”. This is clearly demonstrated in Australia’s agricultural sector where technology has played a major role in reducing the gap between the value of the commodity and the production per unit input (Barr et al 2005). Good examples of the use of technology and its role in regional development are also demonstrated in the mining industries and their ability to continue to compete globally with minimal tariff support compared to the European community.

1.4.2 Regional connectivity and leadership

Globalisation has a major influence in regional economic development (AHURI 1998). As mentioned earlier this is one of the key drivers of change and a very difficult one for regions to effectively deal with in isolation. One approach that has been adopted is for regions to do things smarter by collaboration, using a strategic approach to alliances and partnerships and the sharing of resources to gain a market edge or operational efficiency. The value of this strategic approach is recognised and shared by many authors including Stilwell (2000), Nijkamp van Oirschot and Oosterman (1994) and is also included in the collaboration model espoused by Cohen (2000). Some examples of this are present in the creation of larger bodies, regions or clusters often with a different name than the individual entity or businesses (AHURI 1998; Enright and Roberts 2001). This model also applies to environmental issues. A complex example of this is given in the creation of the Murray–Darling Basin Commission in Australia - a range of organisations across state boundaries with a shared or common interest.

A further response to the pressure of change on regions created by globalisation has been to focus on the development of trade. According to McGovern (2004), trade may or may not benefit a region but it is evident that much of Australia’s regional trade development is from agriculture which is one of the economic anchors of regions (Cavaye 1997). While attracting large new businesses is legitimate and an important part of diversifying regional economies, of equal importance is the ability to sustain and foster the investment that already exists in regions and for many regions this is agriculture (McRuvie 2004).

Another dimension to consider is that the current view for regional development to be

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46 ITC – Information Technology and Communication
sustainable and effective is that while governments may be interventionist (O’Connor et al 2001) they also need to support not only a top down but a bottom up (National Economics 2000) approach to regional development and this more so than the basic provision of money (McKinsey 1994; Roberts et al 1996; Lennon 2001).

In this context regional economic restructuring since the 1970s has created a new economic geography in Australia and there are identifiable causes as to the relative success and growth of some regional cities and towns compared to the decline in others. These causes of the growth or decline has included the location patterns of firms motivated by low cost alternatives to traditional locations and the changes in production towards a national and international export focus. A number of regional cities and towns have proactively promoted low establishment costs and low cost infrastructure and services to new industry. This has had the effect of attracting many new export oriented industries to regional centres and are now seen by many as the prerequisite conditions for the growth of regional cities (Beer et al 1994). However, this is also colloquially known as smoke stack stealing and is sometimes regarded as short term. Successful development also requires regions to actively market themselves and their competitive advantage (Beer 1997).

Mouritz (2001) demonstrates the power of harnessing local cooperative investment to generate business development (and subsequently economic growth) within a regional township. In his work he suggests that to create local business development, regions need to identify and capitalise on the opportunities that are presented in the town. This includes the need to organise people with vision, confidence, good marketing and communication skills while working together to share and foster ideas. These are similar to the ideas of Business LINC (1998) and Ferguson (2001) who promoted leadership, team building, profit development and material support during start-up periods for small businesses.

1.4.3 Creativity, innovation and technology

Malecki (1997) provides a comprehensive investigation into the relationship between technology, innovation and strategy as key drivers of economic development in regions. Malecki argues that technology is the essential ingredient in economic development and that it is behind the proliferation of all new products and services. Some of the arguments that Malecki (1997) proposes are that:

- Technology is an essential ingredient in regional economic development.
- Technology diffusion stimulates business investment and employment in a region.
- Strong inter-firm relationships are vitally important to stimulating investment and development in regions.
- Entrepreneurship and innovation drive regional development.
• Good governance is critical to the effective management of economic development in regions.

• Government policy should focus on means of increasing skills and education and training, embracing technological change and the development of critical infrastructure that is needed to support faster and flexible development in regions.

While this is clearly an important element other elements need to be considered. Pages et al (2001) summarised the findings of an inquiry into ‘what policies are needed to help create more entrepreneurs and what will ensure that more entrepreneurs succeed’ as; a talented entrepreneur can succeed anywhere but they are likely to be more successful in areas that have diversity in sources of capital, an enabling culture, strong local networks, supportive infrastructure and entrepreneur-friendly government. Feedback from the private sector suggests that governments should be more business-minded, by acting faster, and with transparency and flexibility. Further, an ‘amenities based economic development strategy’ should be pursued to encourage skilled knowledge workers to locate in regions that have lifestyle appeal which is also supported by Florida et al (2000).

Pages et al (2001) further argue the need for policy makers to ensure that there is a sound infrastructure and quality human services in regional areas. In addition, Government must facilitate and support private networks and create a regional commitment to leadership and entrepreneurial growth. Governments need to send out a clear message that they encourage and support entrepreneurship, Educational institutions have a key role to play in this aspect of regional development. Governments need to facilitate communication between businesses, entrepreneurs and education institutions to enhance the education sector’s role in training, recruiting, and retaining quality students and workers in their region.

1.4.4 The importance of leadership

The Department of Transport and Regional Services in Australia (2000) makes the point that one of the major obstacles to regional business development is a lack of adequate education and training. This is expressed as a major issue for regions and has resulted in the decline in the regional labour market which is reflected in the availability of a suitably skilled labour force. While a major issue is the attraction and retention of professionals and skilled labour it is of note that most of the debate has targeted at skill development and very little has focused on the development of business acumen, leadership skills or continued professional development.

There are many authors that report on the need for education of the regional workforce and a number also report on the urgent need for strong leadership development (Enright and Roberts 2001; Mouritz 2001; O’Connor et al 2001; Cohen 2000). In addition, many
investigations have examined the issue of skilling of the work force such as, Skilling Australia (Department of Science Education and Training 2005), Inquiry into Rural Skills Training and Research (House of Representatives Agriculture, Fisheries and Forestry Committee 2005) and Skilling a Season Workforce (Kilpatrick and Bound 2005). However, in these reports there is no mention of leadership development without which regional Australia will not advance (McKinsey 1994, Keniry et al 2003).

Professional development is a key in regional development and today this is about lifelong learning. Lombardo and Eichinger (2002) identified that successful career advancement is strongly connected with continuously learning ‘to do what you don’t yet know how to do’. They argue that continuous learning to do new and different things and variety of experience pose the greatest challenges saying, ‘few people have the requisite experiences needed in managing and leading in the world of change, and fewer still have any idea how to learn from them’.

The method of delivery of leadership and professional development is also changing and new methods of on the job training are being offered. Distant or on-line learning are now emerging as new industry standards particularly with the expanded access to internet and broadband services. Wondu Business and Technology Services (2004) in their extensive review of services in rural and regional areas found that the use of broadband for research, education and on line learning is a priority for agriculture and local government users. The development or deployment of new applications in this area creates a significant opportunity for regional Australia. This point is further explored and supported by the work of Standen and Sinclair-Jones (2004) who found e-work offered new opportunities for business and professional development in regional Australia.

To be a successful knowledge-based region, regions have to have a high concentration of access to e-based systems, leadership, entrepreneurship and access to highly skilled professionals (scientists and engineers) and global knowledge workers. These workers tend to migrate to regions with scale and diversity of social and community infrastructure and cultural and lifestyle choices (State of the Nation Report 2005). This view is supported by Florida (2003) and Miles et al (2004).

Media reports frequently talk of the crisis in rural and regional areas leaving urban audiences with the perception that it is always one crisis or another. This is not necessarily the true picture. Some rural and regional areas are doing very well and have a justified interest in challenging overall assessments about regional disadvantage (Birrell et al 2000).

Barnwell (2005) points out however, that as a general rule, regional businesses have reduced access to finance, many have underdeveloped business skills and infrastructure that is in dire need of upgrading. These problems are exacerbated by a general negative perception of regional Australia which is costing regional areas large amounts of skilled capital and compounding the problem of skill shortages, entrepreneurship and leadership capability.
On the other hand Rees and Fischer (2002) and Graham (2005) outline the success stories of people and communities across rural and regional Australia. These are many and varied with many other published examples of successful individuals such as O’Toole (2001) at the Beechworth Bakery and Eady (2005) who provides case studies of successful Queensland women in regional business and Hyde (2000) who profiled 30 Australian champions from rural Australia. Other accounts of successful communities are identified by Cocklin and Alston (2003) and Plowman et al (2003) who studied a range of rural towns in Australia identifying the characteristics of innovative communities. These all link to the ten common themes of:

- passion and persistence;
- core values, idealism and vision;
- community connectedness, ownership and involvement;
- quality customer service;
- idea obsession, innovation and continuous improvement;
- leadership and skilled management principles and practices;
- staff pride, enthusiasm and involvement;
- product differentiation and quality;
- collaboration, networking and strategic partnerships;
- and innovative marketing and associated case studies of successful regional people and their business

These themes were clearly outlined by Kenyon (2005) and follows from his work on small town renewal (Kenyon and Black 2001a, 2001b). In all instances the success stories are underpinned by personal capacity, leadership and innovation.

Major impediments to regional business growth and development have continually been reported as inadequate education and training (Department of Transport and Regional Services 2000). This is reflected in the issue confronting rural and remote Australia in the difficulty with the attraction and retention of skilled labour and professionals. Governments at all levels are struggling on how best to address this and how best to establish and maintain a favourable regional investment environment. The ongoing focus on skills development and the attraction and retention of professionals is also now reflected in the need for strong leadership and the capacity development of regions.

Governments need to continue to assist in the development of regions by supporting them to manage the transition through the significant change induced by the global trends and
drivers. The role of Government will need to be one of facilitator and service provider undertaken in a proactive and supportive policy framework. This will need to be done in a partnerships model with industry and members of regional communities (Blueprint for the Bush 2006).

Development funding programs that respond to the particular needs of Australia’s rural and remote communities are needed and will have to be well targeted. The types and level of government assistance must be developed under this partnership approach and be applied and address real time issues. Regional development activities now need to be effectively coordinated between the three tiers of government. Outdated methods of offering business incentives by themselves have been shown not to work alone and these programs need to be reviewed and changed (Blueprint for the Bush 2006). Existing small business should be encouraged and supported as a priority but not in the absence of the need to address the soft infrastructure needs of today’s vital communities. Efforts to encourage regional business development should engage the local community to ensure engagement and true partnership approach (Blueprint for the Bush 2006).

However, government programs targeted to specific industry sectors need to be flexible, be available to all regional residents and take into account the diversity of circumstances between regions. Government needs to encourage business partnerships such as industry clusters and networks and provide better coordination for business dealing with structural change. Therefore, governments should increase the provision of training, mentoring, skills development and advice on business planning. Government business programs and government provided business and industry assistance packages should be regionally specific and targeted toward improving business acumen and entrepreneurship (Department of Transport and Regional Services 2000).

In the successful regional case studies reviewed (Kenyon 2005; Kenyon and Black 2001a) and highlighted over 10 years ago by McKinsey (1994) it appears that leadership is still a critical element in achieving success.

A great deal of the research cited focuses on successful regional development through the acquisition of the resources and infrastructure, the role of government, good governance and management, and the many other components required for success. Leadership remains the rarely spoken about, but essential ingredient for success. It may well be that often management should be replaced by leadership. In the work of Plowman et al (2004), the authors refer to both the quality of management and leadership renewal.

An examination of successful regions will in all probability identify successful leaders. The question then is how to identify and stimulate the leadership resources in other communities to maximise regional development.

The next section deals with a generic understanding of how regions operate globally, their interdependence and interconnectivity. An understanding of regional connectivity is needed in developing a more grounded philosophical understanding of sustainable economic development.
1.4.5 Key Considerations & Conclusions

- For regional development to be successful there is a need for well placed infrastructure, access to finance and to cluster firms to create synergies in production and economies of size and scale to generate enhanced competitiveness in a global economy.

- There is a growing body of research on the importance of regional liveability, cultural tolerance and other social attributes in regional development. These important features act as a talent magnet in the presence of available technology. This highlights the importance of soft infrastructure that supports liveability, community connectedness and lifestyle.

- The balance between work and leisure and the liveability of a region are now critical determinates of where people will live and work.

- Today there is no such thing as a low-tech industry. There are only low-tech companies. Any company in any industry can be more productive and more competitive by using technology well.

- Technology is an essential ingredient in regional economic development and technology diffusion stimulates business investment and employment in a region.

- Strong inter-firm relationships are vitally important to stimulating investment and development in regions and entrepreneurship and innovation drive regional development.

- Good governance is critical to the effective management of economic development in regions.

- Government policy should focus on means of increasing skills and education and training, embracing technological change and the development of critical infrastructure that is needed to support faster and flexible development in regions.

- Governments need to become more business-minded, by acting faster, and with transparency and flexibility.
• Government must facilitate and support private networks and create a regional commitment to leadership and entrepreneurial growth.

• Governments need to send out a clear message that they encourage and support entrepreneurship and educational institutions have a key role to play in regional development.

• Governments need to facilitate communication between businesses, entrepreneurs and education institutions to enhance the education sector’s role in training, recruiting, and retaining quality students and workers in their region.

• Governments need to continue to assist in the development of regions by supporting them to manage the transition through the significant change induced by the global trends and drivers.

• Regional development funding programs have to be well targeted and must be developed in partnership with industry and be effectively coordinated between the tiers of government. Offering business incentives by themselves does not to work.
1.5 Regions and Regional Connectivity

This section of the report deals with the current state of the knowledge on regional connectivity and the drivers that underpin successful economic development. The section explores how regions connect, their co-dependencies and interdependencies and provides a critique of the current knowledge base. However in the areas where there is an absence of hard data this review also provides a critique of how robust and useful this knowledge is and gives a consideration of its application. The material in this section is largely drawn from a paper by Blakely (2004b) and readers are referred to this document for greater detail on this topic.

The concept of regions currently dominates discussions of economic development globally. Global regional cities now form the platforms for the new economy and are seen as essential building blocks of national economic development (Scott 2001). However few policymakers and economic development planners fully understand the importance of regions in terms of how they contribute to the development of industry clusters, forward and backward linkages or global comparative or competitive advantage. On the other hand, business and political leaders across the world are acknowledging and using regional development as the basic global economic platform.

New age thinking and leading edge regional economic development science is taking a far more complex and interconnected view of regional economics. This approach is based on a more detailed understanding of institutional arrangements and networks not traditionally captured in the more historical approach to regional science. As part of this more detailed analysis a few regionalists are giving attention to the complex array for hard to quantify forces that form soft-structure - i.e. the neuro-regional network perspective on regional development (Saxenian, 2000; Florida, 2003; Porter, 2001). This perspective of ‘regional’ is resonating well with policymakers without much of the hard data of typical regional science. Intuitively policymakers understand the shift from manufacturing to knowledge base which requires a very different set of regimes to control economic outcomes.

Arguments put forward by Saxenian, contribute the ‘organization’ of the regions as plausible accounts for global economic success, rather than a detailed analysis of the economic base of the cities (regions) themselves (Sassen 1991:64). In essence, the capacities nested in cities and its region to ‘manage and coordinate economic power’ is the real story of successful global regions (Beaverstock et al 2003).

There is very strong agreement that these less tangible forces of management and coordination, are now primary in understanding cities and regions capacities to become or remain economically competitive globally or locally. Regional scientists can and do
count the interactions between places and the outcomes of characteristics such as air traffic, financial firms, headquarters, locations and the like. However, regional organization and management is not an easy focus for regional economists no matter how interesting such dimensions are for policymakers. It is difficult to capture or quantify the necessary ingredients that drive a new more institutional and informal base for global regional success. However Florida’s (2003) work and the earlier work of Porter (2001) are the best illustrations of this change from hard economic frameworks to a form of place based organizational analytic base. In the case of both these widely read authors their thesis are derived from policy over economic science. That is, the focus of their work stripped of its economic orientation is on organizations and institutions and not on the direct economic production. Institutions, organization, leadership, community milieu and similar values are now the paramount constructs influencing public and private policymakers. It is this new understanding and dimensionality of these institutions that forms an important future direction for regional development if it is to be relevant in the policy processes.

1.5.1 The Global Region

There is a very clear shift in the major regional development policy literature toward a better understanding of a system of globalised city-regions. The various aspects/drivers that influence sustainable regional development are provided in Table 1.5. For each of these various aspects/drivers a more detailed exploratory paragraph and critic of the popular literature follows. The importance of these components can’t be underestimated and have been identified as crucial considerations in developing the new economy. However the key learning is that there is a need to understand how and even influence when these components interact and that regional development practitioners need to understand and provide guidance for policymakers.
Table 11-5    Regional Economic Development Forces
<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Definitions</th>
<th>Authors</th>
<th>Illustrations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Diversity</td>
<td>Agglomeration of reinforcing firms that collaborate as well as compete for global market share</td>
<td>Hopkins (1995); R. Dietz (2001); M. Storper (2000); J. Quigley (1998); C. Sherwood-Call (1990)</td>
<td>Amsterdam, Munich, San Francisco with very diverse industries that have domestic and international exports</td>
</tr>
<tr>
<td>Population</td>
<td>High levels of immigration and cultural tolerance with regard to race, national origins and related factors</td>
<td>R. Florida and G. Gates (2001); L. Sandercock (1998); J. Ratcliffe (2002); T. Craig (1997); Young, I. M. (1990)</td>
<td>London, Paris and New York with exceptionally vital and diverse populations that attract jobs and firms</td>
</tr>
<tr>
<td>Creative/skilled Workforce</td>
<td>High number of specialized university educated imaginative people in arts, sciences and management disciplines</td>
<td>K. Arrow (1962) R. Florida (2003); C. Landry and F. Bianchini (1995); Bell (1976); A. Scott and M. Storper (1992); Jones, Lang, La Salle (2004)</td>
<td>Dublin, North Carolina Triangle, Hong Kong, Bangalore and Singapore all possess well educated workers attractive to global capital and firms</td>
</tr>
<tr>
<td>Connectivity</td>
<td>High quality and reliable telecommunications, airports, seaports and efficient cross regional connectivity by public and private transportation systems</td>
<td>Sassen (2000); P. Daniels (1991); K. O’Connor (1991); M. Castells (1996); Sassen (1991); P. Knox &amp; P. J. Taylor (1995)</td>
<td>Frankfurt, Chicago, Denver that are global cities primarily because of their internal and external communication and air transport systems</td>
</tr>
<tr>
<td>Innovation/entrepreneurship</td>
<td>Firms organizations lead by creative economic and social entrepreneurs with readily available venture capital</td>
<td>D. Burch (1987); A. P. Aghion, Phillippe and P. Howitt. (1998); K. Arrow, (1962); E. Jonathan &amp; S. Kortum. (1997)</td>
<td>San Jose Costa Rica, Berkeley Calif, Los Angeles, Stockholm are incubators or highly innovative talent</td>
</tr>
<tr>
<td>Quality of Housing/community</td>
<td>Good housing in good neighborhoods that are easily accessible to transit</td>
<td>E.J. Blakely (2003); A. Kearns and M. Parkinson, M. (2001); Calthorpe (1973); R. Putnam, R. (1993)</td>
<td>Minneapolis, Seattle, Portland, Barcelona that work at insuring better mix of housing opportunities</td>
</tr>
<tr>
<td>Quality amenity base</td>
<td>Formal and informal venues for sport, recreation, relaxation and cultural celebration</td>
<td>Blakely and Roberts (1987); Blakely and Roberts (2003); L. Sandercock (1998); J. Jacobs (1969); P.O. Muller</td>
<td>Sydney, Melbourne, Madrid, Milan are consistently rated among the world’s most attractive places to live and</td>
</tr>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
1.5.2 Economic Diversity

There is little doubt that diverse economic regions do better than those dominated by even the most robust technology sectors. Regional science has many tools to measure economic mix via shift share and cluster analysis. However, the key is not just how much but what kind. Regional economies are more diverse in some respects but less in others. For example, the dominant world regional centres like New York, London and Tokyo have a diverse set of finance, insurance, transportation and accounting dominance but they have very little product development and production capacity outside of this narrow band of enterprises. In some ways they are less diverse than they once were. So, the real issue is what constitutes diversity in this new economy where even global or perhaps especially global headquarters firms have almost no locational loyalty (Blakely and Bradshaw, 2002).

It is easy to calculate diversity but it is much harder to examine the right mix. Organizational network analysis is an important tool to examine this aspect of diversity. In doing so, analytical tools have to move to the notion of the global and not just the local region since these networks cross international boundaries (Scott, 2001). Disturbances in the global networks have profound impacts on even global regional city state. For example, Seoul’s economic slump in the late 1990’s was related to its regional network ties in Southeast Asia. Thus, diversity might include the diversity of the global networks the city-region is part of, as well as the internal diversity or elaborations of firm typologies.

There are, in essence, at least two forms of analysis that need to be considered in constructing diversity indices. First, there is a need to understand the interdependencies of firms in clusters internationally and the scope or breadth of the entire network system in the region. In some cases, a great narrow cluster mix like Boston’s Route 128’s engineering technology base may provide an economic warning of vulnerability. On the other hand, Silicon Valley with more diverse cluster of technologies, finance and other export bases is more resilient than Route 128 using the same measures. Second, the globalization factor of diversity needs to be considered too. Regional communities are increasingly tied together in clusters. According to the GaWC (Global and World Cities) world centres are geo-indexed by region as well as by size and capacity. So Sydney, Seoul, Singapore and Tokyo are in an inter-related complex of diversity with Kuala Lumpur, Bangkok, and Manila etc. which defines each city-regions range and strength within a diverse network. SARS is a clear example of these diversity interdependencies.
1.5.3 Population Multiculturalism

A multicultural population is viewed as an important asset by Florida (2003); a position that has now received much international recognition and support. The premise is that a diverse set of people from different cultural backgrounds generate new energy in the society. While this is a politically correct view there is some evidence that new immigrants do add taxes and skills to the local labour pools. However, there are the social drag effects of newcomers as well. The notion that the ‘best and brightest’ human resources are the most likely to move to a new nation in the current world economic and political situation may not be necessarily correct. What the new attractors are is not well known or studied.

Population diversity also includes the take up of internal population such as women and minorities as well. While these values are debated, beyond some general assessments there is little regional science on what levels of diversity or what diversity really is and what kinds account for what outcomes. Florida’s Bohemian and Gay indexes (2003) may be useful proxies but they may also mask other internal relationships with and among populations or other factors that account for these outcomes. For example, local universities may be the actual magnets for a wider population being attracted and retained in selected regions and the actions of these institutions in generating talent in the area accounts for the population diversity gains shown by Florida (2003).

Regional science has not done enough work on the role of universities as human capital capture organizations beyond studies of tech parks and graduation rates. But the link between this new human capital and these institutions seems to be very different than the reported technology transfers from universities to firms.

Age profiles are similarly misleading for regional economics today. Older populations are not what they used to be. Areas experiencing high influxes of older workers are also showing increased economic activity not just in health care. Regional development practitioners are now just beginning to recognize that healthy older human resource pools are making new entrepreneurial contributions to communities. As a result, we need to recalibrate our understanding of demographic profiles and develop a new calculus of economic value associated with changing population profiles. This will require regional scientist and gerontologist to begin new economic impact research on the range of contributions of so called seniors to regional economic development.

1.5.4 Creative/ Skilled Workforce

Workforce has been re-labelled as knowledge worker. But the new labels are seemingly being placed on ‘old wine’. We know far less about knowledge workers than we did about factory workers. In part, the factory worker had the good grace to stay in the same facility all day or all week. The knowledge worker is far more elusive because any worker can have a bit of knowledge in their work and the work can be located in the
workers head, on their computer and can be operationalized from home, a coffee shop, library, lab, airplane or park bench. As a result, even categorizing knowledge/creative work or locating them is extremely difficult. Yet, this is the core of the new regional science disciple.

Clearly, there is a need to do some forms of industrial psychology to examine the character of this work form for several reasons. First, knowledge work creates a new set of economic structural inequalities. Yet, if any work is portable it is this form of work since it is not dependent on any location. A new computer program can spring from anywhere on the planet and be useful. If the work and worker are portable why is it that they agglomerate in so few urban locations? It is surmised that ‘knowledge birds flock together’ but little more. Moreover, the spill-over from knowledge work seem to marginalize other workers rather than enhance their capabilities and make both work less hard and workers more valuable. This new economic transition that relies on worker collaborations to make new products has curiously atomized many workers and de-skilled others. Second, the information on knowledge work stops with schooling/education.

Observations of the new work show that social interaction and creative skills are more important than years of schooling. Thus, if we are to unpack the worker skills we need to move our science to the formation and the organization of the work system so that we might propose new ways of altering the increasing gulf between the technological haves and have-nots. Perhaps the answer to this conundrum will open the doors of commercial exchange between the very poorest of people—who are clever in their own right, to new productive futures without them having to destroy their habitats as their only key to global commerce.

1.5.5 Connectivity

The movement of goods and people is an emerging area of interest. There is a great deal of knowledge about global air routes and sea freight connections, as well as telecommunications infrastructure which are all well documented (O’Connor, 2003). That is we count that the numbers and locations of transactions are in themselves important. No doubt density of communications is a signal that something is going on. But we need to know more than this to provide guidance to policymakers. There is some information that certain communication routes are very tightly linked such as financial communications between New York, London and Tokyo. These links are so deep that no financial transactions of any type can transpire without them. The depth of communications links in few other fields has not been examined as deeply. We do know that law and commercial advertising have links similar to finance. Legal transactions are within a dense network of firms in cities like The Hague and fashion with Rome and Paris. Yet we seem less knowledgeable about how other global connections are forming. This is important because entering such networks can alter the fate of regions.
Johannesburg for historic reasons is linked to global commerce via diamonds. This base has opened global networks to this city as the only place in Africa that is attracting new economic capacity and wealth. It is known that connectivity links are soft links embedded in international organizations, associations and individuals. A new global connectivity forming its own social information capital is emerging as clearly as the old world’s club society like the Masons.

The annual Las Vegas Info-Technology meeting is one of a small but important connectivity links that any community or person serious about a future in that community must penetrate. Regional scientist do examine the size of the airports and the location of convention centres without documenting the connectivity links that are directly associated with these social connecting structures. So, it is important to understand how these networks are formed and how regional policy can forge such connectivity as one of the entry points to the global economy.

1.5.6 Strategic Capacity

The value of individual and collective leadership as seminal ingredients in a regions success is now well recognized and should continue to be nurtured. However early success in a regions economic development is usually attributed to early agents such as government grants, certain geographic endowments or historic factors. However it should be recognized that the catapulting of some places to global prominence can scarcely be so easily attributed to these causal factors. New literature is emerging that equates regional gains more directly with the collaborative structure within them composed of public and private organizations designed to formulate joint action across sectors. Regional stewardship, a term coined by Doug Henton (2004), describes the leadership of collective actors who view the regional venue as the crucible of their organizational futures. As a result, this group or collective creates new institutions and networks designed to enhance civic capital without denying individual commercial success.

This form of civic goodwill is not well understood or easily captured in economic models. In fact this is one of the few forms of regional advantage that is not limited to North American communities, but increasing seen globally in places like Shanghai, Dubai, Dublin and Berlin. In these regional communities leadership replaces leader for articulating the future of these places capturing collective benefits. Porter (2001) describes this collective capacity as “strategic resources of political and social organizations.” Large organizations that proclaim a regional mandate sit on the shoulders of smaller institutional networks. It is these networks of organizations and institutions and the density of them that has not been well appreciated by regional development practitioners.

There are few studies of the network or organizations that form regional economic development institutions. This network of institutions is an increasingly important resource for regional development and the structures along with the capacities of these
organizations need to be better understood as economic engines. Another important component of these organizations is the rise of regional indicators as policy tools. Almost all of the new regional organizations use some form of comprehensive indicators system as an important intervention device. The form of these indicators is known but the actual impacts of indicators aren’t known or documented. Regional development science needs to launch new research on the indicators as systems but also on the measures themselves and their effectiveness in actually measuring the indicated factors. Indicators in some respects are the policymaker’s replacement for regional science data. Indicators and related forms of measurement are clearly in fashion and regional development practitioners can assist in making such data systems more reliable and relevant for the policy process.

1.5.7 Innovation and entrepreneurship

There is no disagreement in the literature that innovative firms and small nimble entrepreneurial organizations are the base of the knowledge economy. There are a few good measures of the importance of these small innovative organizations and firms. But the milieu in which these firms operate includes networks of other support structures. “City regions “…are said to thrive on the creativity, productivity and innovation-enhancing effects of dense and multifaceted urban milieus that are simultaneously embedded in a worldwide networks” (Scott, 2001). The structures are not easy to generate in communities but they are essential. Non profit associations are important glue for this burgeoning creative mix. Non profits form the arts base, the organizational structures and connectors for creative capital formation. Regional research has paid too little attention to this form of soft support structure. The non profit organization does not fit easily into researchable assessments. Nonetheless, it appears that non profit organizations that do a range of things from talent search to incubating artists and other creative talent are integral to regional advantage (Saxenian 2001).

Why some places pull in creativity and others are less successful relates to the interaction among creative people to what Ratcliffe (2004) calls “something in the air” and is now commonly referred to as liveability. Creativity knows where it is wanted and where it is shunned. Communities can and do work on widening their acceptance of creative inputs. Some regions like San Francisco are so widely known for this form of creative acceptance that economic downturns scarcely influence their attractiveness. Tolerance and diversity are necessary but not sufficient components of this force. For example, Miami is a reasonable tolerant and diverse community but attracts almost no technology firms and Boston is only moderately diverse and attracts many technology organizations. We need to understand this part of the puzzle better.

Venture capital is also important. But capital is very mobile. Large amounts of capital seem to be having few impacts on New York or Tokyo’s technology capacities as they fuel the financial sector. Again, the links between venture funds creativity,
entrepreneurship and non profits need to be diagrammed and examined so that we can provide better and clearer advice to policymakers as they pursue global regional advantage.

1.5.8 Quality of Housing / Community

Housing and community are easily linked conceptually but deeply separated in the marketplace. Housing is a commodity. Communities are built by developers and increasing gated or privatized. But the real issue is not house or shelter availability but the kind of communal environment in which the home (not house) is situated. Old neighbourhoods in the inner city are being rediscovered because of the connections that can be forged among the people who live within them. Social diversity in the community is a re-found virtue just as economic forces are increasing the distance between classes. So, the new buzz word is affordable housing. New Urbanism and Smart Growth approaches are aimed at community restorations with appropriate mixes of people, incomes and infrastructure. Regional science seems silent on this issue aside from discussions of housing prices and taxes. So, policymakers are forging programs without much advice on how to attain socio-economic mixes.

An entire class of non profit community housing sector has emerged with almost no research to understand or support it in the United States and the U.K. In both nations the community housing sector underpins both gains in the housing market as well as the restoration of new economic activity in formerly distressed areas. The social good of such approaches needs to be underpinned by a detailed understanding of the link between these community based institutions, housing and community formation, and sustainability.

1.5.9 Quality amenity base

Community identity is usually tied to its amenity structure. Everyone knows where important venues are located ranging from the Louver to the Moscow Zoo. These civic amenities are attractors and retainers of community human capital. Some attractors are rural or non urban such as beaches, mountains and other physical attributes. However, if the attractors are of scale like the Eiffel Tower, Bondi Beach or Vienna Opera House they are urban or they urbanize. Salt Lake City’s mountains have pulled in new economic transforming migrants who increasingly urbanize and transform the community. As such the amenity base of the community is a double edged sword. It attracts all kinds of desirable and not so desirable activities. The relationship of various kinds of amenities on various forms of human capital is not well understood. City leaders pursue new stadia, Olympic Games along with large parks as additional human and financial capital attractors. Very little is known to inform these debates beyond the dubious value of professional sports and hosting of international athletic contests. Precious little work can
be found to support the investments in art museums, symphonies and other civically supported activities and regional economic health. What are the best amenities? Is the quantity or the quality of them? Is the absence or presence of some amenities economically harmful?

1.5.10 Social cohesion

It is well recognised that deep divisions in a community’s social structure impede economic performance. As cities strive to be more diverse they build in new tensions among groups that in some cases remain loyal to their former ways of life and may even resent the transformation of culture as they covet the benefits of new wealth. Social exclusion including youth delinquency, economic isolation, homelessness and rising unemployment are endemic in some global cities. Race and class riots are a culmination of these factors in many large urban centres. Mexico City’s economic improvements have made the city a more dangerous place to live. Similarly, as Jakarta and Manila enter the global economic mainstream forces unleashed internally that may cast them back as they try to move forward. Big western cities are equally vulnerable as riots in Birmingham, London and Los Angeles have shown recently. Social exclusion of the inevitable consequence of rapid wealth and technology transformations is part of the regional development process. Little research helps to guide policymakers in how to make places better for everyone beyond a few modest changes in tax policy. But global capital wants uniform taxes. Global capital also wants both diversity and stability. This is difficult to achieve. Some communities like San Francisco and Lyon, France have taken on integrating diverse populations through civic charters. Regional economic development practitioners might be tempted to dismiss social issues as the province of sociologists but social cohesion is an economic value that shapes regional outcomes. Regional science can pinpoint inequality but what are the coefficients of community social renewal. Here we seem helpless to do anymore. Policymakers need more information to make effective decisions in this area. Recent experiments in the United States and social policy formation in Europe are guided by little science and inspired by hope. It seems both plausible and possible for regional scientist to examine the current options and suggest potential interventions as well as examining the existing trials to see what set of factors are the best options for leveraging the social and economically isolated into the global economic opportunity system.

1.5.11 Governance

While governance does not mean just government, regional governance models are appearing as new partnership arrangements across the public, private and non profit sectors. In some cases they take the form of innovative governmental arrangements to
organize civic resources, like elected Metropolitan Commission or Toronto’s Regional Collaborative Government model. But in many more instances they are voluntary partnerships similar to the Southeast Queensland (Brisbane, Australia) or New York Regional Plan where local governments and civic groups seek alliances to enhance planning for the region. These new institutional arrangements are a new form of regional social capital.

Civic engagement is “…the norms and networks of civil society that lubricate co-operative action among both citizens and their institutions. Without adequate supplies of social capital—that is, without civic engagement, healthy community institutions, norms of mutual reciprocity, and trust—social institutions falter” (Putnam 1998:98)

More knowledge on how these civic systems are formed and what are the best practices is needed. Little is known about this new form of regionalism that is borne of the need to be globally competitive rather than simply governmentally efficient and the combination of social and economic outputs should be examined in some detail.

1.5.12 Neuro-net of interdependent economic development variables

As outlined above global regional advantage is not one thing, nor a single linear set of steps or activities. It is much more like a complicated neuro-network of interconnected forces and factors that operate both alone and in concert as the needs arise. Regional economic development practitioners with roots and connections in geography, urban sociology, urban and regional planning, and public policy must forge these seeming separate links into a multi-disciplinary approach. As the neuro-net is examined as a system of interdependent components we learn more about how each component of the web reinforces the other parts as depicted in Figure 11-3.
In exploring the links it is useful to realize the importance of moving from a descriptive science of the parts into prescriptions of how to make them work better as policy instruments.
1.5.13 Key Considerations & Conclusions

- There is very strong agreement that the less tangible forces of management and coordination, are paramount to understanding a cities and regions capacity to become or remain economically competitive globally or locally.

- Diverse regional economies do better than those dominated by even the most robust technology sectors. However while it is easy to calculate diversity it is much harder to determine the right mix.

- There is a need to understand the interdependencies of firms in clusters internationally and the scope or breadth of the entire network system in the region.

- Regional communities are increasingly tied together in clusters.

- A multicultural population is viewed as an important asset. The premise is that a diverse set of people from different cultural backgrounds generate new energy and ideas and perspectives in the society.

- While the term workforce has been re-labelled as the knowledge worker (highly mobile and educated professionals who sell their skills) there is a need to ensure the very poorest of people—who are clever in their own right, have access to new productive futures without them having to destroy their habitats as their only key to global commerce.

- Regional connectivity now drives the global economy. Effective connectivity is dependent on high quality and reliable telecommunications, airports, seaports transportation and efficient cross regional social, cultural and economic exchange.

- In order to enhance regional connectivity the strategic capacity of a region (ability to mobilize public and private sectors for a common agenda) needs to be strongly nurtured.
Highly developed and successful regional innovation requires firms and organizations to be lead by creative economic and social entrepreneurs with readily available and accessible venture capital.

The attraction and retention of good quality professional and technical staff requires quality housing, vital regions with good neighbourhoods with access to transport and a wide range of services.

The quality of the regional amenity base needs to include venues for sport, recreation, relaxation and cultural celebration. Social cohesion is also needed with allied social capacity/services that are able to deal effectively with social dislocations of a new economy (such as homelessness, crime, economic divisions in the community)

Well formulated governance and intuitional arrangements between governments, the community and private sector are required to provide quality services.

Global regional advantage is non linear complex suite of activities that form a neural-network of interconnected forces and factors that operate both alone and in concert as the needs arise.
Section 2: Australian Case Studies

In the following section of the report two Australian case studies are presented that illustrate the key learning from the adoption of a holistic regional development approach that references the triple bottom line. The case studies presented correlate subjectively to the TBL notion of balanced economic, social and environmental development.

The case studies include references to issues associated with the socio-economic impacts of rapid industrial growth using the example of coal mining in Central Queensland following the work of Rolfe and Hyland (2004). This is followed by a case study highlighting the importance of social infrastructure in sustainable development (Rolfe et al 2005).

2.1 Case Study One - The Socio Economic Impacts of Rapid Industrial Growth

2.1.1 Coal Mining in the Bowen Basin, Central Queensland

Coal mining is a major regional economic development industry in Queensland and is likely be a significant continuing economic activity in the Province of Gansu. Mining is regarded as an important contributor to the economy and social fabric of many regional communities in Queensland and globally. Hence this case study is seen as having considerable relevance and value to the regional economic development strategy for Gansu.

Economic activity and growth can foster improvements in social conditions in a number of ways. These include the direct creation of jobs, with corresponding flows of income and wealth accumulation. Economic growth also allows more resources to be used for social services such as health, education and welfare, both through private and public spending.

The mining industry is a key part of Australia’s economy and an underpinning driver of the Queensland economy, accounting for over 10% of the Gross State Product (NRM, 2006). In Queensland the mining industry employs nearly as many people as the agricultural industry, but tends to pay much higher wage levels. Most mining activities are in regional areas, and require capital spending on infrastructure requirements by both the mining companies and the Government. As a result of spending on wages, infrastructure and operating costs, mines provide direct injections of economic stimulus into regional areas. They also help to maintain regional employment and population growth.

At a broad level, the impacts of the mining industry on the state’s economy and social capital are clear and substantial. At the regional and local level though, the impacts are not so easily defined, particularly for a single mine. This is for two key reasons. Firstly, it is not transparent what the economic and social impacts of mining are on a particular region or local area as compared to other industries and the provision of
public services. Secondly, there is some diversity in the operations and supply of labour to mines, making it harder to identify the impacts of a particular operation on economic and social factors.

Hence, the role of the coal mining industry in regional communities and on regional economic development is both profound and poorly understood, particularly in relation to the ways in which the role and impacts of mining change throughout the life cycle of mining operations. At the same time, the social and economic effects (whether real or perceived) of coal mining operations on nearby communities are often the focus for considerable conflict and misunderstanding. While genuine conflicts of interest may exist, lack of active engagement between mine proponents or operators and relevant communities exacerbates that conflict and limits opportunities to capture benefits and limit negative impacts. This is especially the case in relation to mine closures.

The social and economic impacts of mining on communities can be summarised into three broad areas:

1. Impacts on local communities;
2. Impacts on the wider region, particularly where shiftwork patterns allow families to be located in other communities; and
3. Impacts on individual families and the decisions they make about whether to locate in local or regional centres (Rolfe and Hyland 2004).

Impacts that are experienced positively in one of these areas may be experienced negatively in another. There is often a lack of clarity over the exact magnitude of positive and negative impacts, and over procedurally just ways of allocating resources to manage them. This has led to considerable confusion and conflict over questions such as the extent to which individual mine operators should take responsibility for the provision of infrastructure in nearby communities affected by other mines, other industries, and the policies of multiple levels of government.

The standard approach to dealing with economic and social impacts of mining operations has been to conduct impact assessments as part of the Environmental Impact Assessment process which underlies the approval process for new mines in Australia. While this remains an important part of the assessment process, there are a number of potential weaknesses with relying solely on this methodology to address adverse impacts. These can be summarised as:

(a) Impact assessments are typically only conducted for major new projects, and subsequent changes or expansions of existing projects are not covered,

(b) Impact assessments are only conducted at the beginning of a project, and there are currently no mechanisms to conduct follow-up assessments,

(c) There are no follow-up evaluations or assessments to test the accuracy of predictions or modelling contained in an impact assessment, and

(d) There are a number of other variables influencing economic and social impacts (eg changes in demographics, technology, commodity prices and...
employment relations) that can impact on local and regional communities, and which are not covered in an impact assessment process (Rolfe and Hyland 2004).

International literature on best-practice in social and economic impact assessment suggests that; (1) where mining companies actively seek the views of the community and other stakeholders on proposed mine development, mine operation and mine closure there is significant potential to reduce conflict and maximise the local capture of benefits from coal mining; (2) engagement of the community and government in planning over the length of a mining cycle can lead to more efficient provision of infrastructure in regions; (3) the social and economic sciences offer a range of tools to ensure that community engagement goes beyond traditional processes of consultation and communication; and (4) the social and economic sciences also offer a range of tools to ensure that negotiations between mine operators and other stakeholders are based on accurate and rigorously collected information (Rolfe and Hyland 2004).

Existing literature on natural resource planning and management now takes it as given that broad consultation and participation reduces conflict and improves the quality of decision-making. In relation to large resource development projects, public involvement is seen as something that should occur early in the life of a proposal in order to ensure that:

- impact assessment processes incorporate local knowledge about social conditions, processes and likely impacts;
- attitudes and perceptions towards proposed change can be identified;
- subjective and cultural impacts may be identified;
- appropriate mechanisms to involve different groups in the decision-making process may be identified;
- the views of the public may be incorporated at the stage of project design and used to maximise benefits rather than simply to compensate the losers following implementation;
- a range of alternative mitigation and development options may be identified and adequately assessed; and,
- conflict over projects may be minimised by ensuring that as many interests as possible are considered in decisions and appropriate mitigation strategies are put in place (Rolfe and Hyland 2004).

It is not always clear, however, how communities of interest should best be involved and consultation strategies are often little more than public relations exercises conducted at the beginning of a major project. Ideally, consultation with communities
affected by any aspect of mine development, operation or closure should begin as early in the life of a mining project as possible, and then be ongoing. Adequately resourced closure plans should be maintained throughout the life of mining projects to ensure that planned outcomes are achieved. Community acceptance of the plans will facilitate the acceptance of tenure surrender at the end of mine life. Mine closure issues will vary from site to site, as will appropriate consultative processes. There is a clear need, therefore, for the development of principles—backed up by a toolkit of concrete guidelines and models—on which mining companies can draw to develop effective site-specific processes to engage with communities in planning and negotiation over the life of a project. By supporting systematic and objective research into the specific, but variable, needs of operators and communities in the Bowen Basin\textsuperscript{47} and the options that are potentially available to them the industry in the Basin, and more generally, will maximise opportunities to develop innovative and practical processes.

This section provides a snapshot of the Bowen Basin focusing on the demographic profile of the region, a general overview of the Coal industry in the Bowen Basin and a summary of the key economic and social issues affecting the region.

\subsection*{2.1.1.1 Overview of the coal industry in the Bowen Basin}

There are a number of coal mines in the Bowen Basin. The basin extends from Collinsville in the north to Moura in the south (see Figure 3-1), and produced $2.76 billion of coal in 1999/2000. This was 34\% of Queensland’s total mineral production (Department of Local Government and Planning 2002). Mining activities tend to be carried out by larger scale firms. There were 45 coal mines operating in Queensland during 2003–04. Of these, 34 were open-cut mines and 11 were underground (NRM 2005a). About 85\% of the state’s coal is produced from mines in the Bowen Basin and the remainder comes from mines in the Moreton, Tarong, Callide and Surat basins.

A number of new developments and changes to mine operations have occurred since 2001 with six new mines opening and with feasibility and development work continuing on a number of other projects, and further new mine developments under investigation. Other summary statistics are:

\begin{itemize}
  \item Queensland exported a total of 129.2 million tonnes of coal in 2002-2003, and increase of 5\% on the previous year
  \item Queensland exports coal to 35 countries worldwide. The largest purchasers of Queensland coal in 2002-2003 were Japan (40\% of total exports), Korea (15\%), and India (10\%) (NRM 2005b)
\end{itemize}

Coal mining firms directly employed approximately 16,400 people, and paid them almost $1000 million in salaries (ACIL Consulting 2002a). A further 15 – 20\% of

\textsuperscript{47} Bowen Basin is a region in Central Queensland that is currently undergoing a rapid expansion of coal mining activities
jobs and salary payments would have been sourced through payments to contractors, and a further $2,200 million is paid to firms that provided goods and services to the mining industry (ACIL Consulting 2002a). It is estimated that there are up to 60,000 full-time and part-time jobs involved in the provision of goods and services to the mining industry.

The mining industry in Queensland accounted for around 17% of all capital expenditure in Queensland in 1999-2000 (ACIL Consulting 2002a). This amounted to $1,215 million. The main areas of expenditure from an industry producing more than $6 billion per year are as follows:

- Salaries and wages $1.2 Billion
- Goods and services $2.2 Billion
- Infrastructure $1.2 Billion

Other areas of expenditure include exploration and research and development. These investments are important, because mining relies on new discoveries and better technology for extraction to be able to maintain or increase output. Currently about 10.2% of the Gross State Product, and about 1 in every 14 jobs is generated by mining activities (ACIL Consulting 2002a). The contribution is much higher for regional areas in Queensland where mining activities occur. The economic stability and growth of many regional areas is dependent on continued investment in the mining industry.

The importance of mining to regional economies is driven in Australia by the high incomes of employees in the mining sector. Average weekly earnings in the mining sector in Australia are higher than any other industry, and were $AU1,424/week for a full-time employee in August 2001. Wage levels are approximately double weekly earnings in the retail trade and tourism industries (ACIL Consulting 2002a). The high levels of income in the mining industry mean that flow-on expenditure levels are high. Even though mining accounts for only 1 in every 14 jobs in Queensland, the industry accounts for significant job creation as income is spent in other industries. In terms of spending impacts on the Queensland economy, a job in mining is worth approximately two jobs in either the retail trade or tourism industries (ACIL Consulting 2002a).

The contribution of the coal industry to output and jobs in regions of Queensland has been reported by ACIL Consulting (2002a). These estimates are reproduced in Table 3-1. They show that the coal industry is responsible for approximately half of mining related jobs in Queensland, and that the bulk of economic and employment activity is in Central Queensland, where approximately 15,784 full-time job equivalents have been created by the industry. The estimates indicate that much of the employment and economic activity generated by the coal mining industry is captured within the same region.
Figure 11-2 Bowen Basin Area Map

Source: Bowen Basin website (Bowen Basin Area Map 2003)
Table 11-6  Annual economic benefits from coal and petroleum production.

<table>
<thead>
<tr>
<th>Region</th>
<th>Gross output effects ($M)</th>
<th>Additions to factor income ($M)</th>
<th>Additions to Gross State Product ($M)</th>
<th>Full-time job equivalents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brisbane-Moreton Wide</td>
<td>769.00</td>
<td>230.17</td>
<td>295.91</td>
<td>4558</td>
</tr>
<tr>
<td>Wide Bay-Burnett Southern</td>
<td>584.61</td>
<td>127.38</td>
<td>220.41</td>
<td>3183</td>
</tr>
<tr>
<td>Central</td>
<td>862.84</td>
<td>258.61</td>
<td>310.09</td>
<td>4114</td>
</tr>
<tr>
<td>Northern</td>
<td>4636.64</td>
<td>927.22</td>
<td>1811.82</td>
<td>15784</td>
</tr>
<tr>
<td>Northern-West</td>
<td>634.95</td>
<td>97.14</td>
<td>312.75</td>
<td>3797</td>
</tr>
<tr>
<td>Total</td>
<td>7650.85</td>
<td>1654.90</td>
<td>3023.93</td>
<td>32533</td>
</tr>
<tr>
<td>Queensland Rest of Australia</td>
<td>521.90</td>
<td>148.07</td>
<td>209.30</td>
<td>3322</td>
</tr>
<tr>
<td>Total Australia</td>
<td>8172.75</td>
<td>1802.97</td>
<td>3233.23</td>
<td>35855</td>
</tr>
</tbody>
</table>


The following are examples of how income that results from mining in the Central Region flow to other areas of the economy:

- Purchases of high technology equipment and technical services assess by a mining firm.

- Machinery and equipment for maintenance purposes are purchased from local and interstate suppliers.

- Mining employees and their families spend their income on local goods and services such as housing, food, clothing, health services and recreation.

- Investors in mining firms receive dividends which they use for the purchase of goods and services (ACIL Consulting 2002b).

Within the coal industry, there are a number of important trends that have an impact on social and economic factors. Some of these are summarised below.

2.1.1.2 Commodity cycles

Typical of many resource industries, the coal industry is affected by major commodity cycles. In the late 1990s, the industry contracted its workforce in the Bowen Basin, partly as a consequence of relatively low returns from coal production. In more recent times, the industry has enjoyed a major resurgence. The price of coal has
trended upwards (Figure 3.2) since March 2004 as China and India entered the market as major purchasers and oil prices have tracked higher. While production has trended upwards in response to the increased prices (Figure 3.3), there are a number of major developments occurring that will lift production further in coming years. These developments will impact on the regional economy.

The Queensland Government has predicted that there will be a growth rate of 7% per annum in the coal industry from 2005 – 2010 (Press release by the Government Minister Department of State Development, McGrady 23/11/04). The amount of coal transported by rail is expected to increase from 143 Mt in 2003/04 to 202 Mt in 2009/10. There are a number of current and potential developments across the Bowen Basin as producers respond to the increased demand for coal.

Figure 11-3 Changes in coal prices and value of Australian exports

Figure 11-4 Coal production in Australia and Queensland
2.1.1.3 Operational changes

There have been changes in employment patterns and trends within the coal industry over the past few years, with downstream impacts on social and demographic changes. First, there is increasing emphasis on the use of contractors to perform some or most of the mining operations. This change has been driven by searches for efficiencies in production. Second, there is increased usage of variations on fly-in/fly-out operations, where mining companies no longer build mining towns or take full responsibility of employees outside of working hours. There have also been changes in industrial relations agreements and shift work patterns at many mines across the Bowen Basin.

One effect of the changes is that employees now have more choice about where they are located. Many employees now live in the larger centres or coastal cities and stay in company accommodation when they are completing a shift. Another effect is that there has been some turnover of people across mining towns as many mining companies have shed staff. Most of the mining towns however have maintained the population with a shift to an increase in the employment of contractors and service industries.
2.1.1.4 Social and demographic changes

These changes have to be viewed in the context of other demographic influences on regional Queensland. There have been population decline in many regional areas as increased efficiencies in agriculture and service industries mean that fewer people are employed in those sectors. In many cases the population movements are from rural areas and smaller towns to larger centres within regions. Better transport and communication facilities, increased emphasis on service industries and the increased scale of firms and enterprises are among some of the economic reasons why larger centres have grown at the expense of smaller ones.

There are also a number of social reasons why there have been population movements to larger centres. These include better employment opportunities (especially for partners), better education and health services, increased recreation opportunities, and quality of lifestyle factors. Currently there are a variety of employment patterns at the different mines across the Bowen Basin, ranging from the traditional company town close to the mine site option to the more recent fly-in/fly-out operations. This means that there is some opportunity for employees to “vote with their feet”, and shift to the mining operation that suits their personal preferences.

The intersection of the current boom in the mining industry and the demographic shift away from regional areas is creating acute shortages of skilled labour in some areas. It is becoming increasingly difficult to source skilled labour in the region. Reasons for this include:

(a) a limited pool of specialist skills,

(b) limited training opportunities / graduates in some fields (eg mining engineering),

(c) difficulties in attracting skilled employees to move to regional areas (Rolfe and Hyland 2004).

These factors mean that it is important that regional communities remain attractive residential locations, both to retain existing skilled professionals, and to attract further ones. However, the attributes of communities that are important for current and prospective residents are complex. They include issues such as social capital, service provision, social infrastructure, economic services and infrastructure, access to major centres, and entertainment and recreation opportunities.
• International best-practice in social and economic impact assessment suggests that: mining companies should actively seek the views of the community and other stakeholders on proposed mine development, mine operation and mine closure. There is a need for the engagement of the community and government in planning over the length of a mining cycle as this can lead to more efficient provision of infrastructure in regions.

• The social and economic impacts of mining on communities should be examined in relation to the impacts on local communities and the impacts on the wider region, particularly where shiftwork patterns allow families to be located in other communities; and impacts on individual families and the decisions they make about whether to locate in local or regional centres.

• Impacts that are experienced positively in one of these areas may be experienced negatively in another. There is often a lack of clarity over the exact magnitude of positive and negative impacts, and over procedurally just ways of allocating resources to manage them.

• The impact assessment processes should incorporate local knowledge about social conditions, processes and likely impacts and include the advantages that
  ➢ attitudes and perceptions towards proposed change can be identified;
  ➢ subjective and cultural impacts may be identified;
  ➢ appropriate mechanisms to involve different groups in the decision-making process may be identified;
  ➢ the views of the public may be incorporated at the stage of project design and used to maximise benefits rather than simply to
• Technology and community values have changed employment patterns and trends within the coal industry over the past few years, with resultant downstream impacts on social and demographic changes.

• Global mining companies are placing an increasing emphasis on the use of contractors to perform some or most of the mining operations. This change has been driven by searches for efficiencies in production and the need to maintain global competitiveness.

• There is increased usage of variations on fly-in/fly-out operations, where mining companies no longer build mining towns or take full responsibility of employees outside of working hours.

• Globally there have been population declines in many regional areas as increased efficiencies in agriculture and service industries mean that fewer people are employed in those sectors. In many cases the population movements are from rural areas and smaller towns to larger centres within regions. Better transport and communication facilities, increased emphasis on service industries, liveability and the increased scale of firms and enterprises are among some of the economic reasons why larger centres have grown at the expense of smaller ones.

• The intersection of the current boom in the Australian mining industry and the demographic shift away from regional areas is creating acute shortages of skilled labour in some areas. A situation that requires consideration at
2.2 Case Study Two - Social Infrastructure

2.2.1 The Importance of Social Infrastructure

Social infrastructure includes the physical assets in communities used to provide health, education, recreation and other community needs. Many elements of social infrastructure are provided through public funding, although some (particularly those relating to housing, social and recreational needs) are provided through private market mechanisms. Where infrastructure is provided from public funding, there are often debates about the appropriate levels and types of infrastructure needed. At the regional level these debates become very important because the standard of social infrastructure and associated services are often factors that differentiate communities. Communities with higher standards of social infrastructure are sometimes in a better position to attract a greater population base and capture economic development opportunities.

Social infrastructure can be defined as the network of physical assets that meet community needs, while economic infrastructure can be defined as the network of physical assets that meet business needs. While some assets are easy to define into community or business service categories, many infrastructure assets service both community and business needs and are more difficult to categorise.

Social infrastructure is important to regional communities for a number of different reasons. The first is that infrastructure is usually a prerequisite for the delivery of many services into regional communities. The second is that some social infrastructure is often required for business needs, and hence is directly required for economic development. The third is that social infrastructure is needed to attract and retain workforces in regional areas, and hence is indirectly required for economic development.

2.2.1.1 The relationship between social infrastructure and economic development

The relationship between infrastructure and economic development is shown in Figure 3.4. The model identifies the reciprocal relationship involved where social infrastructure helps to drive economic activity and development, and where economic activity creates demands and funding for social infrastructure (Rolfe and Hyland 2004).

Those relationships can be specified in more detail. There are three specific models of the direct and indirect impacts of social infrastructure on regional economic development:

(a) Investment model – social infrastructure creates long-term beneficial outcomes for community welfare and economic development,

(b) Constraint model – social infrastructure provided when its absence is a constraint to community and economic development,
(c) Catalytic model – appropriate social infrastructure is a catalyst for community and economic development (Rolfe et al 2005)

There is also a model of how economic development creates demands for regional infrastructure:

(d) response model - social infrastructure provided in response to community demands, particularly as communities grow and as expectations rise,

![Diagram of how social infrastructure impacts on economic activity](image)

Figure 11-5  A model of how social infrastructure impacts on economic activity  
(Rolfe et al 2005)

### 2.2.1.2 Government investment in infrastructure

Within Australia and elsewhere, governments fund public infrastructure to provide public services to communities and to provide the structural basis for economic activity and growth. Government outlays on sectors such as health and education, with both infrastructure and service elements, are major components of public spending (Quiggan 2001). There is considerable interest therefore in determining
the levels of government investment that generate appropriate social returns. A key area of interest is the appropriate level of expenditure on social infrastructure as compared to expenditure on economic infrastructure.

At one level the debate about public infrastructure funding revolves around the analysis of how public infrastructure reduces costs and increases productivity for private industry (Paul 2003). This is particularly relevant for economic infrastructure such as railways and ports, where provision allows new forms of trade and communication to flourish. It is more difficult to establish the exact linkages between the provision of social infrastructure and economic productivity, although the general positive relationships between levels of health and education and workforce production are widely accepted (Schultz 1999). This is the ‘human capital’ argument that was developed by Adam Smith and has become important in explaining regional growth models (Chapman and Withers 2001; Eslake 2003).

Determining the appropriate levels of public funding for social infrastructure is difficult for three key reasons. The first is that it is difficult to measure the contribution of infrastructure to economic growth. The second is that the contribution of social infrastructure is jointly tied to the provision of services – without the funding of services, infrastructure has little impact. This means that quantifying the impacts of social infrastructure on economic growth is even more difficult to quantify. The third reason is that technological, demographic and social changes impact on the way that infrastructure is used and viewed by society, making it complex to assess social preferences for infrastructure.

Some commentators would argue that social infrastructure (and services) should be simply focused on addressing equity goals in society, and productivity and economic growth outcomes are separate goals to be pursued with economic infrastructure. There are three very good reasons why this ‘equity only’ argument is too simplistic, and why social infrastructure needs to be planned with both equity and economic outcomes in mind.

The first reason is that the provision of social infrastructure and services has impacts on economic productivity by increasing the pool of human capital, improving knowledge and liveability, and making regions more competitive. This means that social infrastructure can not be divorced from economic impacts. The second reason is that the stock of social infrastructure and services that can be provided is dependent on the existing wealth and productivity of an economy. This means that any future provision of social infrastructure and services is dependent on economic systems maintaining or increasing productivity. With this linkage in mind, it is logical to ensure that if investments in social infrastructure are to meet equity outcomes they should be made in ways that also enhance future productivity.

The third reason is that demographic, social, technological and economic change is continuous and not fully predictable, particularly at regional levels. Changes in economic activity and the development of new technology impact on both the demographics of regional areas and the opportunities to deliver services in new ways. Greater awareness of economic trends and technology advances helps to adjust the provision of services to circumstances and achieve more cost-effective outcomes.
Social infrastructure is not exclusively provided by public funding. Many recreation, health and education services are provided by the private sector, with corresponding investment in infrastructure. As well, there have been moves towards partnership models between public and private sectors to fund typical ‘public’ infrastructure items such as roads, hospitals and prisons. These developments in funding models open more opportunities to source funds for identified social infrastructure projects.

In the next section, some theoretical issues relevant to the analysis of social infrastructure are reviewed. The purpose of the analysis is to provide some guidance for the planning and supply of public social infrastructure, given that both equity and economic considerations are important in a planning process.
2.2.1.3 Definitions and categorisations for Social Infrastructure

There is no single definition for social infrastructure, and it is difficult to find a clear distinction between economic and social infrastructure. One definition is that social infrastructure is focused on the network of physical assets that meet community needs, while economic infrastructure is the network of physical assets that meet business needs. Another definition is that social infrastructure is physical assets provided by governments to meet community needs as distinct from assets provided to stimulate economic production.

There are many cases where infrastructure can provide a dual role. For example, roads can service both businesses and communities, and education has both community and productivity benefits. In one sense, this means that there may be joint justifications for some infrastructure. However it also means that it is very difficult to distinguish clearly between social and economic infrastructure.

Social infrastructure is a very different concept to social capital. Social capital refers to the institutions, relationships, attitudes and values that govern interactions between people (Productivity Commission 2003), whereas social infrastructure refers to the ‘hard’ assets like schools and hospitals that allow social services to be provided to communities. In some cases there may be linkages between the two. Some social infrastructure (e.g. communications infrastructure) may be important in developing and maintaining social capital. Conversely, communities with high levels of social capital may make more effective use of social infrastructure.

There is also some relationship expected between social infrastructure and human capital. Human capital models treat the skills and abilities of people as a pool of capital, roughly equivalent to the value of earnings over a life cycle (Schultz 1961). Viewed in this way, it makes sense for individuals to invest in education, because a short term loss in earnings may be offset by large increases in earnings over the longer term. In the same way it makes sense for individuals to maintain health, and for the state to invest in children and families, because of the long term rewards in productivity. While some definitions of human capital are narrowly focused on productivity outcomes, others are broader, encompassing other learning and personal satisfaction motives (Quiggan 2001).

Social infrastructure and social services provide the framework and mechanisms by which human capital is developed. In turn, higher levels of human capital create more production possibilities, making the development of further infrastructure and services more affordable. It is also likely that close relationships exist between human capital and social capital, and social infrastructure is important in fostering the development of both. However, while models of social and human capital are particularly focused on education services, and to some extent health services, social infrastructure tends to be focused on a much wider group of assets and services.
2.2.1.4 The effects of public infrastructure on productivity in the private sector.

There has been substantial discussion about the linkages between the supply of public infrastructure and subsequent economic performance (Paul 2003). In part, the debate is linked to the trends to restricted government spending in countries such as the United States and the United Kingdom. The argument is that by lowering taxation rates, private incentives are enhanced, leading to higher economic growth. However, if there is a rundown in social infrastructure as a consequence of reduced government income, it may ultimately impact on productivity and social well-being (Quiggan 2001). Understanding the linkages between public infrastructure and productivity helps to guide appropriate levels of government expenditure.

Two other important influences on public infrastructure should be noted. The first is that as society becomes more urbanised, as factors of production become more specialised, and as the economy becomes more service orientated, infrastructure requirements tend to rise. Quiggan (2001) details the growth in the service sectors of the Australian economy and in public expenditure on services. There are also many demographic and cultural factors which drive additional infrastructure requirements. For example, an aging population, together with nuclear families and increased mobility and workforce participation means that in the future more older people will be cared for by the state than within the traditional family structure.

Countering these increased demands for infrastructure is the greater use of private industry to supply services and infrastructure. Private industry already plays an important role in the health, education and recreation fields. This involvement is likely to increase as governments search for ways to limit public spending and ration public services in cost-effective ways. In areas such as education it is becoming more accurate to think of the mixture of public and private spending as a sliding scale of joint combinations rather than a clear demarcation between sectors.

Economists expect that public investment in transport, communications, power and water infrastructure will directly benefit private businesses, while investment in areas such as law and order, education and health will provide strong indirect benefits. Examples of studies that show linkages between investment in public infrastructure and productivity growth include a study of aggregate data in the United States (Aschauer 1989), a comparison of data between countries (Easterly and Rebelo 1993), and two major Australian studies (Otto and Voss 1994, Paul 2003). Many of these studies show high rates of return on public infrastructure investment, although there are wide variations in results (Paul 2003).

The empirical work of Paul (2003) shows that public sector investment in Australia from the period 1968/69 to 1995/96 has had a positive and significant impact on productivity in private sector industries. On average, the rates of return to public investment are about 25 percent in terms of reducing costs for private businesses, and about 68 percent in terms of increasing output for private businesses. In sectors where scale economies have become more prominent, such as agriculture; mining; wholesale and retail trade; and transport, storage and communication, growth in output has been particularly strong. If additional benefits to consumers are
considered, estimated rates of return would be higher. Paul (2003) notes that substitutability exists between public infrastructure, and both labour and private capital. This means that where public infrastructure is not available, it may be substituted by providing additional labour or private capital resources. For the Australian data, the degree of substitutability was stronger between public infrastructure and labour than between public infrastructure and private capital. This may be because private sector firms in Australia have traditionally not invested in infrastructure areas such as transport if public infrastructure was not available.

Some caveats should be noted about this strong linkage between public infrastructure and economic productivity. The first is that past performance is no guarantee of future relationships. Dowrick (2001) notes that the surge in Australian productivity rates over the past decade has occurred at a time of declining expenditure in public infrastructure. This suggests that other factors such as microeconomic reform and the benefits of new information technology may explain increased productivity, and that increasing public infrastructure may not always be a prerequisite for increasing productivity. Not all infrastructure projects represent an efficient allocation of resources, and arguments that infrastructure generates economic returns will not always be accurate.

A second caveat is that while the analysis of Paul (2003) shows high returns on public infrastructure generally, it may not be appropriate to conclude that similar returns exist for social infrastructure as compared to economic infrastructure. This is partly because social infrastructure may be much more substitutable than economic infrastructure (e.g., particular labour shortages may be addressed by bringing in skilled migrants). Returns on social infrastructure may also be lower because there are likely to be long lags between provision and economic impact, and because the impact is jointly dependent on adequate service provision alongside of infrastructure.

A third caveat is that increased public spending on infrastructure is likely to have some crowding-out effects on private investment (Quiggin 2001). The costs of providing or raising public capital will spill over into private capital markets, hence affecting the rates of private return. Where the displaced private investment would have created higher returns than the public investment, then growth will be reduced.

These analytical difficulties are compounded by the measurement problems. It is difficult to differentiate the impacts of social infrastructure on economic performance as distinct from those of economic infrastructure. While there is wide acceptance that social infrastructure provides a basic framework for community and economic performance, it is very difficult to isolate the marginal impacts of increasing social infrastructure at any particular point in time.

A key area where the combination of social infrastructure and social services should impact on economic growth is in the area of education. It is expected that improvements to human capital through education will contribute to increased productivity and economic growth in several ways:

- By increasing the skills and abilities of individual workers
• By raising the flexibility of workplace teams
• By allowing for more rapid utilisation and transmission of new skills and production technologies
• By fostering the creation of knowledge, ideas and technological innovation
• By making it easier for workers to adjust to different environments and unanticipated shocks
• By disseminating knowledge and ensuring that worker retirement or death does not result in knowledge loss (Chapman and Withers 2001, Eslake 2003)

Chapman and Withers (2001) review the evidence that investment in education in Australia is directly related to economic growth. There is clear evidence that education delivers private benefits, which helps to explain why there are higher levels of private funding for education at primary, secondary and tertiary levels. There is also indirect evidence that higher education levels create social benefits (on top of private benefits). Pope and Withers (1994) showed that economic growth in Australia over the previous century had been very highly influenced by changes in aggregate skill levels as measured by participation in education. Chapman and Withers (2001) conclude that if Australian workforce quality had been the average of other countries in the period from the 1960s to the 1990s, the average GDP growth rate would have been approximately one percent higher.

2.2.1.5 Assessing the benefits of social infrastructure.

In any debate about the efficient allocation of public expenditure, it is important to be able to assess the costs and benefits of marginal changes. The need to assess public spending on infrastructure and services comes from several pressures. One is the budgetary problem where there is large growth in demand for publicly funded services at the same time that governments are under pressure to restrain public expenditure. This means that there is more interest in determining which service and infrastructure programs are best meeting community interests. Another pressure comes from greater attention to efficiency measures. The micro economic reform process in place since the late 1980s has demonstrated that matching supply and demand at a micro level helps to signal incentives better and greatly increases productive outcomes. The same logic can apply to public services; where there are many opportunities to match supply and demand more accurately, and to concentrate provision on those services that deliver highest community outcomes. In many cases the costs of providing public infrastructure and services are readily quantified. It is much more difficult to quantify the benefits. Quiggan (2001) outlines the different approaches available to being able to value those benefits more directly. His approach is summarised in Table 3.4. The approaches can be
summarised into three main groups.

1. One approach is the non-economic or political approach, where funding is allocated according to voter support for different programs. However, there is no transparent way in which this approach can be used in Australia.

2. Another approach is to focus on indirect outputs, where measures of economic performance, land values or wage levels may be linked in some way to the levels of social infrastructure. While the outputs are often easy to measure, it is often very difficult to link them to the varying levels of infrastructure provision and generate robust models.

3. The third group focuses on more direct economic measures and includes stated preference techniques and cost-effectiveness analysis. These are more theoretically robust, with more direct linkages between peoples’ preferences and varying levels of social infrastructure. However, the measures are often difficult and costly to estimate in practice.

Quiggan (2001) reports that studies estimating the value of public services generally support the view that allocating more resources to human services in areas such as education, health and road safety, would increase social welfare. However, the debate about whether to increase public expenditure on services, and corresponding taxation levels, is unlikely to be resolved by economic analysis. The major role to be played by the assessment of benefits is in the allocation choices for expenditures between competing service and infrastructure programs.

### Table 11-7 Methods of valuing publicly provided services.

<table>
<thead>
<tr>
<th>Approach</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outputs, outcomes and benchmarking</td>
<td>Detailed measures of output of publicly provided services. In some situations, e.g. a ‘case mix’ approach in hospitals, the funding may be tied to those output measures. It is very difficult to benchmark all outputs, and to do it accurately.</td>
</tr>
<tr>
<td>Voter choice</td>
<td>Voters can use the political process to indicate which services they want. It is very difficult in Australia to distil this information from the general support for different political parties. In the United States the use of specific referendums provides more insights into these issues.</td>
</tr>
<tr>
<td>Stated preference methods</td>
<td>Uses survey methods to identify how people would make tradeoffs involving the provision of public goods. These techniques are mostly employed to assess environmental issues, but more applications are being developed to assess social issues. Estimates values for the provision of public services can then be compared to</td>
</tr>
</tbody>
</table>
The Quality Adjusted Life Year (QLAY) measures used in health economics are very similar in approach to the stated preference methods. They provide some measure of how to rate a life with impairment, loss of employment, pain or illness against a normal life. However, the results are mostly used to identify which procedures yield the most QLAYs for a given expenditure.

Where government services are specific to discrete areas or employment groups, the value of those services should be capitalised into land values or wage premiums respectively. Examples include the improvement in earnings of people who gain a tertiary degree. Wage premiums of people in dangerous occupations can also be used to estimate benefits of safety improvements.

Investments in public infrastructure and services may generate private returns, particularly through improvements to physical and human capital. There are a number of caveats and measurement issues that need to be recognised. Newer growth models are emphasising the importance of generating knowledge (research and development) to achieve economic growth.

Source: Quiggan (2001)

### 2.2.1.6 The contribution of social infrastructure to regions

There is strong evidence at the national level to suggest that the provision of public services will generate community and growth benefits (Paul 2003). A key issue is whether this general relationship can be mapped down to regional levels. Here the debate focuses more closely on the relationship between social infrastructure and regional development.

There has been substantial interest in the reasons why there are variations in the patterns of development between communities (Rainey et al 2003), and a number of different models of regional development have been advanced by researchers (Beer, Maude and Pritchard 2003). One issue of interest is the extent to which social infrastructure contributes to regional development. At a regional level, social infrastructure is mostly about the provision of education, health and recreation/lifestyle assets in a community. One argument is that a high standard of assets makes a community more attractive to live in, which helps industry and business to attract skilled labour at low cost. In this way, these assets make an essential contribution to regional development.

Regional development is often focused on economic criteria, particularly those involving job creation and local employment (Beer et al. 2003). For example, Tietz (1994) defined the regional economic development process as attempts to enhance the ability of a local community to maintain and create local employment. The rationale behind the emphasis on economic factors and employment is that growth and wealth
creation are normally needed to fund other initiatives, and that job creation is an essential factor in maintaining a population base. Many researchers have recognised the complexity of factors that generate regional economic growth, and there is normally an emphasis given to the processes and the institutions involved. Processes include such factors as the nurturing of new firms and businesses, the improvement of skills and management, the search for new markets and alternative industries, and the creation of suitable institutions (Beer et al 2003).

Some researchers have focused on other economic criteria, or have widened the goals of regional development to include non-economic criteria. For example, Rainey et al. (2003) define sustainable community development as encompassing a set of policies and activities across economic vitality, environmental stewardship and social equity goals.

The economic challenge in regional development is to find ways of stimulating private business activity that does not rely heavily on government financial support or patronage. One dominant theme revolves around the notion of allowing regions to be competitive rather than sheltering them from competition. For example, Coombs (2001) observes that in South Australia the degree of openness of the economy and the mobility of resources are two major factors affecting regional development. Globalisation is increasing competition between regions, as it is making it easier to source products and services from different areas. At the same time, globalisation and the development of technology are giving regions more opportunities to compete, including competition with urban centres.

Given that there are both pressures and opportunities for regions to be competitive, a critical issue revolves around the essential requirements needed for a rural or regional community to be able to compete successfully. A traditional view in economic regional development is that some competitive advantage in some natural resources was the most important factor. The BTRE (2003) report contains a useful categorisation of the regional development policies that have been previously implemented in Australia. For convenience, these are summarised in the following table (Table 3.5). The themes demonstrate the movement away from direct government subsidy or intervention towards making regions more self-reliant and competitive at a national and global level.

### Table 11-8 Themes in regional development in Australia over time.

<table>
<thead>
<tr>
<th>Time period</th>
<th>Theme Description</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>To 1940s</td>
<td>Intervention and protection</td>
<td>Provision of government infrastructure, protection of sector interests, generation of depression era employment</td>
</tr>
<tr>
<td>1950s and 1960s</td>
<td>Attraction of major firms from exogenous strategies to attract large firms from outside into regions. Firm specific</td>
<td>Firms became more ‘footloose’, and subsidies weakened</td>
</tr>
</tbody>
</table>
outside subsidies and other financial incentives often used.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Strategy Type</th>
<th>Description</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early 1980s</td>
<td>Sectoral or industry strategies</td>
<td>Promote industry clustering and enterprise areas. Provide infrastructure and location development, and sought to attract new firms as well as promote local ones.</td>
<td>Programs such as enterprise zones often ineffective. Outside firms often transient. Still highly reliant on external support.</td>
</tr>
<tr>
<td>Mid-1980s on</td>
<td>Competition of regions in a global market</td>
<td>Focus on local enterprises that capitalise on region-specific resources and knowledge capital. Emphasis on growth from within region that is driven by region</td>
<td>More closely aligned with human and capital, and hence more complex to implement.</td>
</tr>
</tbody>
</table>

In recent decades the moves towards more service-oriented economies have shown that natural resource endowments are not essential requirements. Rainey et al. (2003) describe two main arguments about the essential factors needed to achieve regional development. The first, advanced by Weinberg (2000), holds that human capital, physical infrastructure and access to finance are the three most important building blocks for regional development. The second, advanced by Rainey et al. (2003) holds that public capital, human capital and social capital are the three most important building blocks.

An example of these issues comes from Plowman et al. (2003), who report that small Queensland towns that appear to be more innovative have (among other factors): a higher proportion of residents who have lived elsewhere, residents who have lived in their present town the least average amount of time, a younger population, an upward population growth, and a higher average level of education. One key challenge for regional centres is to find ways of attracting new people to move to their town and aid in the creation of an ‘innovation’ culture.

Given these debates, the role of social infrastructure for regional areas can be summarised into three key issues:

- Generating growth directly
- Attracting skilled labour and giving regions competitive advantages
- Generating growth indirectly.

Direct impacts on the generation of growth include the economic impacts from the construction and maintenance of infrastructure in regional areas. This is essentially a distribution effect. New growth models emphasize other direct impacts through the creation of new knowledge (Quiggan 2001). This emphasizes the role that universities, research centres and other research and development agents play in stimulating development in regional areas.
Skilled labour is becoming more mobile at regional, national and international levels. As well, lifestyle choices are becoming more important to people when they consider relocation options. The combination of these factors mean that social infrastructure and services are likely to become increasingly important for regional areas that wish to both retain and attract skilled labour, particularly skilled professionals. Developing the ‘quality of life’ in regions across a range of public and private fields is emerging as a key way for regions to increase their stock of skilled labour and develop a competitive advantage.

Social infrastructure also has longer term and more indirect impacts on regional growth through improvements in education and health, and other investments in human and social capital. Key issues here are the degree to which those improvements are:

(a) dependent on the level of social infrastructure within regions, and

(b) fungible in the longer term, where skill sets may become more transportable, and gaps in human or social capital may be substituted by future technology or other advances.

The first issue relates to the fact that it is the overall level of service within a region that may be the critical factor. In some cases, services may be delivered into a region rather than within a region, and so the importance of social infrastructure to regional service outcomes may need to be assessed on a case-by-case basis.

The second issue relates to the fact that the outcome of public services investment is likely to be much more transferable than investments in economic infrastructure. For example, medical practitioners trained in one particular region may end up practicing in other regions, in contrast to fixed investment like roads and bridges. This transfereability means that regions that do not invest in particular areas (like skill sets in specialised engineering fields) can remedy the gaps by attracting in the required levels of skilled labour. The choice of investment in some services therefore is partly dependent on an analysis of the likely probabilities that those outcomes will be required in the future and the cost of provision as compared to the opportunity costs of importing the required skills at some future date.

2.2.1.7 Modelling the contribution of Social Infrastructure to economic growth

The discussion about social infrastructure and regional economic development suggests that the supply of social infrastructure will have a varied impact. There are four broad models of the relationship between regional economic development and the provision of social infrastructure.

(a) response model – social infrastructure provided in response to community demands, particularly as communities grow and as expectations rise,

(b) investment model – social infrastructure provided to provide long-term beneficial outcomes for community welfare and economic development,
(c) constraint model – social infrastructure provided when its absence is a constraint to community and economic development,

(d) catalytic model – appropriate social infrastructure is a catalyst for community and economic development.

The response model is likely to be the dominant paradigm currently guiding investment in social infrastructure. This is where infrastructure is provided in response to community demands. The model tends to be driven by equity considerations rather than in terms of investing in future community development. For example, communities over a certain size tend to argue that they are entitled to certain types of public infrastructure, rather than arguing that investment in those infrastructures will lead to community development outcomes.

The response model is usually driven by demographic considerations. For example, if the population of a certain region increases, the response model predicts how many extra schools, hospitals and other public facilities are needed to cater for the changed population needs. The operations of response models tend to be set as an outcome of economic performance. As private income rises, demands for services tend to rise, with corresponding calls for public infrastructure. In the same way, increases in national income increase government budgets for services and infrastructure, and allow those demands to be met.

An implication of the response model is that investment does not tend to be very strategic, and that it is difficult to change community demands for services and infrastructure as new technology and skill sets become available. Unless governments are proactive then a significant problem with the response model is that it may not encourage very strategic thinking about how to supply social infrastructure. In contrast, an investment model is focused on explaining how the provision of social infrastructure and services leads to long term social and economic development. Here the focus is on causation rather than simply satisfying community demands in the short term. Under the investment model, the focus of social infrastructure provision would be in terms of strategically developing infrastructure to meet community needs in the future in ways that will build economic prosperity for regions.

Examples of strategic investment might be:

- focusing development in regional hubs in anticipation of demographic changes and advances in technology,

- developing new knowledge in regions as an investment for long term growth,

- encouraging specialisation in service and infrastructure provision between regions for efficiency and competitive advantage regions,

- locating different types of infrastructure and services around regions to avoid duplication,
• focusing infrastructure and services in regions that need to attract skilled labour and professional services,

• developing infrastructure strategically to cope with demographic trends (e.g., use of demountable buildings in some mining towns where demographic changes are expected in short to medium terms).

A constraint model refers to the situation where regional growth is held back because there are some gaps in social infrastructure. An example would be where skilled labour is difficult to attract to a new project in a regional town or city because of inadequate health or education facilities. A constraint model is effectively a short-term version of an investment model. To a large extent, the constraint model reflects a degree of substitutability between public infrastructure and private business costs. It is often possible to provide skilled labour to projects, but at the expense of higher wage costs and/or special arrangements like fly-in/fly-out operations. Where constraints on the attractiveness of an area for population shifts can be lifted through the provision of social infrastructure, then the labour costs to private industry should fall.

A catalytic model is where the provision of infrastructure removes a bottleneck, allowing economic expansion and community wellbeing to improve. It can be viewed as an investment model constrained by a very short time frame. For economic infrastructure, catalytic models refer to the provision of essential infrastructure e.g., a port that allows a new mining venture to proceed. For social infrastructure, it is more difficult to find applications of the catalytic model, (although housing shortages in developing areas may be one example). This is because the key economic outcomes of social infrastructure, a highly skilled workforce, are usually substitutable by bringing in skilled labour from other regions. The issue is that this substitution comes at a cost to private enterprise that can reduce the viability of new developments but it is unclear that the substitution of public capital for a reduction in private costs will automatically increase the overall benefits of these projects. It is difficult to see that deficiencies in social infrastructure can create bottlenecks to development in the same way that deficiencies in economic infrastructure can.

However, the catalytic model may be appropriate for social infrastructure in other ways. The first is where new social infrastructure contributes to the development of knowledge in a region, particularly where it provides a leadership or linkage role. The second is where new social infrastructure changes the image for a centre or region, enabling the better attraction of skilled labour, population and/or tourists to occur. Using new social infrastructure to re-badge areas in terms of lifestyle can create new competitive advantages for regions. In many cases though, the scope of new investment is not large enough to be seriously categorised as a catalytic

48 An example of this type of catalytic development might be the Strand Development at Townsville that was completed in 2003.
investment.
A combined model of how social infrastructure impacts on a regional economy were shown in the previous section (Figure 3-4). This has been adapted from the human capital models of Schultz (1999) to be focused on the impacts of social infrastructure. The core of the model is the loop linking Social Infrastructure with National Income. In the model, the provision of social infrastructure (as measured by indicators) impacts directly on economic activity in several ways, encompassing the investment, constraint and catalytic models. The effects include improvements to labour productivity, workforce participation and capital availability (arising from investments in health and education and other services), increases in the liveability and competitiveness of different regions (making it easier to attract skilled labour and professional services) and improvements in knowledge (by providing infrastructure and services to act as catalysts within regions). These impacts on productivity lead directly to increases in State or National Income.
It is also possible that social infrastructure may generate non-economic outcomes. If expenditure on social infrastructure is on items that are not used, that do not contribute to the attractiveness of a region, and do not enhance labour productivity or the knowledge base, then there will be no feedback from that infrastructure investment to the national economy. A key issue therefore in determining the effectiveness of social infrastructure is to identify what linkage exists between it and subsequent economic performance.
The response model for providing social infrastructure is represented by the feedback loop from National Income back to Social Infrastructure. This shows that the investment level is dictated by levels of economic performance. It also implies that as national income (and household income) increases, demands for services and public infrastructure are also likely to increase. A response model effectively represents a reward from economic growth.
The key issue in the analysis of the response model is whether the investments in infrastructure generated from these demands tend to generate economic outcomes (ultimately improving national income) or non-economic outcomes. In the latter case, the investments might ultimately create a drag on economic performance where the higher costs of servicing the infrastructure and lost investment opportunities means regions achieve lower rates of economic performance and growth.
There are a number of internal and external constraints that limit the operation of the model. These include constraints on the input side on the stocks and operation of social infrastructure. They also include output-side constraints on the national economy that limit the effectiveness and impact of improvements in national capital. These constraints help to show how the impact of social infrastructure could be expected to vary across regional, state and national frameworks.

2.2.1.8 Key Considerations & Conclusions
• Social infrastructure can be defined as the network of physical assets that meet community needs, while economic infrastructure can be defined as the network of physical assets that meet business needs.

• Communities with higher standards of social infrastructure are generally in a better position to attract a greater population base and capture economic development opportunities.

• Social infrastructure is important to regional communities for a number of different reasons. The first is that infrastructure is usually a prerequisite for the delivery of many services into regional communities. The second is that some social infrastructure is often required for business needs, and hence is directly required for economic development. The third is that social infrastructure is needed to attract and retain workforces in regional areas, and hence is indirectly required for economic development.

• There are three specific models of the direct and indirect impacts of social infrastructure on regional economic development:

  (a) Investment model – where the investment in social infrastructure creates long-term beneficial outcomes for community welfare and economic development,

  (b) Constraint model – where the investment in social infrastructure is provided when its absence there is a constraint to community and economic development,

  (c) Catalytic model – where the investment in appropriate social infrastructure is a catalyst for community and economic development,
• It is difficult to establish exact linkages between the provision of social infrastructure and economic growth. The contribution of social infrastructure is jointly tied to the provision of services. In addition technological, demographic and social changes impact on the way that infrastructure is used and viewed by society, making it complex to assess social preferences for infrastructure.

• There are many cases where infrastructure provides a dual role. For example, roads can service both businesses and communities, and education has both community and productivity benefits. In one sense, this means that there may be joint justifications for some infrastructure. However it also means that it is very difficult to distinguish clearly between social and economic infrastructure.

• If there is a rundown in social infrastructure as a consequence of reduced government income, it may ultimately impact on productivity and social well-being of the region.

• A key area where the combination of social infrastructure and social services impacts on economic growth is education as improvements to human capital through education directly contribute to increased productivity and economic growth:
Conclusion

This report has been prepared for the Provincial Government of Gansu in the People Republic of China. The intent of the report is to provide a suite of case studies to inform and contribute to the development of a regional development strategy for the Gansu Province. The case studies collated in this report provide a cross section of insights into contemporary knowledge and best practice approaches and methodologies used in Australia, America and elsewhere. The learning’s from this work while having considerable application to a wide range of areas have been selected due to their relevance and application to the Gansu Province. The Province has a number of similarities to Australia including a similar eco-cline, vast rural community, environmental challenges, and emerging federalist system of Government and a strong desire to grow in a sustainable way.

The report has attempted to provide some insight as to the principles of best practice that have emerged from the global research. The report has also attempted to provide some insights as the similarities and differences that exist between the economy of Gansu Province and how the economy of Australia has provided a framework for regional economic development. The role of government in facilitating this sustainable regional development is also explored.

A substantive portion of the report is dedicated to exploring a number of defined case studies covering the economic, social and environmental dimensions. The practices presented in this section are discussed to gain a holistic and more integrated understanding of what are the key inputs that make Regional Economic Development successful or otherwise. As these systemic issues are raised repeatedly in global research they are regarded as underpinning prerequisites for sustainable regional development. However it should be noted that there are vast differences between regions and what will work in one region may not always be directly transferable to another region. However the issues that have been selected through these case studies have a common reference and as such may provide a guide to what are useful first principles in sustainable regional development.

It is clear any attempt to develop a regional strategy must be underpinned by an evidence base of the region's current and future challenges and opportunities. Stakeholder involvement taking a bottom up approach at the outset is fundamental to success.

The stakeholder must work toward the development of a shared vision for the region. This vision should be clear, and well articulated and based on the region's challenges and opportunities and reflect the region's social, economic and environmental priorities. Aims and objectives must be tangible and applied. These should be designed to implement the vision and reconcile strategic issues and conflicts facing the region.

Performance and progress should be benchmarked and monitored using an...
iterative and continuous improvement process. Specific actions should be set that deal with unsustainable activities or negative social, economic or environmental trends. It is important to make specific arrangements that will monitor progress and provide effective reporting to the stakeholders and the community.

Effort should be placed on coordination between all levels of government, NGO’s, industry and the community in order to capitalise on the available opportunities and partnerships. Partnerships between these stakeholders should be open, transparent and designed to empower and engage.

A holistic triple bottom line approach is seen as highly desirable and involves among other things, the public reporting of environmental, social and economic outcomes against established benchmarks. The vitality of organisations and communities depends on positive environmental, social and financial outcomes.

Successful triple bottom line approaches help clarify a region’s governance structures, identify problems with existing data collection and analysis practices and inform the development of practical, achievable social, economic and environmental goals. It may also improve a regions capacity and ability to identify the needs of stakeholders as well as the government’s ability to promote economic development.

The key to success for growth is embedded in the quality of human capital and in particular the leadership within the region. Appropriate learning environments are required to improve leadership and business acumen.

The government has two important roles to play in sustainable regional economic development one is to provide the policy and legislative framework for a stable, globally competitive environment and the second is act as a catalyst for growth and facilitate change. The concepts of what constitutes a world class investment environment, the constraints to effective region investment and what is required to establish and regional best practice program are explored and discussed.

Options for economic development are also explored and include underpinning prerequisites – infrastructure, legal and institutional changes, enhancing existing assets and industries including leveraging from economic “anchors”, reducing economic leakage, attracting new industry, increasing the efficiency and capacity of existing firms, and improving community capacity for economic development as well as others.

Regional connectivity is identified as a key driver that underpins successful economic development. The report explores how regions connect, their co-dependencies and interdependencies and provides a critique of the current knowledge base. Regional cities are now regarded as the platforms for the new economy and are essential building blocks of national economic development.

Aspects that influence sustainable regional development are provided in detail in the report and include: economic diversity, multiculturalism, the need for a creative and skilled workforce, the role of regional connectivity and strategic capacity, as well as innovation and entrepreneurship. Discussion is also provided on the need to create a sense of community, enhance community liveability, social cohesion and develop sound regional governance procedures.
The study has shown that global regional advantage is a complicated network of interconnected forces and factors that operate both alone and in concert through time and space. However the conclusions and learning’s outlined at the end of each section are designed to provide a quick reference (or checklist) of the basic elements required to develop reasonably robust strategies to achieve sustainable regional development in the Gansu Province.
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