

**REPORT AND RECOMMENDATION
OF THE
PRESIDENT
TO THE
BOARD OF DIRECTORS
ON A
PROPOSED LOAN
TO THE
PEOPLE'S REPUBLIC OF CHINA
FOR THE
GUANGXI ROADS DEVELOPMENT PROJECT**

September 2001

CURRENCY EQUIVALENTS

(as of 31 August 2001)

Currency Unit	–	Yuan (Y)
Y1.00	=	\$0.1208
\$1.00	=	Y8.2767

The exchange rate of the renminbi yuan is determined under a floating exchange rate system. In this report, a rate of \$1.00 = Y8.28 has been used.

ABBREVIATIONS

ADB	–	Asian Development Bank
BOT	–	build-operate-transfer
CDB	–	China Development Bank
EA	–	executing agency
EIA	–	environmental impact assessment
EIB	–	European Investment Bank
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
GDP	–	gross domestic product
GCD	–	Guangxi Communications Department
GEMC	–	Guangxi Expressway Management Company
GZAR	–	Guangxi Zhuang Autonomous Region
ha	–	hectare
ICB	–	international competitive bidding
IPO	–	initial public offering
IS	–	international shopping
JBIC	–	Japan Bank for International Cooperation
km	–	kilometer
LCB	–	local competitive bidding
LIBOR	–	London interbank offered rate
MOC	–	Ministry of Communications
MTE	–	medium truck equivalent
NH	–	national highway
NTHS	–	national trunk highway system
PADO	–	poverty alleviation and development office
PCD	–	Provincial Communications Department
PIU	–	project implementation unit
PRC	–	People's Republic of China
TA	–	technical assistance
10FYP	–	Tenth Five-Year Plan
VOC	–	vehicle operating cost

NOTES

- (i) The fiscal year (FY) of the Government ends on 31 December.
- (ii) In this report, "\$" refers to US dollars.

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LOAN AND PROJECT SUMMARY

Borrower	The People's Republic of China (PRC)
Project Description	<p>The Project is located in Guangxi Zhuang Autonomous Region (GZAR), a relatively poor southwestern region of the PRC, where the average gross domestic product per capita is about two thirds of the national average. The Project includes (i) constructing an expressway and highway across flat to hilly terrain with connector roads to county towns; (ii) improving local roads servicing poor villages of the project area; and (iii) providing consulting services and training to enhance construction quality, road safety, and project monitoring and evaluation. The project expressway will support the Government's Great Western Development Strategy by building an important link of the national trunk highway system (NTHS) in GZAR and enhance cross-border trade with Viet Nam.</p>
Classification	Thematic: Economic Growth
Environment Assessment	<p>Category A</p> <p>An environmental impact assessment (EIA) was undertaken, and the summary EIA was circulated to the Board of Directors of the Asian Development Bank (ADB) on 2 May 2001.</p>
Rationale	<p>ADB's country operational strategy for the PRC supports the Government's policies in the road sector, which focus on building roads that will promote economic and social development particularly in the poor areas of the country. GZAR is the fourth poorest of the PRC's 31 provinces. The project road is an important NTHS connector route in GZAR, improving the access of the cities in the project area to Nanning, the capital of GZAR, and the southern seaports, and building an important link to the Viet Nam border. As a result of ADB's policy dialogue, the scope of the Project has been expanded to strengthen its development impact by adding a program of complementary road upgrading, and targeting poor communities in the project area. The Project will also facilitate regional cooperation by improving access between PRC, Viet Nam, and other countries of the Greater Mekong Subregion.</p>
Objectives and Scope	<p>The Project will promote sustainable economic growth, and, thus, contribute to poverty reduction, by improving economic efficiency and reducing the cost of road transport in the southwestern region of GZAR. The Project will relieve traffic congestion and bottlenecks on a key section</p>

of the NTHS, and provide better access to growth centers for poor communities. Specifically, the Project will (i) provide additional transport capacity, alleviate congestion and reduce traffic accidents and vehicle operating costs; (ii) improve access for the poor rural population in the transport corridor; and (iii) facilitate regional cooperation by providing better access between the PRC and Viet Nam. The Project will also support sector reforms initiated under previous and ongoing ADB-financed projects and regional initiatives. The project scope includes (i) construction of 136 km of four-lane access-controlled tollway between Nanning (Wuxu) and Ninming and a further 43 km of highway between Ninming and Youyiguan, including interchanges with toll stations, connecting roads, tunnels, bridges, administrative stations, service areas, and 49 km of connecting roads; (ii) improvement of about 507 km of local roads servicing poor areas; (iii) procurement of equipment for maintenance, toll collection, surveillance and communications, vehicle axle load testing, and road safety; (iv) land acquisition and resettlement; and (v) consulting services and capacity building.

Cost Estimates

(\$ million)			
Item	Foreign Exchange	Local Currency	Total Cost
A. Base Cost			
1. Expressway Civil Works	139.3	150.0	289.3
2. Equipment	10.6	0.0	10.6
3. Land Acquisition and Resettlement	0.0	38.8	38.8
4. Consulting Services and Training	1.7	11.2	12.9
5. Complementary Road Program	0.0	27.7	27.7
Subtotal	151.6	227.7	379.3
B. Contingencies			
1. Physical Contingencies	7.0	8.9	15.9
2. Price Contingencies	14.1	19.1	33.2
Subtotal	21.1	28.0	49.1
C. Front-End Fee	1.5	0.0	1.5
D. Interest/Commitment Charge during Construction	19.0	6.3	25.3
Total	193.2	262.0	455.2

Financing Plan

(\$ million)			
Source	Foreign Exchange	Local Currency	Total
ADB	150.0	0.0	150.0
European Investment Bank	24.0	26.0	50.0
China Development Bank	0.0	60.4	60.4
Ministry of Communications	0.0	101.0	101.0
Guangxi Communications Dpt.	19.4	74.6	93.8
Total	193.2	262.0	455.2
Percent	42.4%	57.6%	100%

Loan Amount and Term	A loan of \$150 million from ADB's ordinary capital resources will be provided under ADB's LIBOR-based lending facility. The loan will have a 24-year term, including a grace period of 4 years, an interest rate determined in accordance with ADB's LIBOR-based lending facility, a commitment charge of 0.75 percent per annum, a front-end fee of 1.0 percent, conversion options that may be exercised in accordance with the terms of the draft Loan Agreement, the Loan Regulations and ADB's Conversion Guidelines, and such other terms and conditions set forth in the draft Loan Agreement.
Relending Terms	The proceeds of the ADB loan will be relented by the Borrower to the GZAR government, which will onlend them to the Guangxi Communications Department (GCD), on terms and conditions acceptable to ADB. GCD will bear the interest rate variation and foreign exchange risks.
Period of Utilization	Up to 31 October 2005
Executing Agency	Guangxi Communications Department (GCD).
Implementation Arrangements	The project management unit established within GCD will be responsible for implementation. Communications bureaus of Chongzuo, Fusui, Longzhou, Ningming, and Pingxiang counties will implement the complementary road program under the guidance of GCD.
Procurement	Goods and services financed under the ADB loan will be procured in accordance with ADB's <i>Guidelines for Procurement</i> . Civil works will be procured through international competitive bidding (12 contracts; 3 other contracts financed under European Investment Bank loan). Advance action for procurement of civil works was approved on 4 April 2001. Equipment (13 contracts) will be procured through international competitive bidding, international shopping, and direct purchase.
Consulting Services	Services of international consultants for 60 person-months, assisted by domestic consultants for 120 person-months, will be provided to (i) assist the project management over the entire construction period, and countersign progress payment certificates and contract variation orders; (ii) provide expertise in earthworks, mechanical and electrical equipment, tunnel construction, traffic safety, and other technical aspects; (iii) conduct a safety audit of the project design and make safety recommendations on the completed construction works; (iv) help set up and implement quality control procedures; (v) assist in resettlement monitoring and evaluation, and help implement the project performance management system,

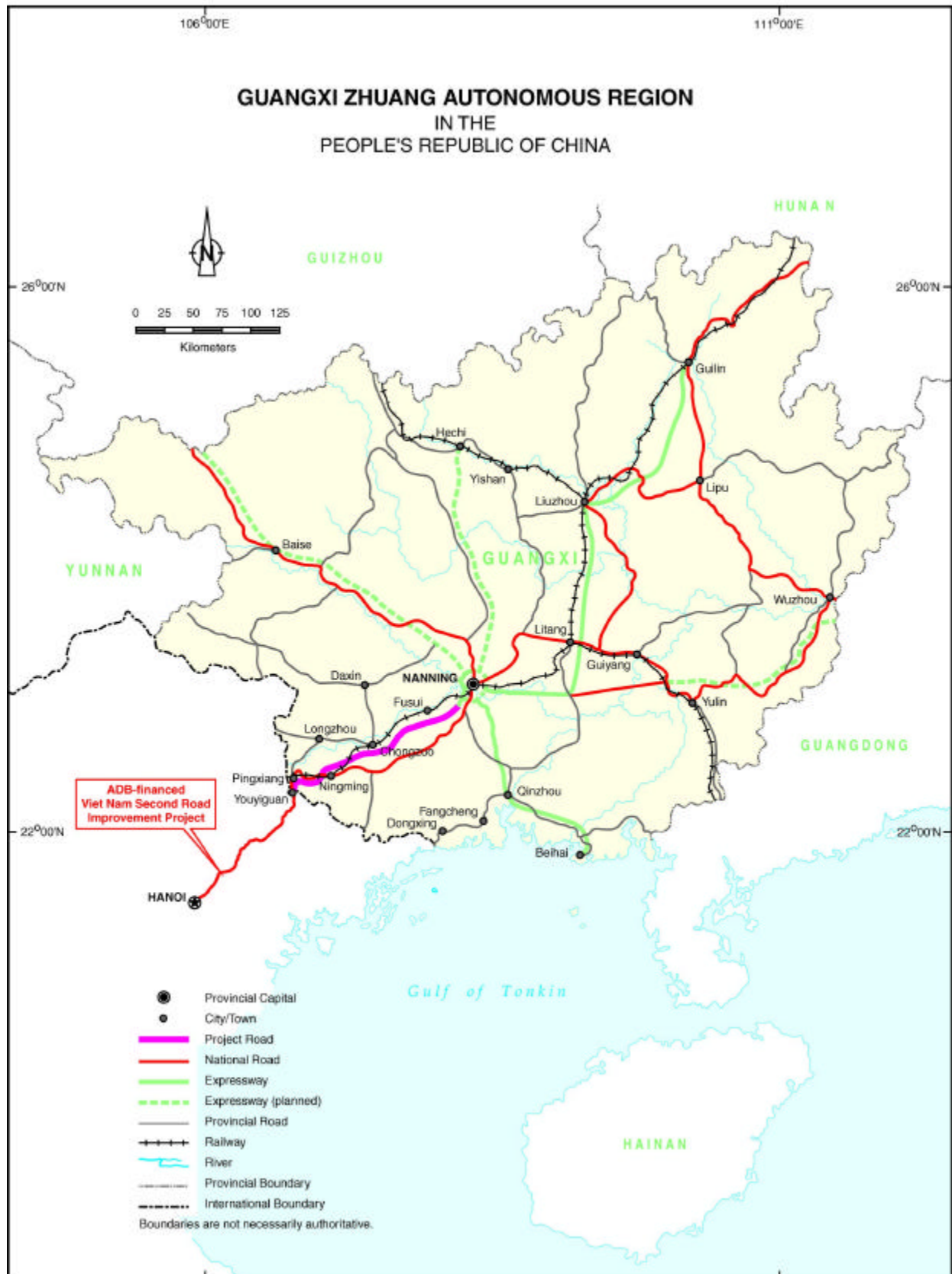
including assessing the impact on poverty reduction; and (vi) provide on-the-job training and help formulate the overseas training program on construction supervision and other topics as required. Additional domestic consulting services, for about 4,780 person-months, will be required for construction supervision. ADB approved advance action for recruitment of consultants on 1 June 2001. The international consultants will be financed from the ADB loan and will be recruited in accordance with ADB's *Guidelines on the Use of Consultants*. Domestic consultants will be financed by GCD, and recruited in accordance with Government procedures acceptable to ADB.

Estimated Completion Date

30 April 2005

**Project Benefits
and Beneficiaries**

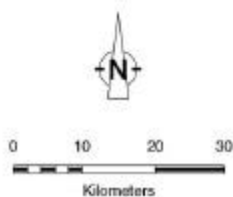
By improving local roads to poor areas, the Project will help improve access to market opportunities and social services for the poor rural residents in the project area. The Project will reduce transport costs, and thereby promote investments, enhance incomes, and create employment opportunities. The economic internal rate of return of the Project is estimated at 20.0 percent. The financial internal rate of return of the Expressway after tax is 9.2 percent. The main beneficiaries of the Project will be households in poor areas, providers of rural transport services, industrial and agricultural businesses, agriculture-based households, crossborder traders, people living in the project area who will have easier access to long-distance transport services, and transport operators and their customers for transit traffic. The Project will also help reduce traffic accidents, vehicle emissions, and traffic noise on the existing roads.



**GUANGXI ROADS
DEVELOPMENT PROJECT
IN THE
PEOPLE'S REPUBLIC OF CHINA**

22°45'N

22°00'N



107°00'E

106°00'E

- Provincial Capital
 - City/Town
 - Township
 - Poor Village
 - ▲ Free Trade Area
 - ✈ Airport
 - Interchange
 - Project Expressway
 - Project Class I Highway
 - Project Connector Road
 - Complementary Road Program
 - Expressway
 - Expressway (planned)
 - National Road
 - County Road
 - Railway
 - River
 - County Boundary
 - International Boundary
- Boundaries are not necessarily authoritative.

Map 2

I. PROPOSAL

1. I submit for your approval the following Report and Recommendation on a proposed loan to the People's Republic of China (PRC) for the Guangxi Roads Development Project.

II. INTRODUCTION

2. Asian Development Bank (ADB) assistance for the transport sector in the PRC includes the construction or upgrading of strategic roads to promote economic growth and poverty reduction. The proposed road project will connect Nanning, capital of the Guangxi Zhuang Autonomous Zone (GZAR), and Youyiguan, at the Viet Nam border. The main road project and the associated complementary road program will provide improved access between poverty areas and market centers, and support the economic and social development of the southwestern part of GZAR, which is one of the PRC's poorest provinces. The project road is part of the national trunk highway system (NTHS) connecting to National Route No.1 in Viet Nam, and will thus facilitate regional cooperation.

3. During ADB's 2000 Country Programming Mission, the Government confirmed its request for assistance for the Project. A feasibility study was prepared by the Guangxi Communications Planning, Survey, and Design Institute. An environmental impact assessment (EIA) and a resettlement plan were undertaken by the Xi'an Highway University. ADB provided technical assistance (TA)¹ to supplement the Government studies. Fact-finding for the Project was undertaken from 8 to 21 February 2001, and appraisal from 17 to 30 April 2001.² The Project has been formulated based on the findings of the ADB missions, information provided by the Government, beneficiary consultations, discussions with other funding agencies, and recommendations of the feasibility study and TA consultants. The logical framework that outlines the goal, purpose, outputs, and inputs or activities is in Appendix 1. A proposal for poverty reduction in southern Guangxi was prepared by the Government for financing under the Japan Fund for Poverty Reduction.

III. BACKGROUND³

4. Investment in transport infrastructure, and especially roads, together with capital investments, provides a key boost to local, regional, and national economies. These investments stimulate economic growth, which generates higher standards of living over the long term. Many of the PRC's rural poor reside in partial or full isolation, which makes transport costly for them and therefore restricts their ability to access basic goods and services. Lack of access deprives the poor of their ability to take advantage of job opportunities. Investment in road projects is a catalyst to reduce poverty for access improvements have a strong income effect.

¹ TA 3220-PRC: *Guangxi Highway Development Project*, for \$540,000, approved on 12 July 1999.

² The appraisal mission comprised P. Giraud, Sr. Transport Specialist/Mission Leader; F. Agnello, Poverty Reduction Specialist; E. Brotoisworo, Sr. Environment Specialist; I. Choi, Sr. Financial Analyst; P. Poinsignon, Transport Specialist; S. Price, Sr. Social Development Specialist; D. Sobel (Sr. Programs Officer); and Y. Zhu, Resettlement Consultant.

³ This section of the report is similar to the equivalent section in the Shaanxi Roads Development Project, which was also formulated for Board consideration in 2001.

A. Sector Description

1. Transport

a. Infrastructure and Traffic

5. Implementation of the Government's economic reform policies since 1978 has resulted in rapid growth of the PRC economy, and a corresponding increase in the demand for transport services. Despite the Government's efforts to increase the country's transport capacity, serious constraints and bottlenecks remain, especially in the road subsector. By the end of 2000, the PRC transport system comprised about 68,000 kilometers (km) of railways, 1.4 million km of highways, 119,300 km of inland waterways, and 1.5 million km of civil aviation routes. However, the density of the transport network in the PRC ranks among the lowest in the world relative to population or geographic area. In terms of density per square kilometer of land area, the PRC's transport network is one sixth of India's network and one fifth of that of the Republic of Korea.

6. Between 1990 and 2000, when economic growth averaged 10.2 percent per annum, domestic passenger transport in all modes grew by 8.0 percent per annum in passenger-km. Freight transport in all modes grew at 5.2 percent per year in ton-km. Road traffic increased its share of traffic and grew at 9.7 percent per annum for passenger traffic and 5.9 percent per annum for freight. In 2000, road traffic accounted for 54.2 percent of total passenger-km, followed by railways with 36.8 percent, civil aviation with 8.2 percent, and coastal and inland waterways with 0.8 percent. The modal split for freight ton-km was coastal and inland waterways, 52.8 percent; railways, 31.2 percent; roads, 13.7 percent; pipelines, 2.2 percent; and civil aviation, 0.1 percent. Since 1990, the railway share of freight traffic has declined by 9.3 percentage points, while the road share has increased by 0.9 percentage points and the inland waterways by 8.6 percentage points. The reduced share of the railway and the increased share of road transport are consistent with trends in other countries, where, as incomes increase, the share of power, roads, and telecommunications in infrastructure expenditures rises, and that of water, irrigation, and railways falls.⁴ Increase in transport demand will be concentrated around and between major cities and in transport corridors serving the ports and their hinterlands. An increasing share of the movement of goods and passengers will be by road, as road transport is more flexible and responsive than other modes to needs in a market economy. In addition, car ownership is growing, and an increasing proportion of passengers will travel by road.

7. At the end of 2000 GZAR had about 3,120 km of railways, 52,910 km of highways, and 5,620 km of navigable inland waterways. From 1990 to 2000, domestic passenger transport in all modes grew by 10.3 percent per annum in passenger-km and freight transport grew at 6.1 percent per annum in ton-km. Road traffic increased its share of traffic and grew at 13.1 percent per annum for passenger traffic and 6.0 percent per annum for freight. In 2000, road traffic accounted for 74.9 percent of total passenger-km, followed by railways with 24.6 percent and coastal and inland waterways with 0.5 percent. The modal split for freight ton-km was railways 62.9 percent, roads 27.2 percent and inland waterways 9.9 percent. Since 1990, the railway and road shares of freight traffic have stayed about the same, while the railway share of passenger traffic has declined by 13.6 percentage points, and the road share has increased by 17.0 percentage points (Appendix 2).

⁴ Ingram, Gregory, and Marianne Fay. 1994. Valuing Infrastructure Stocks and Gains from Improved Performance. Background paper for the *World Development Report 1994*. Washington: World Bank.

b. Investments

8. Public transport investment was about 2.3 percent of the gross national product in 2000. A World Bank study⁵ indicated that total transport investment should increase to at least 3.6 percent of the gross national product to avoid the economic costs associated with congestion and bottlenecks. If not removed, transport bottlenecks will continue to be a major constraint to efficient, sustained economic growth. In the wake of the Asian financial crisis, the PRC has implemented a strategy to stimulate domestic demand. As part of this strategy, the Government developed a Y10 trillion infrastructure investment program from 1998 to 2000 to help ease the transport constraints. This program included projects in urban and rural areas and investments in housing and roads. It will be difficult for the Government to sustain this level of investment even with official development assistance sources. An increasing proportion of financing will have to come from domestic and international private sector sources. Further reforms are needed in transport policy, regulation, and pricing to encourage financing from such sources, reduce inefficiencies, and capture the benefits of a more balanced intermodal transport system.

c. Institutions

9. At the national level, the State Development Planning Commission formulates five-year development plans and establishes priorities and targets for transport in consultation with the ministries responsible for the transport subsectors and with representatives of transport users. The Ministry of Communications (MOC) is responsible for national highways, inland waterways, coastal shipping, and major ports; the Ministry of Railways for the national rail system; and the Civil Aviation Administration for air transport and airports. In line with the country's decentralization policies, many of the administrative and operational functions have been devolved to the provincial communications departments (PCDs).⁶ MOC provides guidance to the provincial governments. Its main responsibilities include planning and coordinating transport investments, and formulating transport policies. MOC shares financing for the national highway system with provincial governments, contingent on the latter using MOC-prescribed road design standards.

2. The Road Subsector

a. Road Network

10. The PRC road network had about 1.4 million km of roads at the end of 2000, but is underdeveloped in both quality and extent. While 51,000 km of new roads were opened to traffic in 2000, including 4,709 km of expressways,⁷ expressways and class I highways still account for only 2.6 percent of the total road network, and class II highways for about 10.9 percent. The remaining 86.5 percent (class III highways and below) are medium- to low-grade paved roads and gravel roads. With only about 1,100 km of classified roads per million inhabitants, the density of the PRC's road network is low.⁸ Many roads are constructed to low design standards and have neither the capacity nor the structural strength to carry current traffic volumes and loads. Roads

⁵ World Bank. 1998. *China: Forward with One Spirit: A Strategy for the Transport Sector*. Report No. 1595-CHA. Transport Sector Unit, East Asia and Pacific Regional Office, Washington, DC.

⁶ Including the municipal communications bureaus or commission of autonomous municipalities, and the communications departments of autonomous regions.

⁷ The total length of the expressway network reached 16,300 km at the end of 2000, which is similar to that in Canada, and ranking only after the United States.

⁸ Comparative figures for other geographically large countries in terms of kilometer of road per million inhabitants are about 25,300 km for the United States and 1,800 km for India. In Japan, where arable land is in equally short supply, there are 90 square meters of road per capita, compared with 20 in the PRC and 496 in the United States.

tend to be congested and pavements show signs of roughness and failure. GZAR has about 1,100 km of classified roads per million inhabitants, in line with the national average, but with lower average standard. At the end of 2000, of GZAR's 52,910 km of roads, only 2.3 percent were expressway or class I, and 5.0 percent class II. The remaining 92.7 percent were lower grade roads, including 31.4 percent of class III highways and 61.3 percent of class IV highways or below. In the project area, the road conditions are as poor as in the rest of GZAR, with 62 percent of class IV highways or below.

b. Vehicle Fleet and Traffic

11. In 2000, the PRC vehicle fleet totaled 15.5 million trucks, cars, and buses, and 46.5 million other motorized vehicles (special vehicles, tractors, and motorcycles). The total number of trucks, cars, and buses increased by about 1.3 million in 2000, with the market share for trucks dropping to 45.0 percent, down from 66.8 percent in 1990. Despite the rapid increase in total vehicles, the PRC has only about 1.3 vehicles (trucks, cars or buses) for 100 persons, which is low relative to other countries in the Asian and Pacific region.⁹ Not until the early 1980s were modern vehicles imported and joint ventures formed with foreign automobile manufacturers to introduce modern technology. There are plans to invest up to \$7 billion in automotive manufacturing in the PRC between 2000 and 2005. The PRC's accession to the World Trade Organization should increase investment in automobile production. The modernization of the vehicle fleet will improve vehicle safety and reduce fuel consumption and vehicle emissions. In 2000 the GZAR had 308,100 trucks and passenger vehicles, equal to 2 percent of the national fleet. This translates into 0.65 vehicles per 100 people in GZAR, half the national average. Growth in the number of vehicles in GZAR during the 1990s, at about 10 percent per annum, was lower than the national average of about 12 percent per annum. This reflects the fact that GZAR is a poor region.

12. The privately owned fleet of motor vehicles in the PRC increased more than 20 times during 1985-2000, from 0.3 million vehicles to 6.3 million. In 2000, trucks accounted for 41 percent of the total privately owned vehicles; cars and buses, 58 percent; and other special vehicles, 1 percent. In GZAR, privately owned motor vehicles totaled 138,700 in 2000. Given the PRC's rapid economic growth and low vehicle ownership, the vehicle fleet, both public and private, is expected to continue to grow rapidly in the coming years. This will result in substantial increase in the volume of road traffic and mounting congestion. The high share of slow-moving traffic, mainly tractors, bicycles, and nonmotorized agricultural vehicles, aggravates road congestion and is a major cause of traffic accidents.

c. The Road Transport Industry

13. The PCDs are responsible for regulating the road transport industry by licensing drivers, vehicles, and intercity bus services. Road transport tariffs are subject to controls in the range of plus or minus 20 percent of locally established tariffs. The relaxation of trucking regulations in the 1980s allowed privately owned trucks to haul cargo for state-owned factories and cooperatives. Privately owned trucks absorbed most of the traffic growth in the 1990s with the market share of state-owned transportation companies declining. The resulting competition is improving road transport efficiency and the quality of services. ADB supported this process through TA.¹⁰ MOC is encouraging the private sector to augment the overall capacity of the road transport industry. The annual passenger handling capacity increased from 12.0 billion passengers in 1997 to 14.5 billion

⁹ Figures for other countries are 2.5 for India, 5.0 for Indonesia, 14.3 for Thailand, 59.6 for Australia, and 65.3 for Japan.

¹⁰ TA 1940-PRC: *Efficiency Improvements in Road Transport*, for \$550,000, approved on 25 August 1993.

in 2000. About 900,000 buses were operating in 2000 compared with 764,000 in 1994. About 85,000 bus routes served more than 94 percent of the villages accessible by road.

d. Road Administration

14. Road administration in the PRC is decentralized. At the provincial level, the PCDs are responsible for the highway networks and plan, budget, and finance road projects. The PCDs are generally financially independent of the central Government except for large projects of national significance. MOC provides policy guidance and technical support to the PCDs through national policies, regulations, and design and construction standards. Provincial planning commissions approve development plans and projects. The PCDs, through their city, prefecture, and county-level units, are responsible for planning and administering the road subsector, including constructing and maintaining the road network. Road safety is mainly the responsibility of the Ministry of Public Security at the national and local government levels. Testing of vehicles and vehicle emissions is the responsibility of local environmental protection bureaus in conjunction with provincial public security bureaus. The road subsector agencies are generally well staffed with trained technical personnel, particularly at the central and provincial levels. Human resource development systems provide regular training for technical staff, operators, and technicians. ADB has supported human resource development in subsector institutions under loans and TAs. ADB's country assistance program evaluation for the PRC concluded that, in the transport sector, executing agencies (EAs) have been making good use of the knowledge transfer and in-country and external training opportunities provided under ADB projects.¹¹

e. Road Subsector Revenues and Expenditures

15. The PRC's road investment needs from 1996 to 2010 are estimated at \$504 billion. Available revenues are estimated at \$302 billion from road user charges and \$29 billion from toll collections, leaving a financing gap of \$173 billion or about \$12 billion per year. Consistent with ADB's policy dialogue, the Government is creating a framework to attract private sector finance for road construction. While the private sector is willing to participate under concession agreements, or in refinancing, leasing, and securitization, it has not participated in many build-operate-transfer (BOT) type projects that entail taking the initial risks of construction and traffic demand. Private sector financing is most likely to be available to finance about 5 percent of the high-grade and provincial road networks.

16. Expenditures in highway infrastructure are financed from dedicated user charges, Government grants, domestic bank loans and bonds, and foreign loans and investments. Two dedicated user charges, the road maintenance fee and the vehicle purchase fee, have provided much of the financing for the road subsector. During the Ninth Five-Year Plan, 1996-2000, the road maintenance fee, levied on the revenue of freight and passenger transport companies and on the load capacity of private vehicles, provided about 53 percent of total financing requirements of road investments. Revenues from the vehicle purchase fee, levied on the retail price of vehicles, financed about 13 percent, mostly in poorer provinces as government policy. MOC provided supplementary financing of about 2 percent of the requirements to construct or rehabilitate rural roads in poverty areas. Domestic loans and bond financing, generally with short maturities, were still relatively low, and accounted for 9 percent of all highway investments. Other domestic investments, including financing from local governments and state-owned enterprises, accounted for 12 percent of the requirements. Foreign loans cover 8 percent of the investment in highway construction, and foreign direct investment the remaining 3 percent. During the 1980s

¹¹ CAP: PRC 98026: *Country Assistance Program Evaluation, People's Republic of China*, December 1998.

and 1990s, the PRC increased its foreign borrowing for infrastructure, mainly from ADB, the Japan Bank for International Cooperation (JBIC), and the World Bank (paras. 28-29).

17. As part of a tax reform to bring off-budget revenues and expenditures within the framework of the national budget, the National People's Congress amended the Highway Law on 31 October 1999. The amendments laid the foundation for future legislation providing for national taxes to replace provincial and local fees. The vehicle purchase fee was replaced by the vehicle purchase tax effective January 2001, and a fuel tax is expected to replace the road maintenance fee, and generate a similar or higher level of revenue. Based on findings of an ADB-financed TA,¹² the fuel tax is likely to improve financing of the road subsector. The Government prepared detailed measures for introducing the fuel tax, but delayed its implementation due to the high international price of oil. Implementation is now expected to take place before the end of 2001 if international oil price declines. The amendments also prohibit local governments from levying on some roads tolls that are not authorized. Thus, arbitrary charges in the road subsector that are a regressive tax impacting most heavily on the poor will be eliminated. Also, transparency and accountability in the use of such off-budget funds were weak. Fiscal accountability is expected to improve with the replacement of these off-budget revenues with a fuel tax that is subject to the oversight and control mechanisms built into the fiscal process.

18. Within each province, the PCD is responsible for planning, financing, and constructing national and provincial roads. County and village roads are the responsibility of the prefecture, county, and township governments. Since the resources of the local governments are constrained, the adequate financing of roads among competing claims is a major challenge, particularly for local roads in poverty counties. The PCD generally provides budgetary support for county road construction and improvement. However, an increasing proportion of provincial road budgets is being used to meet the national priority for expressway and highway construction. In GZAR the proportion of expressway funding in the provincial road budget increased from 16 percent to 39 percent in the last five years, while the proportion for county and township roads declined from 84 percent to 61 percent. However, in 2000 the GZAR government allocated additional funds to upgrade local roads in poor areas. The funding of road and other infrastructure improvements in rural areas is supplemented by poverty alleviation funds allocated separately. The scope of the proposed Project includes upgrading high priority local roads, financed by these additional funds. The inclusion of local roads in the project scope will help ensure that expenditures are reasonably balanced between expressways and local roads. Revenues and expenditures in the road sector in GZAR in 1998-2000 are included in Appendix 3.

f. Road Engineering, Construction, and Maintenance

19. Road and bridge projects are designed by the planning and design institutes at the provincial, prefectural, and county levels. MOC reviews the designs of expressways, class I highways, and associated structures. In general, the institutes are staffed with experienced, well qualified personnel. Construction is supervised by personnel from county, city, and prefectural highway units. The city and county highway bureaus have their own construction units to carry out minor projects within their administrative districts. Drawing on the experience gained under ADB- and World Bank-financed projects, competitive bidding practices were mandated by the 1999 Tendering and Bidding Law (para. 42). Many of the larger provincial and urban construction bureaus are being reorganized into financially independent companies and have been awarded

¹² TA 3086-PRC: *Regional Road Sector Study*, for \$1.185 million, approved on 13 October 1998.

contracts individually or as partners in joint ventures on several previous ADB- and World Bank-financed highway projects in the PRC or overseas.

20. In 1999, MOC implemented a series of measures to enhance quality control in highway construction and carried out two nationwide quality audits of the construction of national highways and major trunk roads. From 1999, as required by MOC, all PCDs, including the Guangxi Communications Department (GCD), are inspecting the quality of their ongoing road construction works. Taking into account findings of the audits, MOC will adopt more stringent regulations to ensure that roads are constructed to national standards. Investment will be increased in regions that have completed good quality roads that are well managed and well maintained. Regions with projects of substandard quality due to inappropriate technical design or poor implementation will receive decreased investment.

21. Road maintenance is well organized and is carried out mainly through labor-intensive operations. Maintenance expenditures have decreased as a percentage of total road expenditures in the past decade (however, maintenance is generally adequate). MOC has established an advanced road maintenance management system, consisting of a road data bank and a pavement management system. It is being introduced in stages to all provinces, autonomous regions, and municipalities, including GZAR, and will become the key tool for programming future maintenance needs and budgets.

3. Transport and Poverty Reduction

22. The impact of transport infrastructure investments on poverty reduction is demonstrated by recent studies that examined the effectiveness of government expenditure on various sectors in contributing to growth and poverty reduction, using an econometric model, in India and Indonesia.¹³ The studies concluded that government expenditure on roads has a larger impact on poverty reduction, productivity, and growth than does expenditure on other sectors, such as irrigation, soil and water, power, education, and health. Labor is the major resource of the poor. For the poor to be able to capitalize on their major asset, they need access to jobs and to transport for bringing the goods they produce to markets. Benefits for poor rural areas include lower transport costs, lower cost of inputs, better access to services and therefore improved farming practices, and better access to health and education. This was also highlighted in World Bank reports.¹⁴

23. In the PRC, the link between transport development and poverty reduction is supported by studies and evaluation of several completed transport projects, financed by ADB and the World Bank. In Shaanxi Province, TA¹⁵ showed the linkage between road density and rural incomes from 1990 to 1999: the higher the road density, the higher the per capita rural incomes. In Liaoning Province,¹⁶ construction of a 109 km expressway with 203 km of local roads was associated with rural incomes more than doubling in the project area. Similarly, impressive improvements in living standards have been experienced in the areas of influence of two railway

¹³ Shenggen Fan, Peter Hazell, and Sukhadeo Thorat. 1999. *Linkages between Government Spending, Growth, and Poverty in Rural India*. Washington, DC: International Food Policy Research Institute; and Economics and Development Resource Center. 2000. *A Link between Infrastructure, Growth, and Poverty in Indonesia (Stage I)*. Asian Development Bank, Manila (Draft).

¹⁴ See, for example, World Bank. 1996. *Kingdom of Morocco-Impact Evaluation Report: Socioeconomic Influence of Rural Roads*. Washington, DC.

¹⁵ TA 3248-PRC: *Preparing the Shanxi and Shaanxi Roads Project*, for \$640,000, approved on 30 August 1999.

¹⁶ PCR: PRC 27398: *Liaoning Expressway*, September 2000.

projects.¹⁷ A World Bank working paper¹⁸ on roads improvement for poverty alleviation in the PRC highlighted the importance of developing trunk routes between urban/market centers, along with rural roads, to maximize the benefit of rural development and reduce poverty. Transport conditions for the rural poor are not adequate in the PRC. The poor have limited mobility beyond their immediate communities because of geographical isolation and the high cost of motorized transport. As a result, the poor view roads as key infrastructure needed for accelerating socioeconomic development. Rural poor benefit from greater employment opportunities, and the transition from subsistence farming to cash crop and higher value crops, which results in a more stable income flow and leads to poverty reduction. Better roads also address the nonincome dimensions of poverty. Improved access helps attract resident teachers and health personnel, and facilitates visits by specialists to health, education, and other community facilities within the villages. It also facilitates visits of villagers to such facilities outside the villages. An ongoing TA¹⁹ recommended setting up a special mechanism to fund rural infrastructure pilot schemes in the PRC, including roads, to investigate the direct and indirect effects on poverty reduction. This is being carried out in Guizhou Province where rural roads, in addition to other rural infrastructure, are being built in poor villages, and the effects of such infrastructure systematically measured, monitored, and evaluated. A regional TA²⁰ is being implemented to further examine the poverty reduction impact of infrastructure projects. The 2002 PRC TA program includes a study to assess in detail the linkage between transport infrastructure and poverty.

B. Government Policies and Plans

24. The heart of the road network is the NTHS, a system of interprovincial expressways and high-class highways of about 35,000 km, to be constructed over a 20-year period up to 2010. The NTHS will be complemented by the development of a network of new national, provincial, county, and village roads. The Government views road development as a key component of its strategy to improve access to markets and services. In particular, the Government's investment plans for the road subsector consider the need to provide infrastructure to facilitate economic growth and reduce poverty. The Government's policies for road development are based on the following principles: (i) constructing expressways to expand the NTHS to link all cities with a population of more than 500,000; (ii) developing secondary roads, particularly those that will help reduce poverty and promote rural markets; and (iii) building roads that will support regional cooperation with neighboring countries in the southwest, northeast, and northwest.

25. The Tenth Five-Year Plan (10FYP), 2001-2005, approved by the National People's Congress, calls for (i) accelerating the construction of the backbone network of highways and national roads, with the focus being on five north-south and seven east-west expressways included in the NTHS, and fully opening three north-south and two east-west expressways; (ii) achieving the initial construction of eight new highways in the western region to improve the structure of the highway network and its reach (para. 27); and (iii) by 2005, having approximately 1.6 million km of highways open to traffic, with expressways accounting for 25,000 km. The 10FYP will support highway construction in the rural areas to improve road

¹⁷ PCR: PRC 26462: *Jing-Jiu Railway Technical Enhancement Project*, April 2000, and PCR: PRC 22276: *Hefei-Jiujiang Railway Project*, February 2000.

¹⁸ Hatim Hajj and V. Setty Pendakure. 2000. *Roads Improvement for Poverty Alleviation in China*. Working Paper No. 1. Transport Sector Unit. East Asia and Pacific Region, World Bank. Washington, D.C.

¹⁹ TA 3150-PRC: *Study on Ways to Support Rural Poverty Reduction Projects*, for \$715,000, approved on 31 December 1998.

²⁰ TA 5947-REG: *Assessing the Impact of Transport and Energy Infrastructure on Poverty Reduction*, for \$800,000, approved on 25 October 2000.

conditions, and the Government will complete building the roads that link poor counties with national and provincial highways.

26. The Government has been supporting poverty reduction through road subsector investments in several ways. First, the focus of NTHS construction has been shifting to the central and southwest regions, which have a higher incidence of poverty. Second, the vehicle purchase fee, which has financed about 13 percent of road subsector expenditures, has been allocated primarily to poorer provinces for financing road investments. Third, MOC grants and PCD resources are used to supplement budgets of county and township governments to improve township roads. Fourth, through the separate budgeting of poverty alleviation funds, road improvements are carried out to bring an increasing number of villages into the road network, by improving the quality of transport services available to them.

27. In March 2000, the Government adopted the long-term Great Western Development Strategy for developing the western part of the country.²¹ This strategy has been reflected as the key theme of the 10FYP. The strategy aims to reduce development disparities between the western region and the coastal region, and to give the highest priority to road development as an effective mean to promote economic growth and reduce poverty in the region. In the road subsector, the strategy aims at (i) facilitating economic development and poverty reduction in the western region, where road density is only less than half of the national average; (ii) linking the western region with the central and eastern regions; (iii) providing access to the trade outlets for the western region at the eastern and southern seaports; and (iv) promoting regional cooperation with the neighboring countries to the west and southwest of the PRC. ADB is providing TA²² to help the Government implement the Great Western Development Strategy. ADB's 2001 program includes TA to help the Government identify ways to attract foreign direct investment to the western region.

C. External Assistance to the Subsector

28. External assistance to the road subsector has come mainly from ADB, JBIC, and the World Bank. Since 1985, the World Bank has provided about \$5.3 billion to finance 22 highway projects and 6 urban transport projects. The projects supported (i) priority sections of the NTHS, particularly in the central and northwestern regions; and (ii) capacity building in construction supervision, quality control, design and planning, road safety, and pavement management. JBIC has provided about \$990 million equivalent for six bridge projects and five highway projects within the NTHS framework, mostly in the central region. ADB's policy dialogue in the road subsector and identification of projects are coordinated with JBIC and the World Bank.

29. Since 1991, ADB has provided 18 loans totaling nearly \$3.2 billion for 2,644 km of highway development, and two loans totaling \$155 million for bridges in Shanghai. The Nanpu and Yangpu bridges are open to traffic, and traffic volumes have exceeded the appraisal estimates. Among the road projects financed by ADB, 10 are completed and open to traffic.²³ Most expressway projects are being implemented ahead of the original construction schedules.

²¹ Consisting of 12 provinces, autonomous regions, or municipality: Chongqing, Gansu, Guangxi; Guizhou, Inner Mongolia, Ningxia, Qinghai, Shaanxi, Sichuan, Xinjiang, Xizang, and Yunnan, and three prefectures: Enshi Tujia and Miao Minority Autonomous prefecture of Hubei province, Xiangxi Tujia and Miao Minority Autonomous prefecture of Hunan province, and Yanbian Korean Minority Autonomous prefecture of Jilin Province.

²² TA 3468-PRC: *Policy Support for PRC 2020 Project (Phase III)*, for \$900,000, approved on 14 July 2000.

²³ Hebei Expressway, Hebei Roads, Heilongjiang Expressway, Hunan Expressway, Jiangxi Expressway, Jilin Expressway, Liaoning Expressway, Shenyang-Benxi Highway, Shenyang-Jinzhou Expressway, and Yunnan Expressway Development.

The EAs have a good record of complying with the major loan covenants, including the timely submission of audited project accounts. ADB has also provided 21 project preparatory TA grants totaling \$9.1 million and 19 advisory TA grants totaling \$11.8 million to the road subsector. The advisory TAs have supported the development of road infrastructure by addressing policy and institutional issues, including highway planning, road safety, human resource development, transport pricing, commercialization and corporatization of enterprises, and mobilization of nongovernment financial resources.

D. Lessons Learned

30. ADB's experience in the PRC's road subsector has shown that the project preparation and implementation capability of the agencies concerned is strong. In general, all loans to the subsector are being implemented satisfactorily. The technical staff have adequate capabilities for design and construction supervision, and most local contractors have proven competent. However, they need to acquire expertise in modern construction methods such as those for constructing long tunnels, large bridges, and flexible pavement design; modern operations such as toll collection methods and environmental protection; and commercial business practices. The use of ADB loan and TA funds to upgrade the capabilities of the EAs has contributed to improved project quality. However, to meet the implementation schedule, contractors are sometimes put under pressure and consequently the bidding process, contract management, and construction quality are compromised. This might have contributed to the collapse of tunnels during construction of some ADB-financed expressways. Insufficient time allowed for soil settlement may have adversely affected pavement quality. ADB has taken these matters up as part of the policy dialogue with MOC and the EAs (para. 42).

31. Traffic volumes for completed projects have generally grown faster than appraisal forecasts. The project completion reports of ADB-financed expressways in the PRC concluded that four projects were generally successful,²⁴ and one was partly successful, mainly due to inadequate safety facilities and enforcement as well as partial compliance with environmental mitigation measures.²⁵ The reports recommended that the EAs strengthen road safety measures and increase benefit monitoring activities. International consulting inputs for a safety audit and for monitoring and evaluation are included in the proposed Project. The project performance audit report²⁶ of two ADB-financed expressways in the PRC concluded that one project was successful and the other highly successful. One of the key lessons identified in the report is that corporatization (restructuring of government departments as corporations) of the expressway in Jilin Province was an effective option for resolving funding shortfalls and ultimately contributing toward financing future expressway development. Under the proposed Project, GCD will establish a state-owned corporation. GCD will be the sole investor, and the corporation will be responsible for construction, operation, maintenance, repair, and management of all expressways in GZAR (para. 51).

32. ADB's TA program in the road subsector has been generally successful. Some of the more recent TAs have been instrumental in focusing the Government's attention on the need to

²⁴ PCR: PRC 23032: *Shenyang-Benxi Highway Project*, September 1998; PCR: PRC 24335: *Jilin Expressway Project*, October 1998; PCR: PRC 24335: *Hunan Expressway Project*, September 2000; and PCR: PRC 27398: *Liaoning Expressway Project*, September 2000.

²⁵ Remedial actions are being taken by the EA for the Heilongjiang Expressway Project, which was rated partly successful in PCR: PRC 26377: *Heilongjiang Expressway Project*, October 1999, through rectifying the infrastructure deficiencies, enforcing harsher penalties for traffic violations, and implementing the environmental mitigation measures recommended in the environmental impact assessment.

²⁶ PPA: PRC 23032/24335: *Shenyang-Benxi Highway and Jilin Expressway Projects*, October 2000.

expand its sources of finance for highway development, and the institutional, policy, and regulatory issues that need to be addressed to facilitate the use of a broader set of modalities for domestic and foreign resource mobilization. Specific improvements have been effected as a result, and are now being disseminated widely to all provinces. In January 2001, ADB's Operations Evaluation Office (OEO) completed a performance audit report on traffic safety TAs.²⁷ The two TAs implemented in the PRC (para. 43) were rated highly satisfactory.

33. In 1998, OEO completed its first country assistance program evaluation. The evaluation concluded that ADB's monitoring mechanisms showed high levels of performance for ongoing transport projects and TAs. Also in 1998, OEO carried out a special study on the operation and maintenance of road facilities and their impact on project sustainability.²⁸ The study concluded that maintenance of roads completed under ADB projects has not been a serious problem in the PRC. An effective budgetary allocation system is in place, and strong institutional capacity to maintain the expressway system has been developed.

34. As part of a special audit of selected projects in the PRC, ADB's Office of the General Auditor investigated whether ADB loans have been used only for authorized purposes. A special review mission was fielded for an ongoing road project²⁹ in December 1999. Its findings indicated that while proceeds of the ADB loan had not been used for any unauthorized purpose, there were weaknesses in the internal control system, such as inadequate internal approval process for major contract variations and discrepancies in accounting practices. As a result, the mission, in its discussions with the Ministry of Finance and the China National Audit Office, emphasized the need to adopt measures to inspect ongoing projects as part of their supervision and audit. A modification of the audit report format has also been proposed for all ADB-financed projects to improve auditing of project accounts. Under the proposed Project, to strengthen the internal control systems in GCD, an international consultant will be appointed as an deputy chief supervision engineer responsible for helping the chief supervision engineer authorize variation orders, contractors' payments, and subcontracting arrangements, and for countersigning the related orders and certificates. The consultant will be assisted by domestic consultants.

E. ADB's Subsector Strategy

35. ADB's PRC country operational strategy³⁰ gives high priority to removing infrastructure constraints and supporting policy and institutional reforms. Given the importance of road transport in the development of a market economy and in poverty reduction, ADB will continue its lending to the road subsector for (i) the NTHS; (ii) roads that improve the access of less developed, poor rural areas to regional market centers; and (iii) selected urban transport projects. With the completion of the northeast transport corridor, the focus of ADB's activities in the road subsector has shifted to poorer provinces in southwest and central PRC. Improving road infrastructure will facilitate economic growth in these poor areas. Sustained, broad-based economic growth will, in

²⁷ TPA: IND/PRC/STU 2000-21: *Selected Technical Assistance in Road Safety*, January 2001.

²⁸ Operations Evaluation Office. 1998. *Special Evaluation Study on the Operation and Maintenance of Facilities and Their Impact on Project Sustainability*. Asian Development Bank, Manila.

²⁹ Loan 1387-PRC: *Hebei Expressway*, for \$220 million, approved on 28 September 1995. There has been an alleged case of corruption, involving a senior official of an EA that is implementing road projects, including one financed by ADB (Loan 1638-PRC: *Chengdu-Nanchong Expressway* in Sichuan Province). According to information available, the corruption case is not related to the ADB-financed project although the investigation is still ongoing.

³⁰ STS PRC 95027: *Country Operational Strategy Study: People's Republic of China*, May 1997, and Sec. M55-01: *Country Strategy and Program Update: People's Republic of China*, July 2001. The PRC poverty partnership agreement, which will form a basis for CSP, is also being prepared.

turn, help reduce poverty. An ADB-financed study (footnote 12) for the five administrative areas in the southwest region showed the lack of high class road infrastructure in and out of the region, between the administrative areas, and within the administrative areas, which increases the cost of transport. The study helped the Government identify road project packages and capacity building activities in the southwest region for implementation during the 10FYP period. This shift in focus of ADB operations is in line with ADB's strategic objective of promoting growth and reducing poverty in inland provinces. The Government has recently reaffirmed its policy of increasing road subsector funding to implement the NTHS as a principal means of promoting and sustaining economic growth. The Government intends to continue seeking the assistance of multilateral development banks for the construction of the NTHS, especially for sections generating direct revenue that can be used for debt servicing.

36. ADB's PRC operational strategy in the road subsector supports (i) construction of roads that connect major growth centers, promote linkages with hinterland economies, and/or promote regional cooperation; (ii) integration of the network so that the NTHS is supported by a system of local roads, particularly those that provide access to poor areas; (iii) promotion of road safety; (iv) further institutional strengthening to increase the commercial orientation and efficiency of expressway organizations; (v) improvement of highway planning and evaluation techniques; (vi) adoption of appropriate pricing policies to ensure optimum use of road transport capacity; and (vii) use of alternative methods of investment financing, including private sector participation. The proposed Project will connect growth centers in a poor, interior province, support the development of local roads that will provide access for the local population to economic centers, and promote economic cooperation between PRC, Viet Nam, and other countries of the Greater Mekong Subregion. The Project is consistent with ADB's country operational strategy.

F. Policy Dialogue

37. ADB has been actively undertaking policy dialogue with the PRC on its road subsector since 1991. The principal issues addressed include poverty impact of road projects, highway design standards, construction quality and road safety, vehicle emissions, pricing policies, commercialization and corporatization, and nongovernment financial resources. The status and achievements to date are discussed in the following paragraphs and summarized in Appendix 4.

1. Poverty Impact of Road Projects

38. ADB and the Government have had extensive discussions on how to enhance the poverty reduction impact of road investments supported by ADB. The ADB policy dialogue focused on three main issues. The first is the location of ADB-financed road subsector projects, which has shifted from the northeast and coastal areas to the poorer central and southwest regions. This shift to poorer interior provinces is sustained by the 10FYP (para. 25). Second, the dialogue focused on the inclusion of a local road network component. Since 1995, the scope of ADB-financed road projects³¹ has included improvements to local roads connecting to the expressway interchanges to facilitate access of rural communities to county centers and to the expressway facilities. The scope of the proposed Project includes upgrading of 507 km of complementary county and village roads that will connect poor areas to the expressway

³¹ Chengdu-Nanchong Expressway Project, Chongqing-Guizhou Roads Development Projects (Leichong Expressway/Chongzun Expressway), Hebei Expressway Project, Hebei Roads Development Project, Jiangxi Expressway Project, Liaoning Expressway Project, Shanxi Road Development Project, Shenyang-Jinzhou Expressway Project, and Southern Yunnan Road Development Project. The local road components of these projects are being implemented or have been completed successfully, helping improve living conditions of the poor people in the project area.

interchanges. This complementary road program was formulated through ADB's policy dialogue, by prioritizing road sections that serve areas where most poor people live and where the most beneficial impact can be made on poverty reduction. Third, ADB's policy dialogue centered on the use of remunerated labor and the greatest possible employment of poor people during project road construction. Specific measures have been formulated in the Project to support these objectives (paras. 92 and 106).

2. Highway Design Standards and Construction Quality

39. Recognizing the importance of sound engineering practices in the context of increasing traffic volumes and heavy vehicles, MOC has recently revised, with ADB assistance, its highway engineering standards.³² Highways are now classified into five categories, expressways and four classes of general highways, according to traffic volumes, functions, and service levels. For expressways, four design speeds were introduced, and design standards for six-lane and eight-lane expressways added. Environmental protection, road safety, and integrated development of highways are also incorporated in the revised standards.

40. In addition to the review of technical standards, ADB helped produce a highway design manual for national roads. The manual, completed in December 1998, elaborates the design principles and introduces design criteria and methods consistent with international engineering practices. The manual, which was translated into Chinese, is now being used on a trial basis by selected design institutes. Initial feedback on the trial use has been positive. Based on information collected from the trial, the manual will be updated and distributed for nationwide use with adjustment to suit local conditions. The manual will promote the Government's efforts to improve construction quality, protect the environment, and enhance road safety and transport efficiency. In addition, a TA³³ is being implemented to strengthen project performance management evaluation capacity, particularly of the Key Projects Inspectorate of the State Development Planning Commission, and to provide an independent check on the quality of major construction projects.

41. The expressway component of the proposed Project has been designed in accordance with the technical standards of highway engineering issued by MOC in January 1998 and in line with the recently developed highway design manual. An international consultant, acting as an assistant chief supervision engineer throughout the construction period, will help the chief supervision engineer oversee the construction supervision process and ensure construction quality. Further international inputs for construction supervision will be provided by earthworks, mechanical and electrical equipment, and tunnel specialists.

42. The EAs are sometimes under pressure to meet ambitious implementation schedules, and contractors selected with the primary objective to complete the works within a limited time. Such an objective is detrimental to the quality of works. Irregularities were identified in the bidding process under some ADB-financed road projects. For example, bids were rejected due to minor technical or commercial deviations, or because the bid price was lower than an EA's unsubstantiated "reasonable price".³⁴ To improve the procurement process, ADB assisted the Ministry of Construction with preparing the national bidding law and related regulations. The Tendering and Bidding Law, which was approved by the National People's Congress in August

³² TA 2573-PRC: *Review of Highway Design Standards*, for \$420,000, approved on 24 May 1996.

³³ TA 3375-PRC: *Project Performance Management Capacity Building*, for \$900,000, approved on 27 December 1999.

³⁴ As a result, ADB declined to finance a major part of the civil works contracts under Loan 1641-PRC: *Changchun-Harbin Expressway (Changyu Expressway)*, for \$220 million, approved on 27 November 1998.

1999 and became effective in January 2000, will promote a transparent, fair, and competitive bidding process. Although its application is limited to local competitive bidding (LCB), the Tendering and Bidding Law is expected to benefit the international competitive bidding (ICB) process as well through improving the EAs' understanding of the bidding concept. TA for governance and public sector procurement is being implemented to help develop the guidelines and procedures on the implementation of the Tendering and Bidding Law.³⁵ TA was approved in February 2001 to help the Government formulate a comprehensive Government Procurement Law that will incorporate the Tendering and Bidding Law.³⁶

3. Road Safety

43. Rapid traffic growth on the largely substandard road network has led to increasing traffic accidents. Official statistics indicate that there were 616,971 road accidents in 2000, killing 93,853 people, injuring 418,721, and resulting in direct economic losses of Y2.67 billion, up by 49 percent, 12 percent, 46 percent, and 26 percent, respectively from the previous year. Most accidents are the result of drivers, cyclists, and pedestrians ignoring traffic regulations. If accidents at railway crossings, in military areas, at roadworks, and on roads in industrial areas were included, the number of deaths would increase to over 120,000 per year, a fatality rate of around 46 deaths per 10,000 vehicles. This is very high by international standards.³⁷ In addition, accident statistics are not collected or analyzed in the best manner to identify preventive measures. Reducing the high accident rate is an important element of ADB's policy dialogue. Construction of a high-standard expressway normally reduces the number of road accidents. Evidence from the Shenyang-Dalian Expressway³⁸ indicates that the accident rate was less than half of that for the parallel National Highway 202, a two-lane highway. ADB TAs at the provincial and regional levels³⁹ have helped (i) formulate road safety guidelines, (ii) develop a master plan for the systematic improvement of road safety, (iii) implement selected road safety pilot programs, and (iv) build capacity in road safety enforcement. Findings of the TAs are being disseminated to all PCDs. ADB's policy dialogue on road safety is being enhanced through TA,⁴⁰ which aims at increasing road safety by raising public awareness and strengthening the capacity of the Ministry of Public Security for traffic safety, planning, and management. Under this TA, training sessions were held in Jiangsu Province in April 2001, covering aspects of road safety and traffic management, and 57 traffic police officers from almost all the PRC provinces, autonomous regions, and municipalities benefited from the sessions. Two other training sessions will be conducted by the end of 2001, and the TA will develop a comprehensive action plan to address critical road safety issues in the PRC.

44. In 2000, GZAR recorded 7,771 road accidents, involving 2,587 fatalities and 7,090 injuries. In the project area in 2000, accidents increased by 10 percent over the previous year and at a higher rate than traffic volumes, due to the poor condition of the existing road. In view of the high accident rate, GCD is carrying out a road safety program with assistance of the World Bank, including improvement of the accident reporting system and identification and analysis of

³⁵ TA 3457-PRC: *Implementation of the Tendering and Bidding Law and Related Regulations*, for \$565,000, approved on 14 June 2000.

³⁶ TA 3631-PRC: *Formulation of the Government Procurement Law*, for \$578,000, approved on 20 February 2001.

³⁷ Comparative figures for other countries in terms of deaths per 10,000 vehicles are 26.5 for India, 11.8 for Indonesia, 8.5 for Thailand, 2.3 for Australia, and 1.9 for Japan.

³⁸ Liaoning Provincial Communications Department. 1994. Postevaluation Report for the Shenyang-Dalian Expressway.

³⁹ TA 2177-PRC: *Preparation of a Road Safety Program*, for \$600,000, approved on 29 September 1994, and TA 5620-REG: *Regional Initiatives in Road Safety*, for \$600,000, approved on 4 January 1995.

⁴⁰ TA 3341-PRC: *Capacity Building in Traffic Safety, Planning, and Management*, for \$600,000, approved on 14 December 1999.

accident-prone areas. In this context, the Project will include several measures to improve the road safety situation, such as axle load weighing stations, standard road signs, and training of staff of the EA in road safety. The final design of the project will incorporate the traffic safety measures recommended in the PPTA final report regarding road design. These include careful design of at grade intersections, provision of an alternative road for slow moving vehicles on the class I section, speed limits to suit the geometric design, frequent speed limit and speed advisory signs, well defined transitions where there is a change in design speed, and extended ramp deceleration lengths where ramp design speeds are low. A safety audit of the expressway will be conducted by consultants recruited under the Project. Findings of previous ADB road safety TAs were presented to GCD and the Guangxi Security Bureau during project processing, and officials of the Guangxi Security Bureau attended the first workshop of TA 3341-PRC in April 2001 (para. 43).

4. Vehicle Emissions

45. Air quality in most PRC cities, and in many rural areas, is poor. The major cause is the burning of coal in power plants, boilers, district heating systems, and factories. However, pollution from vehicles is increasing rapidly and has drawn attention to particular pollutants. In some cities, vehicles already account for 80 percent of total carbon emission levels, 50 percent of nitrogen oxides, and a substantial proportion of lead. Under ADB-financed TA,⁴¹ the Government is exploring the use of market-based instruments such as subsidies, fuel taxes, emission charges, congestion charges, and tradable area licenses, to help reduce vehicle emissions.

46. Measures have been taken in provincial capitals and other cities to limit the distribution of leaded fuels. Since 1 January 2000 there has been no further production, and since 1 July 2000 no further sale of leaded fuels in the PRC. Trucks and heavy vehicles in the PRC are mostly using diesel engine, which do not require any lead additives, and there has been no difficulty in switching to unleaded fuel as it becomes widely available. In addition, use of liquefied petroleum gas instead of gasoline is being promoted in Beijing, where 1,000 buses were converted in 1998, and in other cities. The Government is encouraging the use of ethanol as a cleaner, higher-octane additive and alternative to gasoline. The ethanol application will be carried out on an experimental basis by adding 10 percent ethanol to gasoline.

47. Improved emissions standards for new vehicles are directed at reducing carbon monoxide and nitrous oxides emissions. Vehicle emissions are tested when new vehicles are produced. Partial and full European standards will be implemented for the production and importation of small vehicles in 2001 and 2004, respectively, and for larger vehicles in 2002 and 2005. Similarly, motorcycles will be subject to European standards in two phases, by 2001 and 2005.

48. Regulation of vehicle emissions is the responsibility of local environmental protection bureaus, in cooperation with the traffic division of the public security bureaus.⁴² Vehicles are subject to annual inspection, which can be done on a customized basis for fleets of transport enterprises. In addition, vehicle emission testing is carried out at some city boundaries, where time-bound permits are issued for use of the vehicle in the city, and there is also random testing

⁴¹ TA 2951-PRC: *Promotion of Market-Based Instruments for Environmental Management*, for \$697,000, approved on 16 December 1997.

⁴² The Government strengthened the control of emissions from motor vehicles by amending the Air Pollution Prevention and Control Act in April 2000.

on highways. These activities are self-financing; inspection fees and fines are sufficient to fund expanding inspection and testing programs. As the interprovincial movement of vehicles is encouraged by development of the NTHS, there is a need to harmonize among provinces differences in vehicle emission control and regulations, enforcement and monitoring, testing programs, certification, and inspection procedures. This issue is being addressed under a TA⁴³ that assists governments to develop and implement policies to reduce vehicle emissions on a regional basis, including the PRC. The TA will also assist selected governments to formulate action plans to reduce vehicle emissions. The TA's activities will focus primarily on fuel quality, alternative fuels, the regulation of two and three wheeled motorized vehicles, vehicle testing, inspection, and transport planning. A regional workshop on inspection and maintenance of vehicles will be organized in Chongqing in November 2001. In GZAR, vehicle emission control is carried out, strictly following the relevant provisions specified in the Atmospheric Pollution Control Law (1987 and revised in 1995), the State Regulations on Vehicle Emission Control (1990), and GZAR's Regulation on Supervision and Administration of Vehicle Emission Control (1993/1996).

5. Pricing Policies for Road Users

49. The Government's policy on road user charges allows cost recovery through tolls for expressways and highways that are partly funded through loan financing, and meet the following conditions: (i) high traffic volumes, (ii) a relatively inelastic demand for road transport in relation to the toll level, and (iii) high values attached to time savings for passengers and freight. ADB has undertaken a study to develop a toll traffic diversion model applicable to socioeconomic conditions prevailing in the PRC.⁴⁴ This will help the Government introduce toll pricing policies that improve cost recovery and transparency, and provide adequate incentives to attract private sector investment. The toll diversion manual has been translated into Chinese and is being distributed to PCDs. Through training, further consideration will be given to toll collection methods and the introduction of technologies that will reduce the transaction costs of toll collection for road users. ADB's policy on expressway toll levels, incorporated in loan covenants for previous projects and the proposed Project, requires full cost recovery including regular review of toll levels to ensure the recovery of operation and maintenance costs and debt service, and generation of an additional return for replacement and improvement investments. However, toll rate levels established for new expressways also take into account the affordability for transport users (para. 98).

6. Corporatization and Commercialization

50. The PRC's move to a market economy has put pressure on existing expressway organizations and their staff to become commercially oriented and more efficient. Financing and commercial business management practices could be improved. To support good governance in the subsector and the institutional development of expressway organizations, the Government, with assistance from ADB and the World Bank, is pursuing capacity-building programs to encourage commercialization and corporatization in all provinces. TA has been provided to help the Government develop institutional capacity to promote corporatization, leasing, and securitization⁴⁵ in the road sector to attract private sector participation in the construction,

⁴³ TA 5973-REG: *Action Plans for Reducing Vehicle Emissions*, for \$900,000, approved on 26 September 2000.

⁴⁴ TA 3102-PRC: *Preparing the Chongqing-Guizhou Expressway Project (Part 2): Toll Diversion Study*, for \$900,000, approved on 26 November 1998.

⁴⁵ The term "securitization" refers to the process of raising funds through the issuance of either shares or bonds on local or foreign stock exchanges and markets.

management, and operation of bridges, expressways, and other roads in the PRC.⁴⁶ Through review of practices in the PRC and in other countries, conduct of workshops for all PRC provinces, and development of case studies, the TA produced documents and guidelines, and made recommendations. The main document produced is an investor's guide for infrastructure investment in the PRC, including (i) a toll roads investment and policy options model (TRIPO) and its user manual; (ii) articles of associations, founder's agreement, and operation and management agreement for corporatization; (iii) lease and concession agreements; and (iv) approval procedures for corporatization, leasing, concessioning, and securitization of toll roads. The main recommendations of the TA are that the Government should (i) prepare a new law integrating all existing laws (and directives, rules and regulations from various ministries) dealing with toll roads, to achieve internal consistency; (ii) examine the role of long-term debt financing for toll roads, and facilitate access for PRC companies to the domestic and international bond markets, on the same basis as for the securities equity market; (iii) combine roads together into routes, where possible, and create corporations to operate the routes; (iv) consider setting a target for new toll road companies wherein the PCD's ownership aims to be no more than 80 percent of the outstanding shares; (v) ensure that land acquisition costs are adequately shared between public and private parties, and resettlement and land use certificate issues are adequately addressed, particularly when the private sector is involved; (vi) ensure that traffic forecasts are realistic and conducted by independent companies, and toll setting is flexible enough to be adjusted in relation to traffic; (vii) allow bundling of toll roads with nontolled roads under concession agreements to balance the perceived cost and utility of toll roads; (viii) establish offices of investment support at national and provincial levels to help investors move through the approval process of leasing and concessioning; (ix) consider the option of open bidding for future lease and concession agreements; and (x) avoid inflating the use value of assets for securitization for reasons unrelated to the commercial use of the roads. These recommendations are under discussion with the Government.

51. GCD has agreed to establish the Guangxi Expressway Management Company (GEMC) six months prior to the expected date of project completion, and not later than 30 June 2004. GEMC is expected to be a state-owned corporation, with GCD as sole investor. GEMC will be responsible for construction, operation, maintenance, repair, and management of all expressways in GZAR. GEMC will obtain all finance (equity and debt) necessary to perform such activities. Before commencement of commercial operation, the project expressway will be transferred to GEMC. GEMC will be entitled to collect and retain tolls in accordance with the toll structure and will repay the loans contracted for the project expressway. Details on the creation of GEMC, and transfer of assets, revenues, and debt service obligations from GCD to GEMC, including GEMC's financial statements for the Project, will be submitted for ADB's approval six months prior to GEMC creation. GEMC will develop a commercialization program with appropriate accounting and management information systems, and will introduce commercial business practices using the training financed under the Project. Such a program will ensure autonomy of operations, encourage the establishment of road facility performance indicators, and facilitate future refinancing of road subsector assets.

7. Mobilizing Nongovernment Financing

52. The Government has taken a number of significant steps to mobilize domestic resources, including developing capital markets and transforming specialized banks into commercial banks. ADB has provided assistance to help develop the PRC's capital markets, and made a major

⁴⁶ TA 2952-PRC: *Corporatization, Leasing, and Securitization in the Road Sector*, for \$1.0 million, approved on 19 December 1997.

contribution to improving governance in the capital markets by supporting the drafting of the 1998 Securities Law.⁴⁷ The Government is also seeking a greater role for private sector financing in highway and other infrastructure projects. Apart from increasing the resources available for highway development, the use of foreign direct investment would allow project risks to be spread over a large community of investors, and help improve the management efficiency and quality of highway services. In the road subsector, ADB provided a TA⁴⁸ to assess a broad range of financial instruments for mobilizing additional domestic and international funding sources, including the domestic capital markets. ADB also provided assistance for (i) preparing a feasibility study on financing a road project using a BOT scheme, and for capacity building in relation to BOT processes;⁴⁹ and (ii) developing institutional capacity to promote corporatization, leasing, and securitization to attract private sector participation in the road sector (para. 50). Appendix 5 summarizes options available for mobilizing nongovernment financing and ADB's investment in private sector funds in the PRC.

53. The increasing infrastructure needs in the PRC require local governments to shift from the conventional financing modes such as commercial bank loans, international or bilateral loans, government grants, and export credits toward the capital markets. Initial public offerings (IPO) of expressway companies on the stock exchange have demonstrated that such investments can be financially attractive under certain circumstances. Bond issues are another suitable tool for infrastructure projects owing to the long-term and stable earnings stream of such projects. Revenue bond issues by a public agency that owns the asset have an advantage, as the public owns the facilities, but the private investors finance it. However, any capital market instrument requires an adequate registration process and public disclosure, and a strong credit standing, and the legal and regulatory framework in the PRC needs strengthening. Expressway corporations may also consider leasing schemes, which would have considerable potential if combined with tax incentives for the lessees. ADB helps the Government select suitable private sector financing modalities for road projects. This will ultimately alleviate the burden on the final road users as well as the Government budget. These instruments are, however, easier to use where traffic volume and income level are high, i.e., in the coastal region and near major cities. They are not easy to use in the inland southwest and central regions, where traffic densities are low and the road network needs to be developed to support economic development.

54. Six months prior to the opening of the project facilities, GCD, through GEMC, will analyze the feasibility of attracting nongovernment investment funds including private sector participation in the operation, maintenance, and management of the project road. GCD has already taken two private sector participation initiatives: a joint venture agreement with Hong Kong Merchandise Int'l Ltd. for the 138 km Guiliu Expressway for a total investment of Y2.13 billion in May 1997; and a BOT agreement with China Huawen Development General Company for the Liujing-Xingye section of the Nanning-Guangzhou Expressway for a total investment of Y2.34 billion in December 2000.

⁴⁷ TA 3032-PRC: *Legislative Drafting Support for the PRC Securities Law*, for \$150,000, approved on 24 June 1998; and TA 3304-PRC: *Capacity Building of the Capital Markets Regulatory System*, for \$1.0 million, approved on 24 November 1999.

⁴⁸ TA 2409-PRC: *Appraisal Methodologies and Restructuring Highway Financing in Hebei Province*, for \$740,000, approved on 28 September 1995.

⁴⁹ TA 2649-PRC: *Facilitating Build-Operate-Transfer Modality in the Highway Sector*, for \$1.1 million, approved on 27 September 1996.

IV. THE PROPOSED PROJECT

A. Rationale

55. ADB's PRC country operational strategy supports the Government's policies in the road sector, which focus on building roads that will promote economic and social development particularly in the poor areas of the country. GZAR, located in the southwest, is a poor interior province. GZAR had around 15.2 million rural poor by the end of 2000, using a rural income level of Y1,000 per capita per annum,⁵⁰ accounting for about 32 percent of the total GZAR population of 47.6 million. In terms of gross domestic product (GDP) per capita, GZAR is the fourth poorest of the PRC's 31 provinces. In 2000, the average GDP per capita in GZAR was Y4,285, about two thirds of the national average. Since 1980, the average annual economic growth in GZAR, 9.2 percent, has been slightly lower than the national average of 10.1 percent. Lack of transport infrastructure is one of the factors contributing to the depressed economic conditions. As a result of ADB's policy dialogue, the scope of the Project has been expanded to strengthen its development impact by adding a program of complementary road upgrading to improve the local road network and access of poor communities in the project area.

56. The proposed Project is a NTHS connector link from the Viet Nam's National Highway 1 to the NTHS corridor 40 linking Chongqing Municipality via Guiyang, in Guizhou Province, and Nanning to Zhanjiang, in Guangdong Province, and to the NTHS corridor 75 from Kunming in Yunnan Province to Hengyang, in Hunan Province (Map 1). The Project will also connect to the Nanning-Guilin Expressway, a major link to Hunan Province and, via the Nanning-Wuxhou Expressway (to open in 2005), to Guangdong Province.

57. The proposed Project will facilitate regional cooperation between the PRC, Viet Nam, and other countries of the Greater Mekong Subregion (GMS). The project road will improve accessibility between Nanning (GZAR's capital) and the Viet Nam border, while another ADB-financed road project⁵¹ is improving accessibility between the border and Hanoi, Viet Nam's capital. Connection between Hanoi and neighboring Lao People's Democratic Republic and Cambodia, and Thailand, will be improved by the ongoing GMS road program. Improving physical links between the PRC, Viet Nam, and other GMS countries will catalyze the conclusion of agreements to harmonize and simplify procedures governing the movement of people, goods, and vehicles across national boundaries.

B. Objectives and Scope

58. The proposed Project will promote sustainable economic growth, and, thus, contribute to poverty reduction, by improving economic efficiency and reducing the cost of road transport in the southwestern region of GZAR. The Project will relieve traffic congestion and bottlenecks on a key section of the existing road, National Highway 322 (NH 322), a link of the NTHS, and provide better access to growth centers for poor communities through the inclusion of a complementary program of local road upgrading in the project scope. Specifically the proposed Project will (i) provide additional transport capacity, alleviate congestion, and reduce traffic accidents and vehicle operating costs; (ii) improve access for the poor rural population in the transport corridor; and (iii) facilitate regional cooperation by providing better access from GZAR and other PRC provinces to Viet Nam and the road network of the GMS. The proposed Project

⁵⁰ Using the same income level, the national rural poverty incidence is 12 percent.

⁵¹ Loan 1487-VN: *Second Road Improvement Project*, for \$120 million, approved on 21 November 1996.

will also support sector reforms initiated under ongoing ADB-financed projects and regional initiatives.

59. The scope of the Project includes:

- (i) construction of 136 km of four-lane access-controlled tollway from Nanning (Wuxu) to Ningming, 43 km of four-lane class I road from Ningming to Youyiguan at the Viet Nam border, and 49 km of class II connector roads between the project road and major towns, including interchanges with toll stations, bridges, administrative stations, service areas, and improvement of about 100 km of access roads to affected villages along the project road alignment;
- (ii) upgrading of about 507 km⁵² of complementary county and village roads to improve the local road network and the access to poor areas;
- (iii) procurement of equipment for road maintenance, toll collection, surveillance and communications, vehicle axle load testing, road safety, and office administration;
- (iv) land acquisition and resettlement; and
- (v) consulting services for construction supervision, monitoring, and evaluation, and in-country and international training for capacity building.

C. Technical Justification

60. GZAR has a land area of 236,661 square kilometers, 62 percent of which is mountainous. The existing NH 322, a single carriageway two-lane highway is the only road linking Nanning, GZAR's Capital City, to Youyiguan at the Viet Nam border. The proposed Project will start on a new expressway that was completed in October 2000 between Nanning and Wuxu, to connect Nanning to its airport. The new expressway has a different alignment from the 25 km Nanning-Wuxu section of NH 322, which follows class II highway standards. A 14 km section close to Pingxiang City and a 5 km section east of Ningming City were also upgraded to class II highway standards. All other sections of NH 322 between Wuxu and Youyiguan follow class III-IV highway standards. The technical standards of these sections of the road are low, grades are steep, especially close to Ningming and the border, and there are many sharp curves. Passing sight distance is poor over much of the road's length leading to many accidents (2,255 accidents, with 431 fatalities, recorded on NH 322 in 2000). The road network that radiates from NH 322 and the provincial roads in the hinterland served by Project is limited, generally of low standard, and largely unsealed.

61. Most of road sections have reached their capacity, which is low, ranging between 1,500 medium truck equivalent units (MTE) and 6,000 MTE per day depending on road class. Travel time along the road is highly variable. Passenger cars take about 5 hours to cover the 220 km between Nanning and Youyiguan, and trucks and large buses take longer. As the traffic on the road is near or exceeds capacity, travel times will increase rapidly with further increase in traffic over the next few years. From an average of 3,200 MTE per day in 1998, the traffic between Nanning and Youyiguan is forecast to reach an average of 6,800 MTE per day in 2005, equivalent to an annual growth rate of 11.3 percent, and 20,800 MTE in 2025, equivalent to an average annual growth rate of 5.8 percent between 2005 and 2025 (Appendix 6). The existing NH 322 will not be able to safely and efficiently carry the forecast traffic from 2005. A new road following a new alignment must be constructed to accommodate the expected traffic and support continued economic development of the area. While expressway standards will be

⁵² Construction of a further 471 km of complementary roads has started in 2000 and will be completed by the end of 2001.

adopted for the Wuxu-Ningming section, class I highway standards will be used for the Ningming-Youyiguan section in view of the lower traffic forecast and the hilly terrain. In this report, the term “expressway” is used for the whole alignment including expressway and class I highway sections.

62. NH 322 is not near the major county towns in the project area, which have developed close to the railway. The proposed alignment is the logical route to serve these towns in addition to those on NH 322. Alternative alignments were considered for sections of the proposed road in consultation with local governments and local communities. The final alignment was selected based on overall length, ease of construction, and minimization of adverse environmental and social impacts, including protection of cultural and historic sites. The new road is being designed in accordance with MOC standards.

63. The complementary road program was prepared in consultation with local communities to improve the local road network and access of the poor communities to the expressway in the five counties where poverty incidence was the highest (Map 2). This program will be implemented concurrently with the expressway. In addition to 471 km of village roads for which improvement works have already started, about 507 km of county and village roads will be improved under the Project, including (i) upgrading of 283 km of county roads and 7 km of village roads to class III highway standards; (ii) upgrading of 54 km of county roads and 111 km of village roads to paved class IV highway standards; and (iii) upgrading of 52 km of village roads to unpaved class IV highway standards. Road links were prioritized using an analysis that took account of economic and social benefits, availability of funds, and road network efficiency (Appendix 7).

D. Cost Estimates

64. The total cost of the Project, including physical and price contingencies and interest during construction, is estimated at \$455.2 million equivalent, of which \$193.2 million (42.4 percent) is in foreign exchange and \$262.0 million equivalent (57.6 percent) is in local currency. The cost estimates are summarized in Table 1.

Table 1: Cost Estimates
(\$ million)

Item	Foreign Exchange	Local Currency	Total Cost
A. Base Cost			
1. Expressway Civil Works	139.3	150.0	289.3
2. Equipment	10.6	0.0	10.6
3. Land Acquisition and Resettlement	0.0	38.8	38.8
4. Consulting Services and Training	1.7	11.2	12.9
5. Complementary Road Program	0.0	27.7	27.7
Subtotal (A)	151.6	227.7	379.3
B. Contingencies			
1. Physical Contingencies	7.0	8.9	15.9
2. Price Contingencies	14.1	19.1	33.2
Subtotal (B)	21.1	28.0	49.1
C. Front-End Fee	1.5	0.0	1.5
D. Interest/Commitment Charge during Construction	19.0	6.3	25.3
Total	193.2	262.0	455.2

Source: Staff estimates.

E. Financing Plan

65. The Government has requested ADB to provide a loan of \$150 million and the European Investment Bank (EIB) to provide cofinancing of \$50 million. The proposed ADB loan will finance 77.6 percent of the foreign exchange cost of the Project. The proposed EIB loan will finance 11.0 percent of the total cost, including foreign exchange and local currency costs. The China Development Bank (CDB) will provide domestic cofinancing of \$60.4 million equivalent, to cover 23.1 percent of the local currency cost of the Project. The Government, through MOC and GCD will finance the remaining foreign exchange and local currency costs. The financing plan is shown in Table 2. Detailed cost estimates and ADB and EIB financing is in Appendix 8.

Table 2: Financing Plan
(\$ million)

Source	Foreign Exchange	Local Exchange	Total	Percent of Total Cost
ADB loan	150.0	0.0	150.0	32.9
EIB loan	24.0	26.0	50.0	11.0
CDB loan	0.0	60.4	60.4	13.3
MOC grant	0.0	101.0	101.0	22.2
GCD funds	19.4	74.6	93.8	20.6
Total	193.2	262.0	455.2	100.0

ADB=Asian Development Bank, CDB=China Development Bank, EIB=European Investment Bank, GCD=Guangxi Communications Department, MOC=Ministry of Communications.
Source: Staff estimates.

66. The proposed ADB loan will be in United States (US) dollars from ADB's ordinary capital resources and have a 24-year term, including a grace period of 4 years, an interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.75 percent per annum, and a front end fee of 1.0 percent (the fee will be capitalized in the loan), conversion options that may be exercised in accordance with the terms of the draft Loan Agreement, the Loan Regulations and ADB's Conversion Guidelines, and such other terms and conditions set forth in the draft Loan Agreement. The Borrower will be the PRC. The Government has provided ADB with (i) the reasons for PRC's decision to borrow under ADB's LIBOR-based lending facility on the basis of these terms and conditions and (ii) an undertaking that these choices were the PRC's own independent decision and not made in reliance on any communication or advice of ADB. The proceeds of the ADB loan will be relented to the GZAR government, which will onlend them to GCD, on terms and conditions acceptable to ADB. GCD will bear interest rate variation and foreign exchange risks on the loan.

67. The proposed EIB loan will be provided as parallel financing to the ADB loan to finance the class I road section from Ningming to Youyiguan. The conditions of the EIB loan will be agreed between EIB and the Government. The EIB loan will have a maturity of 20 years including a grace period of 5 years. No front-end fee or commitment charges will be applied. Interest during construction will be paid directly by the Government to EIB.

68. The CDB loan will be repayable over a period of 17 years, including a grace period of 4 years, and at an interest rate of 6.2 percent per annum. The Government contribution to the Project will include a grant from MOC of \$101.0 million equivalent. GCD's contribution to the Project will be a grant of \$99.2 million equivalent from its construction fund.

F. The Executing Agency

69. GCD will be the EA for the Project. GCD has completed its reorganization and restructuring in 2000, which resulted in reduction of its staff and separation of most enterprises initially under GCD, which are now independent companies. GCD has only about 50 staff directly employed in the department. In addition about 1,600 people are employed in several related bureaus, institutes, and other agencies. This does not include the staff employed in the prefecture and municipal communication bureaus (Appendix 9). GCD has satisfactorily implemented one ADB-financed transport project⁵³ and one World Bank-financed inland waterway project, and recently started implementing a World Bank-financed road project. GCD has the capability to implement the Project, provided that it receives adequate support from the construction supervision consultants and ADB review missions. After GEMC is established (para. 51), the project facilities and GCD's responsibilities for the Project will be transferred from GCD to GEMC, after receiving ADB's concurrence on the proposed arrangements.

G. Implementation Arrangements

1. Management and Organization

70. GCD has established a project management unit (PMU) to coordinate and monitor all project activities. The PMU is headed by a Deputy Director of GCD, and comprises 9 management staff, including a Project Coordinator. The PMU is responsible for recruitment of supervision consultants, training, and international procurement. All activities related to the construction of the project expressway are the responsibility of a construction office comprising 5 headquarters divisions (contract management, environment and resettlement, administration, financial, and human resources). The complementary road program will be implemented by the county communication bureaus, under the supervision of the Nanning Prefecture Communications Bureau. To facilitate land acquisition, resettlement, and environmental protection measures, and to ensure that local concerns are adequately addressed, project implementation committees, consisting of officials from local governments and various local agencies, have been established in the counties along the project roads, i.e. Chongzuo, Fusui, Longzhou, Ningming, Pingxiang, and Yongning.

2. Implementation Schedule

71. Preconstruction activities of ADB-financed works, such as detailed design, preparation of bidding documents, prequalification of contractors, tendering, and award of contracts commenced in March 2001 and should be completed by the end of January 2002. However because of the shorter EIB procurement process, EIB-financed works will be ready to start earlier. Overall project construction is therefore scheduled to start in late December 2001 and take about 40 months, the anticipated completion date being the end of April 2005. Implementation of the complementary road program will be concurrent with expressway construction. The implementation schedule is in Appendix 10.

3. Procurement

72. All procurement to be financed under the ADB loan will be carried out in accordance with the ADB's *Guidelines for Procurement*. All civil works contracts will be awarded on the basis of

⁵³ Loan 1427-PRC: *Fangcheng Port*, for \$52 million, approved on 18 January 1996. The project also included a road component for access to the port.

international competitive bidding (ICB) procedure. Supply contracts estimated to cost more than \$500,000 will also be awarded under ICB. Supply contracts estimated to cost \$500,000 or less will be awarded on the basis of international shopping and those costing \$100,000 or less by direct purchase procedures. Local competitive bidding procedures will not be used. Procurement under ICB and international shopping procedures, including prequalification, tendering, and bid evaluation, will be carried out with the assistance of the China International Tendering Company. This company has relevant experience gained under other externally financed projects, including those of ADB and the World Bank. Procurement for ADB financing will include 12 packages of civil works to be procured under ICB procedures, and 13 packages of equipment under ICB/international shopping/direct purchase procedures. EIB will finance 3 packages of civil works to be procured under ICB procedures. Prequalified contractors with adequate technical and financial capacities will be allowed to bid on several packages and, if successful, may be awarded more than one contract based on least cost combination of contracts. The detailed contract packages are in Appendix 11.

4. Consulting Services

73. Eight resident supervision engineer offices, staffed with domestic consulting firms selected by GCD, will directly supervise construction works in the field. Overall project supervision will be under the responsibility of the Chief Supervision Engineer Office (CSEO), to which the international consultants will be fully integrated. A chief supervision engineer (CSE) and two deputy chief supervision engineers (DCSEs) will head the CSEO. One DCSE will be the team leader of the international consultants and will assist the CSE in project and contract management activities, and certify contractor's progress payment certificates and contract variations prior to their approval by the CSE. Other international experts will provide short-term assistance to the CSEO on earthworks, mechanical and electrical equipment, tunnel construction, traffic safety, and other technical issues.

74. GCD will select individual domestic consultants to staff the CSEO, and nominate the chiefs of the main units of the CSEO, i.e., the supervision division, measurement office, and central laboratory. Three individual domestic consultants recruited as deputy chiefs of these units will have the special duty to assist the team of international consultants. They will be a qualified contract management specialist (supervision division), quantity engineer (measurement office), and quality control specialist (central laboratory), fluent in English. The terms of reference (TORs) of these three positions will be submitted to ADB for concurrence prior to selection; the biodatas of the selected candidates will be submitted to ADB for concurrence prior to their recruitment; and GCD will confirm to ADB the recruitment of the selected candidates. If the selected domestic consultants cannot satisfy the requirements of their TORs, GCD will find internationally recruited consultants to fill these positions.

75. In addition to international consultants for construction supervision, international specialists will provide inputs in resettlement monitoring and evaluation, project performance management systems, training, and other topics as required. A total of about 60 person-months of consultants from an international consulting company will be required for international consulting services. International consultants will be financed under the loan, and recruited by GCD in accordance with ADB *Guidelines on the Use of Consultants*. Construction supervision will require about 4,900 person-months of professional domestic consultants.⁵⁴ Domestic

⁵⁴ It also includes about 3,900 person-months of technical support staff, for a total of about 8,800 person-months of hired domestic technical services.

consultants will be financed by GCD and recruited in accordance with local procedures that are satisfactory to ADB.

5. Advance Recruitment and Procurement Actions

76. During project processing, the Government requested ADB's approval for advance action to expedite the recruitment of consultants and procurement for civil works. Advance procurement action was approved on 4 April 2001 and covers prequalification of contractors, tendering, and bid evaluation for the civil works contract packages, but does not include signing of contracts. Advance recruitment action was approved on 1 June 2001, and covers selection of international consultants, up to but not including signing of the contract. The Government and GCD have been advised that ADB's approval of advance actions does not commit ADB to finance the Project.

6. Midterm Review

77. In 2003, ADB and GCD will carry out a midterm review of the Project, focusing on all policy, institutional, administrative, organizational, technical, environmental, social, economic, financial, and other relevant aspects that may have an impact on the performance of the Project and its continuing viability. The review will (i) examine the progress in implementing subsector reforms, policy development, progress in resettlement, and compliance with assurances in the Loan Agreement; and (ii) consider complementary activities to enhance the poverty impact during operations.

7. Land Acquisition and Resettlement

78. A resettlement plan was prepared by the Xi'an Highway University for GCD in February 2000 and revised with the assistance of the TA consultant. The resettlement plan was finalized at loan appraisal based on the preliminary technical design of the Project. Appendix 12 summarizes the resettlement plan. The Project will result in loss of land, houses, and other assets due to the expressway construction. An estimated 31,000 people will be affected, less than 10,000 of whom need economic rehabilitation. Of these, 1,130 will have their housing relocated. Those losing land will be compensated, through their economic collectives, under the 1998 Land Administration Law and the provincial guidelines, which set out the procedures, compensation rates, and resettlement subsidies, for acquisition of land. The Project will result in permanent land acquisition of nearly 1,200 hectares (ha), plus about 190 ha of temporarily borrowed land for construction purposes. Those losing housing will receive compensation directly and a replacement house site, with vulnerable households receiving assistance to replace their houses. Those losing other assets, such as crops, trees, sheds, and other structures, will be compensated directly for their losses. People whose land will be borrowed temporarily will be compensated for the loss of production. The initial land acquisition and resettlement budget, estimated at about \$38.8 million equivalent, is included in the project cost estimates.

79. GCD will fund the resettlement costs according to the standards set out in the resettlement plan. Compensation will be paid for housing and new housing will be made available before relocation takes place. The 1998 Land Administration Law, which was drafted with ADB assistance,⁵⁵ provides for disclosure of information and consultation with people affected. The summary of the resettlement plan, together with provincial compensation rates,

⁵⁵ TA 2735-PRC: *Capacity Building for Natural Resources Legislation*, for \$800,000, approved on 24 December 1996.

has been distributed to county and township offices in early April 2001, to be disclosed to affected people through village collectives. Disclosed resettlement information includes a broad summary of the scope of land acquisition and resettlement, rates for compensation and other assistance, the grievance mechanism, and intended time frame. To date, no adverse response has been received. During appraisal, an ADB mission conducted a training workshop on resettlement policy and implementation of the resettlement plan for the resettlement staff of the PMU and selected county resettlement staff, to facilitate the smooth implementation of the resettlement plan. GCD will monitor the resettlement process and submit quarterly reports to ADB. A regular reporting system has been established to ensure key resettlement activities are implemented on time. GCD will engage a qualified local institute to provide independent monitoring of the resettlement process. Further surveys will be done on completion of the resettlement, and one and two years after Project completion, and the findings will be reported to GCD and ADB.

8. Reports, Accounts, and Audit

80. The Government has agreed that, as in previous ADB-financed projects, arrangements satisfactory to ADB will be made for reporting the progress of Project implementation. In this regard, GCD will submit to ADB quarterly progress reports in such form and detail as ADB may request, and brief monthly updates. To facilitate postevaluation of the Project, GCD will also furnish ADB, within three months of project completion, a project completion report providing details regarding physical implementation, project costs, recruitment and performance of consultants, procurement of goods and civil works, performance of suppliers and contractors, social and environmental impacts, project financial and economic performance, and other details as requested by ADB. In addition, GCD will provide to ADB reports on contract management procedures (including approval of variations orders and progress payment certificates), forecast traffic volumes and proposed toll tariff increases, benefit monitoring, and other activities within the required time as stipulated in the loan and project agreements.

81. GCD will maintain separate accounts for the Project and related financial statements, such as statements of sources and application of funds, implementation of the loan agreement, and income and expenses. The accounts will be started on commencement of toll operation, and audited annually. After its establishment, GEMC (para. 51) will also prepare such separate statements plus an overall balance sheet. GMEC will prepare one set of financial statements for the Project and another for consolidated accounts, and have both sets audited annually. The audit will be in accordance with appropriate auditing standards consistently applied, by independent auditors, whose qualifications, experience and TOR are acceptable to ADB. GCD will submit to ADB within nine months of the end of each related fiscal year, certified copies of audited project accounts and financial statements and an auditor's report for the Project, all in the English language. ADB reminded the Government of its stringent requirements for timely submission of audited project accounts and financial statements, and that noncompliance with the requirements may result in the suspension of loan disbursements. During the midterm review in 2003, financial projections of GEMC for the next five years should be submitted to ADB for its review and such projections should be updated annually thereafter.

9. Project Performance Management System

82. A set of indicators for monitoring and evaluating the performance of the Project in relation to its goals and objectives has been agreed with GCD. Prior to project implementation, GCD will establish the necessary baseline values for impact indicators. These values will be updated during project implementation. Specific indicators will be measured, with the necessary

frequency, during project construction. Comments and findings regarding project impact will be incorporated in every second ADB quarterly report. Indicators for project evaluation will be measured at project completion and annually for three years after completion. Where relevant, indicators will be disaggregated by gender. To facilitate assessment of the socioeconomic impact of the Project, TOR for services of an international consultant and local institute/consultants to monitor and evaluate all relevant project effects, have been included in the scope of consulting services to be provided under the Project.

10. Anticorruption Measures

83. During project processing, ADB's anticorruption policy was explained to central and local government officials. Attention was drawn to the section on fraud and corruption that was added to ADB's *Guidelines on Procurement* and *Guidelines on the Use of Consultants*, particularly the need for bidders, suppliers, contractors, and consultants to observe the highest standards of ethics in the procurement and execution of ADB-financed contracts, and the sanctions if fraud and corruption are discovered. ADB's program for the PRC includes assistance to the Government that will improve governance and provide incentives to reduce the incidence of corruption in the longer term. In 1998, ADB TA helped the Government to develop detailed guidelines for the selection and engagement of consultants,⁵⁶ to increase transparency, take account of the principles of ADB's anticorruption policy, and provide for equal opportunity competition. The resulting draft guidelines were well received by the Government. ADB is providing assistance to strengthen the Government's auditing system to conform with the requirements of the Audit Law and, as far as practicable, international auditing standards by (i) formulating government auditing standards and procedures, and (ii) designing and implementing an audit training program to promote full and consistent adherence to such auditing standards and procedures by government auditors.⁵⁷ This work will strengthen the Government's ability to detect fraud and corruption. ADB has also provided assistance for establishment of national procurement regulations, implementation of the Tendering and Bidding Law and related regulations, and formulation of the Government Procurement Law (footnotes 35 and 36). These laws and regulations will help ensure transparency in the procurement process and reduce corruption. In line with these national developments, GCD has established an anticorruption system by preparing specific programs and targets, and organizing training and workshops.

11. Capacity Building and Human Resource Development

84. The international consultants for construction supervision will provide on-the-job training for about 100 GCD staff and domestic consultants in construction supervision, quality control, and contract management. In addition, domestic consultants will provide training to GCD and GEMC staff in a variety of subjects, including financial management, resettlement policies and implementation, environmental protection and monitoring, construction supervision, road safety, and road maintenance. Some of the training sessions may also require the participation of the international consultants for construction supervision.

85. About 46 person-months of international training will be financed under the loan. The international consultants for construction supervision will help GCD organize 16 person-months of international training in construction supervision training, but will not provide the training services, unless requested by GCD during contract negotiations. About 30 person-months of international

⁵⁶ TA 3138-PRC: *Regulatory Framework for the Engagement of Consultants*, for \$700,000, approved on 22 December 1998.

⁵⁷ TA 3103-PRC: *Strengthening the Government Auditing System*, for \$700,000, approved on 26 November 1998.

training programs will aim at developing the human resources of GCD and GEMC and strengthening their institutional capability in highway management, human resources development, international procurement and contract management, quality control, and road operation and maintenance. The EA will prepare for ADB's concurrence an international training plan including a program of courses and lists of candidates to be trained. Language training will be provided to the trainees, if necessary. Each trainee will be required to submit a report on training received and make a presentation to the employer agency.

H. Environmental and Social Measures

1. Environmental Measures

86. The Project is classified as environmental category A. The environmental impact assessment (EIA) was prepared by Xi'an Highway University on behalf of the Government, and was approved by the State Environmental Protection Administration on 22 January 2001. Public consultations were conducted between June 1998 and September 1999 (Appendix 13). The overall conclusion of the EIA, which was confirmed during project processing, was that the adverse environmental impacts arising from the construction and operation of the project facilities can be mitigated to acceptable levels. A summary EIA of the Project was circulated to ADB's Board on 2 May 2001, and put on the ADB web page. The Chinese version of the EIA will be provided in the Project's field offices for reference by the public and other interested parties.

87. Adverse environmental impacts were minimized by the selection of appropriate alignment. The EIA further assesses the environmental impacts of the selected alignment and prescribes environmental protection and mitigation measures. Environmental impacts and mitigation measures are summarized in Appendix 4 of the summary EIA. The environmental protection and mitigation measures are estimated to cost Y30.2 million equivalent, including Y29.1 million of capital costs that are included in the project cost estimates. The environmental mitigation measures will be incorporated in the bid documents and bill of quantities of the civil work contracts. Monitoring will be undertaken to ensure that environmental impacts will be minimized to acceptable levels, and meet ADB's environmental requirements, and the Government's environmental standards. Domestic environment consultants will be recruited under the construction supervision consulting services to prepare and supervise the implementation of the environmental management plan, monitor the environmental and social impacts, and prepare related reports.

88. The road alignment will not pass through primary forests or other ecologically sensitive areas. However, to comply with the PRC's forestry law and ADB's forestry policy, GCD agreed to mitigate affected plantation forest areas by compensatory planting of an equivalent or larger area. The planting program will be implemented in coordination with the GZAR Forestry Department.

89. The EIA identified the white-headed leaf monkey, a critically endangered species, in the project area, i.e., in Longling (Bapen) Nature Reserve in Fusui County, Lobai Nature Reserve in Chongzuo County, and in Longrui Nature Reserve, which is part of the larger Nonggang Nature Reserve in Ningming and Langzuo counties. The project processing ADB missions confirmed EIA findings that the Project is unlikely to cause significant environmental impacts. Economic development in southern GZAR may bring adverse environmental impact on natural resources if precaution is not taken. Considering the critical population of the white-headed leaf monkey, which has received international attention, ADB recommended that the GZAR government address the possible environmental impact by preparing a comprehensive management plan of

the three nature reserves. An advisory TA was included in the 2001 TA program for the PRC to help the GZAR government prepare this management plan.

2. Social Analysis

a. Overall Impact

90. Key issues were identified in the initial social assessment carried out during TA fact-finding in March 1999 (footnote 1) and assessed in detail during the social analysis and feasibility study. The key issues included reducing the adverse impacts associated with resettlement and maximizing the poverty reduction impact of the Project. The social analysis examined the broader trends in the project area, and the needs of affected people and their ability to benefit from the Project. Public consultations were also held to ascertain the support of the residents for the Project (Appendix 13). A summary of the social and poverty impact analysis is in Appendix 14.

91. The project area mainly covers five counties between Nanning City and the Viet Nameese border. These counties have a total population of around 1.6 million, of whom less than 20 percent live in urban areas. The Project will directly benefit most of the population of the counties of the project area, but also indirectly benefit a large share of the GZAR population of 47.6 million through economic development induced by improvement of the road network. The dominant minority, the Zhuang, makes up over 80 percent of the total population of the project area. Several measures were recommended in the social analysis to maximize the poverty reduction impact and to mitigate the possible adverse impact of the Project. GCD will implement all recommendations listed in Appendix 14.

92. In addition, and to maximize the poverty reduction impact of the Project, (i) all roads financed by GCD under the Project will use wage labor, with wages set at market rates; and (ii) construction companies involved in civil works for the expressway will hire as much labor as possible from poor villages. Labor teams will be identified through the Poverty Alleviation and Development Office (PADO), the All-China Women's Federation (WF), and the Labor Department. The PADO and the WF will identify appropriate team leaders in poor natural villages in the Project area and train them as necessary. The team leaders will then select a labor team from poor households in their natural villages. The county government, the Labor Department, PADO, and WF will coordinate the signing of the contracts between the contractors and the team leaders from poor villages.

93. The social impact of the project in its entirety will be generally beneficial. The social analysis indicates the following: (i) the largest beneficiary group will be the farmers, although most of the easily quantifiable benefits will accrue to road users; (ii) many farmers, particularly those on the complementary road program schemes, but also those near the expressway interchanges, will be in a position to increase their agricultural production through improved access to markets and cheaper transport costs; (iii) farmers in settlements served by the complementary road schemes will have improved access to education and health facilities and increased information flows and interaction with the outside world; (iv) the expressway is likely to provide opportunities for construction employment, some permanent employment, revenues from the sale of construction materials, and trading and service activities in the service areas; (v) the Project will benefit most of the poor in the project area, with direct benefits arising mainly from the complementary road program rather than from the expressway, the impact of which will be felt over a longer term; (vi) disbenefits will arise from resettlement and land acquisition, but will be mitigated by compensation payments and replacement houses as per the resettlement

plan; and (vii) health risks could increase due to infectious diseases and potential crossborder HIV/AIDS transmission, but will be mitigated by distribution of targeted information, education, and communication during and after construction.

b. Impact on Minorities

94. The population of the Project area is dominated by the Zhuang ethnic group. Because the Zhuang are fully assimilated into the mainstream economy, their cultural identity will not be adversely affected by the Project.

c. Gender Issues

95. Women participate fully in the rural economy and frequently engage in small-scale trading. They are however underrepresented as drivers and long-distance traders, in the public sector, and in the management of enterprises. The impacts on farmers therefore apply equally to women. The complementary road program will help women expand livestock rearing and other small-scale retail activities, and improve agriculture in general. Although 15 percent of the construction employment will go to women, they will be given equal opportunities and pay for construction and operational jobs, in accordance with the ADB's Policy on Gender and Development.

V. PROJECT JUSTIFICATION

A. Financial and Economic Analysis

1. Economic Analysis

96. An economic internal rate of return (EIRR) was calculated based on a comparison of the with- and without-project situations (Appendix 15). The economic costs of the project roads include the resource costs for construction, operation, and maintenance, and the value of agricultural production from land lost permanently. Allowance has been made for costs of equipment replacement, road maintenance, and minor improvements to the network without the Project. The economic benefits generated by the project roads include (i) VOC and time savings for those who remain on their original routes, (ii) VOC and time savings for those who choose to pay the toll and divert to the new road, (iii) VOC savings on the improved local road network; (iv) benefits from generated traffic, (v) savings in the direct and indirect costs of accidents, (vi) working capital savings to freight in transit; and (vii) resource cost savings arising from diversions from rail to road. Environmental benefits will come from avoided vehicular emissions as a result of the reduced level of congestion on the NH 322. However, these benefits were not included in the analysis due to lack of an established methodology for their valuation. Economic costs and benefits have been valued in economic prices.

97. On this basis, the economic internal rate of return (EIRR) for the Project is 20.0 percent, indicating that the Project is economically viable. The EIRR of the complementary road program alone is 22.7 percent. Results of sensitivity analysis confirm the robustness of the project's economic viability. Changes in the key variables, such as 20 percent reduction in VOC savings and growth rate of normal traffic, do not significantly impact the economic viability. The capital cost would have to increase by about 100 percent over the base estimate for the EIRR to fall below 12 percent. The benefit level would have to decrease by more than 50 percent to achieve the same effect. Given the previous experience in the PRC, variations of such magnitude are unlikely.

2. Financial Performance and Analysis

98. The responsibility of toll setting has been devolved by MOC to provincial governments. Within GZAR, the level of tolls is set by the Price Control Bureau in consultation with GCD. The provincial government approves and endorses the toll rate proposal. The primary criteria for establishing toll rates include (i) standard of the road, (ii) total construction and maintenance costs, (iii) traffic volumes, and (iv) affordability of toll rates. Toll rate increases are decided on the basis of the actual traffic volumes on the road, debt servicing, real income, and price increases.

99. The toll rates proposed for the project roads are in line with tolls proposed for other roads in Guangxi, and are in the high end of rates nationally. Based on preliminary financial analysis, the proposed toll level would ensure the financial viability of the Project. GCD will undertake a toll study prior to opening the expressway and each year for five years thereafter, to confirm the appropriate toll level, and will submit the results for ADB concurrence. ADB provided TA (footnote 44) to carry out a toll diversion study and the resulting manual has been distributed to PCDs. Findings of these studies will help GCD determine the toll levels for the proposed Project. Toll levels will be reviewed annually to account for increases in costs, and other factors. The level and structure of the tolls for the tollway will be designed to ensure that the revenue will cover operation and maintenance costs, debt servicing, and depreciation in excess of debt servicing, and generate an acceptable rate of return on the investment as adjusted for inflation. If an adjustment in the toll levels is required based on this principle, GCD will submit its toll adjustment plans for ADB's concurrence prior to finalizing and submitting it to the provincial government for approval.

100. The financial performance of the project expressway was forecast taking into account the anticipated traffic, the projected operating costs, and the proposed toll rates. The working ratio is expected to be below 12 percent over the project life. The debt service coverage ratio of more than 1.2 is achievable from the first year of full operation. The debt-to-equity ratio will be below 65:35.

101. The GEMC, when established as a corporation independent of the provincial government, is expected to be financially autonomous. Projections based on currently available information and investment plans show that the expressway portfolios will be financially sound (Appendix 16). The after tax financial internal rate of return (FIRR) for the project expressway including the cost of complementary roads is estimated at 9.0 percent, which is acceptable as it exceeds the estimated weighted average cost of capital of 3.1 percent (Appendix 17). Sensitivity analysis shows that the Project will be able to meet all its financial obligations, and that the FIRR will stay above the estimated weighted average cost of capital under various adverse scenarios (20 percent increase in the project cost, 20 percent decrease in the toll revenue, 30 percent increase in operation and maintenance costs, and a one-year implementation delay). A devaluation of the yuan by 30 percent would reduce the FIRR to 8.1 percent. Without including the complementary roads, which do not generate any direct revenues, the FIRR after tax is 9.7 percent.

B. Social Dimensions and Impact on Poverty

102. The Government, with the assistance of ADB, prepared a poverty impact analysis for the Project, based on 1999 poverty data. Of the 1.6 million people living in the project area, about 1.1 million are expected to directly benefit from the Project. The proportion of poor (footnote 50)

among project beneficiaries will be around 13 percent, slightly above the 12 percent poverty incidence in the PRC. During appraisal, the GZAR government provided new poverty data, based on surveys conducted in 2000, which result in a much higher proportion of poor among project beneficiaries.⁵⁸ A summary of the poverty impact analysis is in Appendix 14.

103. The economy in the project area is predominantly agricultural providing 40 percent of GDP and 75 percent of the employment. Industrial development is limited, accounting for 20 percent of GDP, much lower than the 45 percent at the national level. There is a high level of temporary migration to the eastern cities (especially Guangzhou and Shenzhen). About 30 to 40 percent of the rural labor force has temporary jobs outside their area. Remittances from those migrating to work temporarily in other provinces are an important factor in boosting household incomes, and reducing poverty. This results from the wide wage rate differences between rural and urban areas.

104. Lack of access to economic opportunities is a significant cause of rural poverty in the PRC. Poverty counties are concentrated in remote mountainous areas in the central and western regions. In the project area, townships that are far from NH 322 have higher incidences of poverty than those closer to the highway. Linking the poor areas to growth centers will improve the economic conditions and expand the scope for economic and social activities. Direct or indirect access to growth centers will provide market and employment opportunities, and better social services. The Project is expected to generate a sustainable poverty reduction impact in the long term and a limited positive impact in the short term. The improvement of the road network under the Project, including expressway, connectors, and complementary roads, will boost investments in GZAR, which will create demand for the goods and services provided by the people in remote areas, even if they are not directly connected to the Project. The combination of these anticipated effects will have a pronounced positive influence on poverty reduction in GZAR, within and beyond the project area.

105. Poverty considerations have been an integral part of project design. The Project includes measures to extend socioeconomic benefits to the poor, in particular the complementary road program, explicitly formulated to target the remaining concentrations of poor populations in the project area (para. 63). Virtually all settlements served by the complementary road scheme are either classified as poor today or have only recently been elevated from poverty status. Additional measures will be required to stimulate and encourage increased agricultural production and build new income opportunities for the poor.⁵⁹

106. During construction and operation, the Project will generate employment opportunities and priority will be given to poor people living in the project area. Approximately 16,500 laborers will be hired for the duration of the construction. The Government has assured ADB that a large proportion of these will be from labor teams identified through PADO and that they will be paid a market wage. In addition, during the operational phase up to 750 poor workers will be employed, whose living conditions will improve. The wages from employment during construction and operation of the Project will increase family incomes, raise living standards,

⁵⁸ Based on the new data, which are still unofficial, the proportion of poor among the GZAR population would be around 32 percent, much higher than estimated in 1999, due to the correction of overestimation of rural incomes before 2000. The official 2000 poverty data will be available by the end of 2001, and taken into account during loan inception when updating the base line used for the project performance monitoring system (para. 82).

⁵⁹ To implement such measures, ADB is helping the Guangxi PADO prepare a project proposal for financing under the Japan Fund for Poverty Reduction. The proposal includes investment in fruit tree planing, and training of poor farmers to improve quality, productivity, and marketing of their produce.

and thus reduce poverty. The impact of the Project on poverty reduction will be evaluated during and after Project implementation.

C. Project Risks

107. The Project has been formulated to reduce potential technical and economic risks. The main technical risks, which could result in implementation delays and cost overruns, are associated with the six large bridges and two tunnels. To mitigate these risks, international consultants have reviewed the proposed construction methods. The prequalification of contractors will focus on their financial and technical capability in handling similar works. During the construction period, monitoring and contract management information systems will be set up and implemented with the assistance of the international consultants for timely identification of technical problems and implementation of corrective measures. GCD has proven experience and has satisfactorily implemented similar projects. There are no major environmental and resettlement risks and adequate mitigation and monitoring mechanisms have been built into the Project. Appropriate coordination and monitoring mechanisms will be put in place for resettlement.

108. Economic performance in the project influence area would have to deteriorate substantially for the Project to lose economic viability. While a financial risk is associated with construction and operation of the expressway, its extent will depend upon the actual construction costs when contracts are awarded and during the subsequent implementation. To mitigate this risk, GCD is consciously oriented to building up a commercial business environment for expressway operations, and the project expressway will receive substantial equity injections from the central and provincial governments. As the Project will generate revenue in domestic currency, there is a risk related to exchange rate changes. Sensitivity tests indicate that an adverse exchange rate change will have only a limited effect on the FIRR.

VI. ASSURANCES

109. The following assurances in addition to the standard assurances will be incorporated in the legal documents:

- (i) **Counterpart Financing.** The Government and GZAR will ensure that GCD obtains, on a timely basis, all funds and resources necessary for construction of the project roads, in accordance with the financing plan for the Project as agreed to by ADB.
- (ii) **Construction Quality and Sound Development Management.** GCD will ensure that the project roads are constructed in accordance with the Government's technical standards of highway engineering. GCD will promote sound development management, and ensure that quality control, contract management, and construction supervision, are performed in accordance with national standards and internationally accepted practices. GCD will (a) provide the international team leader with all the necessary powers to review and certify variation orders and contractors' monthly payments, prior to their approval by the chief supervision engineer; (b) submit for ADB concurrence the TOR of the contract management specialist, quantity engineer, and quality control specialist hired as deputy chiefs of the Supervision Division, Measurement Office, and Central Laboratory, respectively, of the Chief Supervision Engineer Office; (c) submit for ADB concurrence the resumes of the candidates selected for these

three positions; (d) confirm to ADB the recruitment of the selected candidates; and (e) find internationally recruited consultants to fill these positions, if the selected domestic consultants can not satisfy the requirements of the TOR.

- (iii) **Road Traffic Safety.** GCD will ensure that the recommended road safety enhancement measures are incorporated in the design of the Project and are implemented, and that road safety audits are carried out before construction starts, and again before operations commence. The Government will ensure that the project roads are adequately patrolled to mitigate against illegal use of the facilities.
- (iv) **Axle Load.** GZAR will take appropriate measures to prevent overloading on the project roads by installing vehicle axle weighing equipment at selected locations, and making suitable arrangements for operation of such equipment. Prior to commercial operation of the project roads, GCD will submit to ADB a statement indicating legal axle load limits, frequency of testing, and penalties for infringement.
- (v) **Operation and Maintenance.** GZAR will ensure that, upon completion of the Project, the project facilities will be adequately operated and maintained, and that the project road pavement will be maintained at an international roughness index level of not more than 3 meters per kilometer.
- (vi) **Corporatization.** Six months prior to the expected date of project completion, and not later than 30 June 2004, GCD will have created a corporation, tentatively called Guangxi Expressway Management Company (GEMC), to construct, operate, and maintain all expressways in GZAR. Details on the creation of GEMC, and transfer of assets, revenues, and debt service obligations from GCD to GEMC, including GEMC's financial statements for the Project, will be submitted for ADB's approval six months prior to GEMC creation. GCD will enter into an agreement with GEMC to ensure autonomy of operations, encourage the establishment of road facility performance indicators, and facilitate refinancing of road sector assets. Prior to opening to traffic, the onlending agreement between GZAR and GEMC for transfer of part or all of the ADB loan will be submitted for ADB's concurrence. After GEMC has been created as a corporation, the responsibilities of GCD as EA will be transferred to GEMC. Prior to the assumption of GCD's responsibilities under the Project by GEMC, ADB will enter into a project agreement with GEMC, which will set forth the responsibilities of GEMC as EA under the Project.
- (vii) **Tolls.** The tolls for the project roads will be set at levels sufficient to ensure the maximum debt service coverage, the operation and maintenance costs, and depreciation in excess of debt service, and to generate an acceptable return on assets as adjusted from time to time for inflation. Six months prior to the start of commercial operations, GCD will prepare and submit for ADB's concurrence a report on the proposed toll structure and levels, before submitting the application to the GZAR government for its approval. For the first five years of operation, GCD will review the toll structure and levels annually and submit a report to ADB. If the toll levels must be adjusted to cover inflation, GCD will submit for ADB's concurrence the toll adjustment plan, prior to finalizing and submitting it to the GZAR government for its approval.

- (viii) **Financial Ratios.** To ensure the financial sustainability of the operation of the tolled project roads, GCD and GEMC after it is established, will maintain (a) a working ratio (operating and annual maintenance costs, excluding periodic maintenance, to revenue) of not more than 12 percent; (b) a debt service coverage ratio of not less than 1.2; and (c) a debt-to-equity ratio of less than 65:35. To this end, GZAR will provide or cause to be provided, to GEMC on a timely basis all funds needed in addition to their internally generated revenues.
- (ix) **Nongovernment Financing.** Six months prior to the opening of the project roads, GCD will analyze the feasibility of attracting nongovernment investment funds for the project facilities (including private sector participation in the operation, maintenance, and management of the project roads); report its conclusions and objectives to ADB; and outline the approach for achieving these objectives.
- (x) **Environment.** GCD will ensure that the Project is constructed and operated in accordance with environmental procedures and guidelines of the national government, local government, and ADB; that any adverse environmental impacts arising from the Project are minimized by implementing the mitigation measures and environmental monitoring program presented in the EIA and summary EIA; and that the implementation of the environmental monitoring program, including mitigation measures, and copies of permits, licenses, and clearances is regularly reported to ADB as specified in the EIA, including violations of safety and environmental standards, if any, and how they have been corrected.
- (xi) **Land Acquisition and Resettlement.** GCD will ensure that the resettlement plan is carried out promptly and efficiently, including land acquisition, in line with the PRC Land Administration Law and ADB's *Policy on Involuntary Resettlement*; that all affected people are consulted on the entitlements at least four months before ground clearing commences; and that sufficient budget is made available, the compensation to the affected people is made in a timely manner, and those affected will be at least as well off after the Project as they were before it. GCD will ensure that the implementation of the resettlement plan is monitored and evaluated independently by a local institute and reported annually to ADB. GCD will keep ADB informed of the progress of resettlement activities through regular reporting as specified in the resettlement plan.
- (xii) **Poverty Reduction.** GCD, in cooperation with the Guangxi PADO and Labor Bureau, will ensure that (a) contractors maximize the employment of local poor people for constructing the project roads; and (b) local villagers working for the complementary road program will receive a salary based on market rates. GCD will monitor the impacts on poverty with the assistance of a local institute. GCD will provide semiannual monitoring reports on these impacts to ADB during construction, as part of the quarterly reports, and an evaluation report three years after project completion.
- (xiii) **Complementary Road Program.** GZAR and GCD will (a) ensure that the county governments implement the complementary road program as agreed with ADB, (b) provide, in a timely manner, adequate funds to implement the program and the

social and environmental mitigation measures for the program, and (c) ensure that the county governments adequately operate and maintain the roads constructed/upgraded under the program.

- (xiv) **Gender and Development.** GCD will follow ADB's *Policy on Gender and Development* during implementation of the Project, and will take all necessary actions to encourage women living in the project area to participate in planning and implementing the Project, including construction work. GCD will monitor effects on women during project implementation, through gender-disaggregated data in the resettlement plan and the monitoring and evaluation system, in consultation with the All-China Women's Federation at the provincial and local levels.
- (xv) **Health Risks.** GCD, together with the appropriate authorities, will ensure that contractors disseminate information on the risks of sexually transmitted diseases to those employed during project implementation. GCD will also ensure that similar information is disseminated to transport operators during operation of the project facilities.
- (xvi) **Vehicle Emissions.** GCD will cooperate with and assist the environmental protection bureau in controlling vehicle emissions on the project roads. GCD will submit to ADB, before commercial operation of the project facilities, the Government-prescribed emission regulation limits, penalties for their infringement, and a plan for operation of vehicle emissions testing stations.
- (xvii) **Monitoring and Evaluation.** GCD will monitor and evaluate project impacts through a project performance management system to ensure that the project facilities are managed effectively and the benefits, particularly to the poor, are maximized. GCD will collect data agreed with ADB prior to implementation, at completion, and annually for three years thereafter.
- (xviii) **Human Resource Development and Training.** GCD will prepare a human resource development plan based on their future requirements and strategy. Prior to undertaking international training financed under the ADB loan, GCD will prepare for the concurrence of ADB (a) a training plan and a list of candidates nominated for international training, (b) a program of workshops to be delivered at GCD by those trained internationally, and (c) a list of training equipment and aids required to strengthen and implement GCD's in-country training programs. Upon completion of the workshops, GCD will provide ADB with an evaluation of the international training and workshops, and identify subjects that are appropriate for formal incorporation into GCD's regular staff training curricula.
- (xix) **Change in Ownership.** If (a) any change in ownership of the project facilities, or (b) any sale, transfer, or assignment of GCD's or GEMC's interest in the project roads, is anticipated, the Government, GZAR, and GCD will consult ADB at least six months before the change is implemented. The Government, GZAR, and GCD will ensure that any proposed change in the ownership of the project facilities is carried out in a legal and transparent manner.

VII. RECOMMENDATION

110. I am satisfied that the proposed loan would comply with the Articles of Agreement of ADB and recommend that the Board approve the loan of \$150,000,000 to the People's Republic of China for the Guangxi Roads Development Project from ADB's ordinary capital resources with interest to be determined in accordance with ADB's LIBOR-based loan facility, an amortization period of 24 years, including a grace period of 4 years, and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan and Project Agreements presented to the Board.

TADAO CHINO
President

2 October 2001

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SUPPLEMENTARY APPENDIXES

(available on request)

- A. External Assistance to the Road Sector
- B. Complementary Road Program
- C. Terms of Reference for Consulting Services and Training
- D. Resettlement Plan
- E. Project Performance Management System
- F. Social Analysis
- G. Poverty Impact Analysis

LOGICAL FRAMEWORK

Design Summary	Project Targets	Project Monitoring Mechanism	Risks and Assumptions
Goals			
1. Promote pro-poor economic growth in Guangxi Zhuang Autonomous Area (GZAR) by facilitating trade and attracting investment for the project area.	Economic growth for affected cities and counties during 2001-2025. Tonnage of interprovincial and international trade by road. Increase in domestic and foreign direct investment in the project area.	Annual economic reporting at the provincial and national level, provincial statistical yearbooks, and county statistics.	Continued rapid economic growth in the People's Republic of China, particularly in the western provinces.
2. Reduce poverty by improving living standards and creating employment in poor counties and townships in Guangxi Province.	Per capita incomes, numbers of poor people, and access to social services in the counties of the project area.	Participatory rural appraisal results, monitoring and evaluation, project performance management system.	Adequate funding for road improvements. Complementary investments in infrastructure development, microfinance to poor households, human resource development, and social mobilization programs. Adequate resettlement and environment measures.
Purpose			
1. Improve road infrastructure through increased capacity for more efficient movement of freight and passengers at lower cost.	Serious congestion on existing road National Highway (NH) 322 between Nanning and Viet Nam border (Youyiguan) removed through the construction of a four-lane controlled access expressway and class I road. East-west corridor capacity increased at opening in year 2005. Access improved to townships and villages through interchanges to connecting roads and complementary local roads. Average travel time between Nanning and Youyiguan reduced by 4 hours over 180 kilometers (km) in 2005. Reduced vehicle costs and freight and passenger charges in the project area. Safer roads in the project area through separation of slow and fast moving traffic and separation of opposing flows.	Project completion report. Traffic counts and travel time survey for expressway and other roads in corridor including existing NH 322. Annual reports of transport enterprises. Project completion report. Direct measures of cost and travel time for a truck and bus. Direct measures of freight and passenger charges. Accident statistics for road corridor by number and severity.	Demonstrated implementation capacity of Guangxi Communications Department (GCD) Traffic surveys undertaken. Better traffic enforcement and accident reporting procedures.
2. Provide improved access to poor counties.	Improved all-weather access on complementary local road component.	Participatory rural appraisal results, project administration missions, and reports of supervision consultants.	Because GCD is not responsible for rural socioeconomic development, the risk is that local government

Design Summary	Project Targets	Project Monitoring Mechanism	Risks and Assumptions
	More reliable and reduced delivery time and lower transport costs for rural and agricultural inputs and outputs.	Direct measurement of cost and time for small truck on road network.	below municipality and provincial level will not be able to mobilize adequate resources through GCD to secure the full impact of improved transportation.
	Increased volume and higher proportions of high value agricultural products marketed. Increased mobility of the relatively poor and minorities. Increased ownership of motorized vehicles in rural communities.	Project performance management system process. Agricultural statistics. Vehicle registrations.	However GCD has committed to a program of improvement of rural roads over the next 5 years.
3. Catalyze restructuring of expressway agencies, as corporations improve expressway management, and create conditions to attract private sector financing.	GCD will create the Guangxi Expressway Management Company to construct and operate expressways in GZAR before 30 June 2004. Financial self-sufficiency with positive net income within three years of project completion.	Project administration missions, progress reports, and project completion report. Audits of corporation and project companies.	The expressway company will build on the experience of the private sector initiatives already existing in GZAR and actively seek private sector financing.

Outputs

1. Civil Works and Equipment

- a. 136 km of expressway, 43 km class I road, and 48 km of class II connecting roads including bridges, tunnels, interchanges, and service areas.
- b. Completion of about 507 km of local road improvement.
- c. Equipment for road maintenance and safety, toll collection, communications, traffic management, vehicle weight and emissions testing, and office administration.

Construction completed and open to traffic by first quarter 2005.
Pavement roughness index lowered to below 3m/km.
Improvement completed by 2005.

Equipment operational and incident response plans implemented.

Project administration missions, progress reports, and project completion report.

Project administration missions, progress reports, and project completion report.

Project administration missions, progress reports, and project completion report.

Implementation capacity of GCD. Good performance of contractors, and strict construction supervision and quality control. GCD capacity to plan and coordinate with local governments the timely implementation of provincial and county local roads. Funding availability and commitment of GCD and local government agencies. Completion of equipment procurement and installation at project opening.

2. Consulting Services

- a. Strengthen GCD and domestic consultants' capacity in project management, quality control, traffic engineering and safety, and monitoring and evaluation.

On-the-job training of GCD staff and domestic consultants.
Implementation of a human resources development plan.

Midterm review and project administration missions. Supervision consultants' reports.

Selection of competent consultants who perform well.

Design Summary	Project Targets	Project Monitoring Mechanism	Risks and Assumptions
b. Establish and upgrade operations, maintenance, and management systems.	Monitoring of operations and maintenance costs. Level of service meets international standards.	Annual reports.	Allocation of sufficient funds for operations and maintenance.
c. Establish monitoring and evaluation methodology.	Traffic volumes, passenger fares, and freight rates; social impact of the expressway; impact on resettled, relocated, and indigenous people; environmental impact; and upgrading and maintenance of local roads.	Survey results.	Adequate organizational skills within GCD supplemented by international and domestic consultants, particularly in social and environmental assessment.
3. Resettlement and Compensation			
a. About 1,200 hectares of land acquired.	Implementation of land acquisition and resettlement plan.	Monitoring and evaluation, project performance management system, and participatory rural appraisal.	Adequate land for new house sites is available within villages for resettlement.
b. About 1,130 people to be resettled.	Welfare of those resettled reestablished at least to level prevailing before acquisition.	Independent consultant monitoring during resettlement implementation, at completion, and one year after.	Implementation of agreed compensation rates. Timely compensation payments and resettlement. Off-farm income opportunities made available for those left with insufficient farm sizes will be rewarding.
4. Environment Environmental mitigation measures	Implementation and monitoring plan based on summary environmental impact assessment agreed by GCD and Asian Development Bank (ADB). Mitigation measures included in contractors' contracts.	Project administration missions, project completion report, monitoring and evaluation.	Commitment of GCD supervision consultants, and contractors to implementation of mitigation measures.
Activities/Inputs			
1. Provide adequate counterpart funds.	Funds allocated from the Ministry of Communications, GCD, and local governments.	Government budget estimates.	Counterpart funds provided in a timely manner, including funds from local governments.
2. Recruit supervision consultants.	Consultants to be recruited by November 2001.	Contract documents.	
3. Carry out survey and design.	Survey and design completed by second quarter 2001.	Survey and design reports.	

Design Summary	Project Targets	Project Monitoring Mechanism	Risks and Assumptions
4. Contract awards and procurement.	ADB civil work contracts awarded by February 2002. (European Investment Bank contracts awarded in December 2001).	Progress reports and project administration missions.	Effective coordination and phasing of project activities.
5. Construct expressway and improve selected provincial and county road sections.	Construction and improvement completed by April 2005.	Progress reports, project administration missions, project completion report.	Effective coordination and phasing of project activities. Close supervision of bridge design and construction.
6. Supervise construction and installation, and on-the-job training.	60 person-months of international consultants, assisted by 120 person-months of domestic consultants, for construction supervision, road safety, resettlement, monitoring and evaluation, and training. Construction supervision completed by April 2005 and GCD staff trained in contract administration, quality control, design, and traffic management.	Progress reports and project administration missions, midterm review, and project completion report.	Effective performance of contractors and consultants.
7. Provide capacity building and human resources development to GCD.	46 person-months of international training in construction supervision, highway management, human resources development, international procurement and contract management, quality control, and road operation and maintenance.	Project administration missions and training reports.	Effective training.
8. Acquire land, agree on compensation levels, restore livelihoods, and replace lost assets.	Resettlement plan and compensation measures completed by December 2002. Minimized relocation in final alignment selection and interchange design.	Project midterm review and project administration missions. Reports of Executing Agency (EA) and consultants. Resettlement monitoring program. Detailed action plan.	Good monitoring and review takes place. Independent local consultants appointed.
9. Incorporate appropriate environmental mitigation measures in project design.	Adverse environment impact mitigation and minimization and environmental enhancement measures, based on execution and action plan completion statements.	Environmental monitoring reports and management by trained staff from relevant offices, EA, and domestic consultants.	Cooperation and coordination between EA and consultants. Adequate environmental monitoring.

TRAFFIC TRENDS

Table A2.1: People's Republic of China

Freight Traffic by Transport Mode (billion ton-km)							Percentage Share					
Year	Railway	Road	Coastal/ Inland	Civil Aviation	Pipe Line	Total	Railway	Road	Coastal/ Inland	Civil Aviation	Pipe Line	Total
			Waterway						Waterway			
1990	1,062	336	1,159	0.8	63	2,621	40.5	12.8	44.2	0.0	2.4	100.0
1991	1,097	343	1,296	1.0	62	2,799	39.2	12.2	46.3	0.0	2.2	100.0
1992	1,158	376	1,326	1.3	62	2,922	39.6	12.9	45.4	0.0	2.1	100.0
1993	1,196	407	1,386	1.7	61	3,051	39.2	13.3	45.4	0.1	2.0	100.0
1994	1,246	449	1,569	1.9	61	3,326	37.5	13.5	47.2	0.1	1.8	100.0
1995	1,287	469	1,755	2.2	59	3,573	36.0	13.1	49.1	0.1	1.7	100.0
1996	1,297	501	1,786	2.5	59	3,645	35.6	13.7	49.0	0.1	1.6	100.0
1997	1,325	527	1,924	2.9	58	3,837	34.5	13.7	50.1	0.1	1.5	100.0
1998	1,252	548	1,940	3.3	61	3,804	32.9	14.4	51.0	0.1	1.6	100.0
1999	1,284	572	2,126	4.2	63	4,049	31.7	14.1	52.5	0.1	1.6	100.0
2000	1,362	597	2,306	4.9	95	4,366	31.2	13.7	52.8	0.1	2.2	100.0
Average Annual Growth Rate	2.5%	5.9%	7.1%	19.7%	4.3%	5.2%						

Passenger Traffic by Transport Mode (billion passenger-km)						Percentage Share				
Year	Railway	Road	Coastal/ Inland	Civil Aviation	Total	Railway	Road	Coastal/ Inland	Civil Aviation	Total
			Waterway					Waterway		
1990	261.3	262.0	16.5	23.0	563	46.4	46.6	2.9	4.1	100.0
1991	282.8	287.2	17.7	30.1	618	45.8	46.5	2.9	4.9	100.0
1992	315.2	319.3	19.8	40.6	695	45.4	45.9	2.8	5.8	100.0
1993	348.3	370.1	19.6	47.8	786	44.3	47.1	2.5	6.1	100.0
1994	363.6	422.0	18.4	55.2	859	42.3	49.1	2.1	6.4	100.0
1995	354.6	460.3	17.2	68.1	900	39.4	51.1	1.9	7.6	100.0
1996	332.5	490.9	16.1	74.8	914	36.4	53.7	1.8	8.2	100.0
1997	358.4	554.1	15.6	77.4	1,006	35.6	55.1	1.6	7.7	100.0
1998	377.3	594.3	12.0	80.0	1,064	35.5	55.9	1.1	7.5	100.0
1999	413.6	619.9	10.7	85.7	1,130	36.6	55.0	0.9	7.6	100.0
2000	448.8	660.0	10.4	99.6	1,219	36.8	54.3	0.9	8.2	100.0
Average Annual Growth Rate	5.6%	9.7%	-4.5%	15.8%	8.0%					

Source: PRC Statistical Yearbook 2000 and Statistical Communiqué of the PRC on the 2000 National Economic and Social Development.

TRAFFIC TRENDS

Table A2.2: Guangxi Zhuang Autonomous Region

Freight Traffic by Transport Mode (billion ton-km)					Percentage Share			
Year	Railway	Road	Coastal/ Inland	Total	Railway	Road	Coastal/ Inland	Total
			Waterway				Waterway	
1990	26.66	11.70	4.28	42.64	62.5	27.4	10.0	100.0
1991	28.61	9.16	5.17	42.94	66.6	21.3	12.0	100.0
1992	31.10	10.27	6.44	47.81	65.0	21.5	13.5	100.0
1993	33.52	10.32	7.35	51.19	65.5	20.2	14.4	100.0
1994	34.81	14.04	10.05	58.90	59.1	23.8	17.1	100.0
1995	35.16	14.34	9.79	59.29	59.3	24.2	16.5	100.0
1996	34.63	17.06	8.92	60.61	57.1	28.1	14.7	100.0
1997	36.67	18.35	9.21	64.23	57.1	28.6	14.3	100.0
1998	41.35	19.05	9.14	69.54	59.5	27.4	13.1	100.0
1999	41.46	20.21	8.15	69.82	59.4	28.9	11.7	100.0
2000	48.50	20.94	7.60	77.04	62.9	27.2	9.9	100.0
Average Annual Growth Rate	6.2%	6.0%	5.9%	6.1%				

Passenger Traffic by Transport Mode (billion passenger-km)					Percentage Share			
Year	Railway	Road	Coastal/ Inland	Total	Railway	Road	Coastal/ Inland	Total
			Waterway				Waterway	
1990	6.68	10.12	0.68	17.48	38.2	57.9	3.9	100.0
1991	7.13	10.52	0.72	18.37	38.8	57.3	3.9	100.0
1992	8.32	13.34	0.73	22.39	37.2	59.6	3.3	100.0
1993	11.20	16.40	0.77	28.37	39.5	57.8	2.7	100.0
1994	11.86	16.53	0.55	28.94	41.0	57.1	1.9	100.0
1995	11.21	18.08	0.55	29.84	37.6	60.6	1.8	100.0
1996	9.38	22.60	0.39	32.37	29.0	69.8	1.2	100.0
1997	9.44	28.03	0.35	37.82	25.0	74.1	0.9	100.0
1998	9.18	29.26	0.26	38.70	23.7	75.6	0.7	100.0
1999	10.54	33.23	0.25	44.02	23.9	75.5	0.6	100.0
2000	11.40	34.75	0.25	46.40	24.6	74.9	0.5	100.0
Average Annual Growth Rate	5.5%	13.1%	-9.5%	10.3%				

Source: Guangxi Statistical Yearbook 2000 and Guangxi Communications Department.

ROAD SECTOR REVENUES AND EXPENDITURES IN GUANGXI PROVINCE
(Y million)

Funding	1998	1999	2000
A. Sources of Funds			
1. Recurrent Sources			
Road Maintenance Fee	839	769	810
Expressway Tolls	80	228	386
Public Transport Administration Fee	68	62	61
Vehicle Purchase Fee	491	431	450
Total Recurrent Sources	1,478	1,490	1,707
2. Nonrecurrent Sources			
International Loans	99	59	8
Domestic Loans	2,840	3,844	2,000
MOC Grant	1,170	1,090	1,180
Highway Construction Fund	850	806	820
Total Nonrecurrent Sources	4,959	5,799	4,008
Total Sources	6,437	7,289	5,715
B. Application of Funds			
1. Recurrent Expenditure			
Maintenance	867	817	832
Interest on Domestic Loans	50	50	50
Repayment of Domestic Loans	320	730	490
Interest on International Loans	5	10	11
Repayment of International Loans	-	-	3
Total Recurrent Expenditure	1,242	1,607	1,386
2. Nonrecurrent Expenditure			
Total Road Construction Expenditure	4,968	4,710	5,550
Total Expenditure	6,210	6,317	6,936

Source: Guangxi Communications Department.

ROAD SECTOR POLICY REFORM PLAN

Initiative	Current Status	Actions	Target Date
1. Poverty impact	All projects financed by the Asian Development Bank (ADB) in the People's Republic of China (PRC) country assistance plan are now in poorer central and southwest regions. Project design to include feeder roads.	Project identification and design assisted through technical assistance (TA) 3086-PRC: Regional Road Sector Study.	Recommended investment packages to be considered for Tenth Five-Year Plan (10FYP) period. Feeder road components now included in all ADB-financed road projects.
		Project assistance to improvement and financing of provincial and county roads. Measurement of poverty impact in transport project being prepared by ADB's Economic Development Resource Center.	For application to road projects from 2001 on. Results for application from 2001 on.
2. Road design standards and construction quality	Highway design standards were inadequate for changing vehicle mix and road conditions.	Ministry of Communications (MOC) engineering standards revised and reissued on 1 January 1998.	New design standards applied from 1 January 1998.
		Assistance in developing appropriate standards including transport efficiency, road safety, and environmental considerations provided through TA 2573-PRC: Review of Highway Design Standard.	
		Production of highway design manual to complement MOC standards in areas such as identification of accident-prone places, under TA 2573-PRC.	Highway design manual being tested will be modified as required.
3. Road safety	Very high accident and fatality rate, more than 78,000 deaths per annum. Lack of attention to safe design and safe road environment.	TA for strengthening of evaluation capacity for the Key Projects Inspectorate of State Development Planning Commission through TA 3375-PRC: Project Performance Management Capacity Building.	To be implemented in 2000-2001.
		Road safety program for Heilongjiang Province prepared under TA 2177-PRC translated and disseminated. Recommendations of TA 5620 on road safety adopted by the PRC	Recommendations reviewed and disseminated in 1999-2000. To be implemented in the 10FYP.
		Public awareness in road safety raised and the Ministry of Public Security's capacity strengthened in traffic safety, planning, and management under TA 3341-PRC: Capacity Building in Traffic Safety, Planning, and Management.	Results for implementation in 2001 on.
4. Vehicle emissions	Increasing vehicle pollution, especially in large cities.	Leaded fuel phased out: Production Sales	January 2000 July 2000
		European vehicle emissions standards to be adopted for all new vehicles: Phase I Small vehicles Large vehicles	2001 2002

Initiative	Current Status	Actions	Target Date
	Vehicle testing and monitoring program.	Phase II Small vehicles Large vehicles Expanded on self-financed basis. Recommendations of TA 2951-PRC, Promotion of Market-Based Instruments for Environmental Management.	2004 2005 To be considered for implementation in 2000-2001.
5. Road pricing	Principle of user pays and cost recovery for toll roads under implementation in most provinces.	Toll levels reviewed for ADB projects to ensure cost recovery. Government to replace road maintenance tax with fuel tax in 2000 to enhance the user pays principle. Toll diversion study completed.	Annual review of tolls Results for application from 2000 onward.
6. Corporatization	Several provincial communications departments set up corporate structures during the eighth and ninth five-year plans, especially for facilitating refinancing and leasing arrangements. Lack of a legal agreement between provincial communications department and expressway companies.	Assistance provided through TA 1724-PRC, Institutional and Policy Support in the Road Sector. Further assistance provided through TA 2592-PRC, Corporatization, Leasing, and Securitization in the Road Sector. A model concession agreement prepared under TA 2592-PRC to ensure autonomy of operation, encourage the establishment of road performance indicators, and facilitate future refinery of road sector assets.	To be considered for implementation in 2000-2001. Implementation of recommendations in 2001 onward. Adoption of concession agreements considered for the Shaanxi Project and other 10FYP expressway projects.
7. Commercialization	Present practices do not take full advantage of possible revenues from expressway operation.	Project assistance has been provided for competitive bidding in contracting and maintenance. Project assistance being provided for training in commercial operation of expressway services (Shanxi and Yunnan).	Contracting of maintenance and commercial operation of expressway services for 10FYP projects.
8. Financial resource mobilization	The financing requirements for road infrastructure are expected to grow. Refinancing or leasing arrangements for selected road sections in place in several provinces.	Results of TA 2409, Appraisal Methodologies and Restructuring Highway Financing in Hebei Province under consideration. Build-operate-transfer (BOT) guidelines drafted and feasibility study for pilot project prepared under TA 2649-PRC: Facilitating the BOT Modality in the Highway Sector. Further assistance provided through TA 3569 for Jiangsu Highway BOT Project. BOT law awaiting approval. ADB-financed Jilin Expressway and Hunnan Expressway securitized as part of stock listing.	Implementation of recommendations to begin during the 10FYP. Implementation of a pilot BOT road project is being considered by the Government. To be implemented in 2001. Stocks listed in 1999.

MOBILIZATION OF NONGOVERNMENT FINANCING IN THE PRC

A. Technical Assistance Findings and Experience in the PRC

1. Cooperative Joint Venture

1. The cooperative joint venture has been the most common method of using nongovernment funds in toll road financing in the Peoples' Republic of China (PRC) for several reasons: (i) strong equity investor interest in toll roads; (ii) benefits from the cooperative characteristics of this type of joint venture;¹ (iii) limited lender interest in toll road projects, mainly due to unresolved problems of risk allocation; and (iv) the absence of debt service coverage requirements. Its primary disadvantage is its high cost to road users and to the economy. Equity investors require a higher rate of return than lenders, and seek to obtain this from road users through higher tolls, reducing the net economic benefits from projects. The current expected rate of return on cooperative joint venture equity for PRC road projects is about 18 percent. The Asian Development Bank (ADB) facilitated the development of cooperative joint ventures in Guangdong, Hebei, Hunan, and Sichuan provinces by investing about \$15 million through the China Assets Holding Limited, and \$71 million in the DeMat TransAsia Holdings Limited, through the Asian Infrastructure Fund (Table).

2. Securitization

2. Securitization through an initial public offering can benefit from cash flow accruing at the operating entity level as well as at the project level. The share of the toll road entity sold to public investors usually ranges from 20 percent to 40 percent. The advantage of this financing option is its low cost. Securitization is undertaken at the operation stage, after certain project risks have been mitigated, such as construction delays, cost overruns, and initial traffic levels. An H share listing on the stock exchange in Hong Kong, China is an inexpensive modality with a high price-earning ratio² (6 to 17 times in 1999). B share listings on the Shenzhen or Shanghai stock exchanges are slightly more expensive with a price-earning ratio of 10 to 15 times in 1999, which is lower and less volatile than A share listings (with an average monthly price earning ratio of about 54 times in 2000).³ The greatest disadvantage of this financing modality is the time required to complete the regulatory formalities. In addition, in the Shenzhen and Shanghai stock exchanges, companies must have three profitable years of operation before they can be listed. Because of these issues, this modality is more appropriate as a refinancing instrument.

3. Since 1995, 15 PRC expressway companies and infrastructure developers have been listed on the stock exchanges in Hong Kong, China; Shanghai; and Shenzhen.⁴ Two of these

¹ In a cooperative joint-venture scheme, the foreign investor receives a percentage of profit higher than its equity share during the early years of operation until its equity investment is fully recovered, and less over the following years. Normal equity joint ventures are less attractive because there is no such preference for foreign investments.

² Calculated as the stock price divided by the earnings per share.

³ An H share listing involves the sale of shares on the stock exchange in Hong Kong, China only in foreign currency. A and B listings involve the sale of shares on a PRC stock exchange (Shanghai or Shenzhen) in local and foreign currencies, respectively. The Government has recently allowed Chinese with available foreign currency to buy B shares, which is likely to boost their price.

⁴ These are: Anhui, Jiangsu, Shenzhen, Sichuan, and Zhejiang Expressways and Cheung Kong, New World, and Road King Infrastructures, in Hong Kong (H shares); Northeast (Jilin) Expressway in Shanghai (A shares); Ganyue, Guangdong, Hainan, and Hubei Expressways in Shenzhen (A shares); and Guangdong and Hunan Expressways in Shenzhen (B shares).

projects were financed by ADB.⁵ After three years of profitable operations, the Jilin Provincial Expressway Corporation⁶ established the Northeast Expressway Co., Ltd.⁷ by securitizing the future toll revenues of the expressway. The company went public on 10 August 1999, offering 25 percent of the total shares on the Shanghai stock exchange as an A share listing. The issue price was Y4.00 per share and the trading prices ranged between Y4.92 and Y6.40 after listing. A price earning ratio of 44 was achieved during 1999. ADB helped review the initial public offering proposal and revenue projections of the corporation for this transaction. The Hunan Expressway Project was completed in November 1996, and one of the project components, together with other toll roads and bridges, was listed on the Shenzhen stock exchange, B share section, on 28 January 1999. Because of a stock split in May 1999, earnings per share have decreased slightly, while the market capitalization has reached Y2,629 million. Average price earning ratio was 30 in 1999.

3. Revenue Bond Financing

4. Revenue bond financing involves the sale of rated notes backed by a pledge of a company's cash-flow sources. This is a relatively new highway financing modality in Asia. In August 1996, Zuhai Municipality in Guangdong Province completed a landmark company-level revenue bond financing, which raised \$200 million from investors in the United States (US) for the Zhuhai Highway Company Limited. The main problem of this financing option is the weak regulatory framework, which results in a difficult and time-consuming procedure for securing the necessary approvals. The US dollar rate of return required by investors in a company-level revenue bond was in the 10-15 percent range for a PRC issue in 1999.

4. Build-Operate-Transfer (BOT) Structure

5. Although the BOT approach has been widely used in the power generation industry, it has met with only limited success in the roads, except where the project is a natural monopoly, such as a bridge or tunnel. BOT financing transfers risk to the private sector. It relieves the government of funding responsibility, but makes the investment less attractive to private investors in a high-risk environment. In the PRC, the State Development Planning Commission has developed a policy and regulatory framework to facilitate the formulation and award of BOT projects, but this has yet to be formalized through Government decree. One of a few road projects in the PRC attractive enough to be developed under a BOT scheme is the Tianjin-Shugang Highway project to upgrade and operate a 40 km three-lane dual expressway between Tianjin City and Tanggu Port, under a 25-year concession. ADB invested in the Asian Infrastructure Development Company that holds a \$36.2 million equity stake in the Tianjin-Shugang Highway. Another successful BOT agreement was concluded in December 2000 in Guangxi Zhuang Autonomous Region for the Liujiang-Xingyue section of the Nanning-Guangzhou Expressway, which has a very high expected traffic. Although ADB attempted to develop the Yangjiang-Dianbai expressway in Guangdong Province on a BOT basis, the feasibility study⁸ concluded that the project was not financially viable for this modality, because of weak performance criteria and high risks associated with the traffic forecast.⁹ ADB is providing further assistance in this area through

⁵ Loan 1262-PRC: *Jilin Expressway Project*, for \$ 126 million, approved on 9 November 1993; and Loan 1261-PRC: *Hunan Expressway Project*, for \$74 million, approved on 9 November 1993.

⁶ Wholly owned subsidiary of the Jilin Provincial Communications Department.

⁷ Founded jointly by the Jilin and the Heilongjiang Provincial Expressway Corporations and a subsidiary of MOC.

⁸ TA 2649-PRC: *Facilitating Build-Operate-Transfer Modality in the Highway Sector*, for \$1.1 million, approved on 27 September 1996.

⁹ The World Bank attempted to develop a bridge project on a BOT basis in Hubei Province, but it did not materialize.

technical assistance¹⁰ to develop an 80-kilometer section of the Nanjin-Hanzhou expressway in Jiangsu Province on a BOT basis.

6. The initial model BOT projects were structured to have 100 percent foreign financing. The Asian currency turmoil made investors and commercial lenders cautious about infrastructure projects that use foreign currency debt in construction but generate revenues in local currency. Part of ADB's policy dialogue has been to encourage the Government to allow BOT sponsors to arrange some domestic financing should they so wish. Other potential risks for BOT projects are lower-than-expected levels of traffic and revenues in the early years of operation, construction cost overruns, implementation delays, and land acquisition problems. The current lack of legal and regulatory clarity has also increased the perceived risk of the BOT approach, making it unattractive for most PRC road projects. The model based on cooperative joint ventures is rather costly, and hence feasible only for projects with high financial rates of return.

B. ADB Investment in Private Sector Funds in the Road Sector

7. ADB, through its Private Sector Group, has holdings in several funds that invested \$122.7 million in equity in seven road projects, mostly in the eastern coast of the PRC (Table). The projects in which ADB has participated are well established in the market, with satisfactory track records and quality assets. As such, most are operating profitably, although traffic flows are generally below those forecast. Future financial returns are expected to improve as the projects mature; most are still in the early stages of operation when revenues have not peaked. In an exception to the generally good performance, revenues are much lower than anticipated in one case because of inadequate toll collection arrangements and a competing road with similar travel distance and time.

¹⁰ TA 3569-PRC: *Jiangsu Highway BOT Project*, for \$555,000, approved on 12 December 2000.

**Investments in the PRC Road Sector by Private Sector Funds
with ADB Holdings**

Investment No., Fund Name	Investee/Projects	Equity (\$ million)
7072, China Assets Holdings Ltd. (CAHL)	Zhongshan Dongfu Road and Bridge Company Construction and operation of a dual class II highway between Dongfeng Town and Fusha Town (17 km) in Zhongshan City, Guangdong Province.	9.19
	Zhongshan Nangang Road and Bridge Company Construction and operation of a dual class II highway between Fusha Town and Gangkou Town (11 km) in Zhongshan City, Guangdong Province.	6.01
7101, Asian Infrastructure Fund (AIF) through DeMat TransAsia Holdings Limited	<p>Hebei Province: 15 percent of the Shijiazhuang-Taiyuan (Shitai) expressway (69 km), jointly owned and managed by five cooperative joint ventures established with the Hebei Provincial Highway Development Company Limited, one of Hebei Provincial Communications Department's wholly-owned subsidiaries.</p> <p>Sichuan Province: 13 percent in a cooperative joint venture with a company affiliated with the Sichuan Provincial Communications Department to construct, operate, and maintain the Chengdu-Mianyang expressway (90 km) and adjacent class I and II tollways (52 km).</p> <p>Hunan Province: 90 percent in cooperative joint venture with the Xiangtan Municipal Government to operate an existing bridge and build a new one.</p>	71.28
7115, Asian Infrastructure Development Co. (AIDEC)	<p>Tianjin-Shugang Highway Company:</p> <p>Upgrade and operate a 40 km three-lane dual carriageway between Tianjin City and Tanggu Port under a 25-year build-operate-transfer concession.</p>	36.20
Total Investments		122.68

TRAFFIC FORECAST

A. Existing Traffic

1. During the feasibility study for the Project, carried out by the design institute, traffic surveys were carried out for traffic analysis, pavement design and economic and financial evaluation. The surveys included manual counts and origin and destination surveys. The surveys were verified and updated by the project preparatory technical assistance consultants in 2000 and the additional work included a survey of traffic traveling to the Viet Nam border crossings and free trade area¹.

2. Traffic increased considerably during 1990-1997 on the existing national highway (NH) 322 between Nanning and the border with Viet Nam. Overall annual growth in this period has been 13 percent for motorized traffic and 5 percent for nonmotorised vehicles, although in some road sections it is as high as 21 percent overall. The increase reflects the high economic growth in counties adjacent to the highway over the same period.

3. Many sections of NH 322 have traffic volumes over capacity levels and the journey from Nanning to the border currently takes five hours for the 220 km for passenger cars and longer for trucks. When breakdowns occur these times can be much longer. If highway capacity is not increased, average times will increase dramatically and economic growth will not be sustained. Traffic volumes on NH 322 in 2000 were 6,000 medium truck equivalent (MTE) units per day at Wuxu, 30 km from Nanning, dropping to 1,500 MTE near Banli in the middle of the project area, and rising to 5,000 MTE close to Ningming town and nearly 3,000 MTE close to the border. This indicates a slowing in the growth rates since 1998 except in the border area, where traffic growth has been over 20 percent for the last two years.

B. Traffic Forecast

4. Future traffic demand forecasts were prepared for the proposed expressway and the surrounding road network for the years 2005, 2015, and 2025. The forecasts were prepared using the feasibility study 1999 trip matrixes and a model of the road network within the project area coupled with the major roads outside the project area within Guangxi Zhuang Autonomous Region (GZAR). The forecasts of travel demand use forecasts of economic growth within the project area and in GZAR and the rest of People's Republic of China (PRC), estimates of elasticity of demand, and projected future changes in freight and passenger vehicle fleet composition. Allowance was made for some limited diversion from rail to road. Waterborne traffic in the area is negligible and unlikely to divert, and there is little air traffic; the only possible affected route would be that between Nanning and Hanoi.

5. As the existing NH 322 will be very congested by 2005 when the expressway opens, some allowance was made for traffic suppression on this road in the without-Project case. With the expressway constructed this suppressed traffic will be released.

6. Some trips will be generated as a result of the new expressway and class I road, from (i) people who choose to travel more as a result of improved highway and reduced travel costs (travel from Nanning to Pingxiang and back will take a single day); (ii) new trips made by people who would not travel due to the condition of the existing highway; (iii) additional national and international trade resulting from reduced transport costs; (iv) new and relocated businesses

¹ This traffic was not defined in the original surveys.

along the new highway taking advantage of reduced transport costs; and (v) new trips due to increased tourist numbers particularly between the PRC and Viet Nam.

7. Volumes of traffic forecast on the NanYou Expressway and on the existing parallel NH 322 are summarized in Table A6.1. The forecasts clearly show the need for additional road capacity in the corridor after 2005.

8. Because of the large time and distance savings (over four hours in 2005 and 45 km from Nanning to YouYiGuan) and poor condition of the existing road, virtually all (over 95 percent) long distance traffic will divert to the new road under the toll system proposed. Lesser rates apply to short haul traffic although, as some of the major towns on the route (Fusui and Chongzuo) lie far from NH 322 and close to the expressway, diversion rates are also high for traffic from these towns.

9. Construction of the expressway will provide significant savings in travel times both for users who divert to the new expressway and those who remain on the existing NH 322. These savings are shown in Table A6.2. The table sets out travel time savings for freight traffic between major towns in the project area both on the expressway and the existing road when the expressway is complete, compared to times on the existing NH 322 if the expressway is not constructed. Time savings for other vehicles are similar.

Table A6.1: Forecast Average Annual Daily Traffic Volume by Section by Year

Corridor Section	1998 ^a	NH 322	Expressway	Total	Percent Growth (per annum)
	MTE/day				
2005					
Wuxu-Xichang	5,850	2,400	7,350	9,750	7.6
Xichang-Banli (Fusui County)	2,500	1,000	4,300	5,300	11.3
Banli-Ningming (Chongzuo County)	3,600	5,300	3,800	9,100	14.2
Ningming-Xiashi (Ningming County)	1,500	1,000	2,300	3,300	11.9
Xiashi-Pingxian	2,000	400	3,600	4,000	10.4
Pingxiang-YouYiGuan ^{b, c}	900		1,600	1,600	8.6
2015					
Wuxu-Xichang		3,350	14,100	17,450	6.0
Xichang-Banli (Fusui County)		1,900	8,500	10,400	7.0
Banli-Ningming (Chongzuo County)		5,600	8,000	13,600	4.1
Ningming-Xiashi (Ningming County)		1,900	5,100	7,000	7.8
Xiashi-Pingxian		1,700	6,300	8,000	7.2
Pingxiang-YouYiGuan ^{b, c}			2,900	2,900	6.1
2025					
Wuxu-Xichang		4,500	25,250	29,750	5.5
Xichang-Banli (Fusui County)		3,200	16,100	19,300	6.4
Banli-Ningming (Chongzuo County)		5,900	16,000	21,900	4.9
Ningming-Xiashi (Ningming County)		3,200	11,350	14,550	7.6
Xiashi-Pingxian		4,300	11,900	16,200	7.3
Pingxiang-YouYiGuan ^{b, c}			5,000	5,000	5.6

MTE=medium truck equivalent unit, NH=national highway.

^a On existing NH 322 road.

^b Existing road and new Class I road use substantially the same alignment over this section.

Local slow moving traffic will use a service road where the two alignments coincide.

^c Does not include local service traffic to free trade areas. This traffic uses part of this section.

Source: Consultant Traffic analysis.

Table A6.2: Time Saving Between Major Towns
(for freight vehicles)

From Nanning (hours):	2005	2015	2025
Savings to Traffic Diverting to the Expressway			
Fusui	0.65	1.20	1.32
Chongzuo	2.32	2.93	3.60
Ningming	3.05	3.38	4.45
Longzhou	4.40	4.72	6.41
Pingxiang	4.36	5.38	7.18
Savings to Traffic Remaining on NH 322			
Fusui	0.27	0.81	0.93
Chongzuo	0.55	0.94	2.10
Ningming	0.00	0.29	1.38
Longzhou	0.85	1.18	2.84
Pingxiang	0.07	1.09	2.83

Source: Consultant analysis.

C. Crossborder Traffic

10. Guangxi's foreign trade grew rapidly from a low base in the early 1990s, with an annual growth rate of 18 percent between 1990-1998. Trade with Viet Nam has also grown steadily in the 1990s following relaxation of border controls in the mid-1990s. The road and rail routes from Nanning to Viet Nam through the project area accounts for half of Guangxi trade with Vietnam thus traffic traveling to the border areas has grown correspondingly. There is one rail and four road border crossings in Pingxiang City (county) and trade between the PRC and Viet Nam takes place under the auspices of the Customs General or less formally through the local frontier trading administration. The majority of trade is of the less formal type.

11. Formal Government trading passes through the customs at Friendship Pass, the junction of NH 322 and Viet Nam NH 1. The proposed road will also meet Viet Nam NH 1 at this spot. Tourist traffic also uses this crossing point. The majority of trade however uses the two free trade areas close to Pingxiang City at Pozhai and Nongyao. Roads from these areas connect with NH 322 close to Pingxiang City, about 20 km from Friendship Pass. At present all goods to and from Viet Nam by road are transshipped at the free trade areas.

12. Following the signing of the Frontier Trade Agreement in 1999 a further agreement, the Highway Transport Agreement, was signed (December 2000). This has facilitated crossborder traffic between Guangxi and the three bordering provinces of Viet Nam. The two countries hold regular meetings and discussions to improve the crossborder movements of freight and passenger vehicles in the Nanning-Hanoi economic corridor. Guangxi Communications Department considers that the Project and the improvement of Viet Nam's NH 1, financed by the Asian Development Bank, will facilitate the discussions by providing better road infrastructure in the corridor. At present, however, the permitted bus and truck routes between Guangxi and Viet Nam are restrictive and are unlikely to stimulate growth by any significant amount. With further freeing of travel restrictions, however, crossborder traffic will rise given the shortened travel time from Nanning to the border.

13. In 1999 over 251,000 tons of goods crossed into Vietnam by road from Pingxiang through the free trade areas and 189,000 tonnes was imported. In addition 170,000 tonnes went

through Friendship Pass. Only 61,000 tonnes was transshipped by rail.² In the last three years the tonnage has grown at an annual rate of 16 percent and this rate should continue to rise as trade restrictions are further liberalized.

14. Given the fluid nature of ongoing discussions on further agreements on crossborder trade it is difficult to estimate with any confidence the future growth in traffic going to and over the border. For this reason, only traffic growth following normal economic growth has been used in the economic and financial evaluations for the Project. However, these growth rates are almost certainly understated.

15. Benefits of increased trade as a result of the Project are similarly difficult to estimate. While the vehicle operating cost benefits are measurable for traffic using the project roads included in the project evaluation, the liberalization of border crossing and trade will reduce the need for the free trade areas and transshipment requirements; although through traffic will increase, local growth in Pingxiang City may suffer.

² Because of the difference in rail gauge between the two countries all goods must be transferred at Pingxiang City. This will continue to put rail travel at a disadvantage and the move from rail to road is likely to continue.

SUMMARY COMPLEMENTARY ROAD PROGRAM

Appendix 7

Road Improvement Type	Length ^a (km)	Cost (million Yuan)	In which		
			GCD Poverty Alleviation Fund	GCD Subvention	Other
Fushui County					
County Roads					
Class III-paved	50.00	12.00		12.00	
Class IV-paved	42.00	10.40		5.40	5.00
Village Roads					
Class IV-unpaved	25.20	0.91		0.47	0.44
Chongzuo County					
County Roads					
Class III-paved	40.00	9.60		9.60	
Village Roads					
Class IV-unpaved	27.00	1.62		0.60	1.02
Longzhou County					
County Roads					
Class III-paved	142.40	113.14	3.08	101.50	8.56
Ningming County					
County Roads					
Class III-paved	38.20	33.80	0.96	30.17	2.67
Class IV-paved	12.00	3.48		2.88	0.60
Village Roads					
Class IV-paved	111.00	32.20		26.64	5.56
Pingxiang City					
County Roads					
Class III-paved	11.50	10.17	0.29	9.09	0.79
Village Roads					
Class III-paved	7.30	2.56		2.19	0.37
Total	506.60	229.88	4.33	200.54	25.01

^a The improvement of 471 km of roads, earlier identified to be included in the complementary road program, has already started and will be completed before the end of 2001. Total road improvement in the project area therefore totals about 978 km, including about 336 km of county roads and 642 km of village roads.

COST ESTIMATES AND FINANCING
(\$ million)

Item	Foreign Exchange	Local Currency	Total Cost	ADB Financing	EIB Financing
A. Base Cost^a					
1. Civil Works ^b	139.3	150.0	289.3	107.7	45.2
2. Equipment	10.6	0.0	10.6	10.6	0.0
3. Land Acquisition and Resettlement	0.0	38.8	38.8	0.0	0.0
4. Consulting and Training Services	1.7	11.2	12.9	1.7	0.0
5. Complementary Road Program	0.0	27.7	27.7	0.0	0.0
Subtotal	151.6	227.7	379.3	120.0	45.2
B. Contingencies					
1. Physical Contingencies ^c	7.0	8.9	15.9	5.4	2.3
2. Price Escalation ^d	14.1	19.1	33.2	10.6	2.5
Subtotal	21.1	28.0	49.1	16.0	4.8
C. Front-End Fee	1.5	0.0	1.5	1.5	0.0
D. Interest/Commitment Charge during Construction	19.0	6.3	25.3	12.5	0.0
Total	193.2	262.0	455.2	150.0	50.0

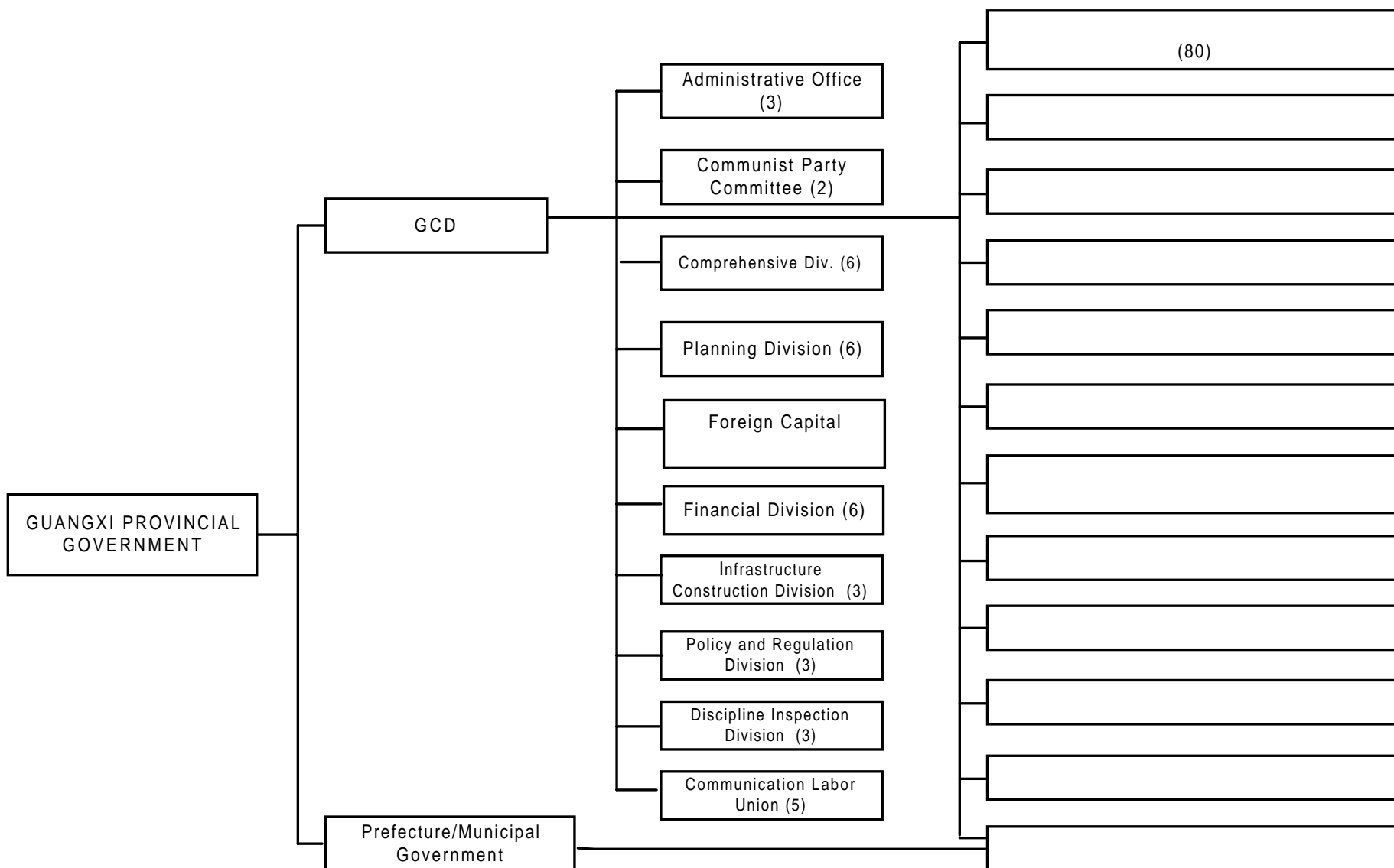
^a Base cost reflects 2000 prices and includes taxes.

^b Includes costs of environmental protection measures for about \$3.5 million equivalent.

^c At 5 percent of civil works and complementary road program.

^d At 2.4 percent per annum.

ORGANIZATION CHART OF GUANGXI COMMUNICATIONS DEPARTMENT



IMPLEMENTATION SCHEDULE

Activity	2001												2002												2003												2004												2005			
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M											
A. ADB Loan Processing																																																				
1. Fact-Finding		X																																																		
2. Management Review Meeting				X																																																
3. Appraisal			X																																																	
4. Loan Negotiations						X																																														
5. Board Consideration									X																																											
6. Loan Effectiveness											X																																									
B. Land Acquisition and Resettlement																																																				
C. NanYou Highway Civil Works																																																				
1. Prequalification																																																				
2 Bidding																																																				
3 Construction ^a																																																				
D. Equipment																																																				
1. Procurement																																																				
2. Supply																																																				
3. Delivery and Installation																																																				
E. Complementary Local Road Program																																																				
F. Consulting Services and Training																																																				
1. Shortlisting																																																				
2. Bidding																																																				
3. Services and Training																																																				

^a Construction of ADB-financed packages will start by early February 2002, about one month later than European Investment Bank-financed packages.

CONTRACT PACKAGES^a

Package	Section^b (km)	Length (km)	Procurement Method
A. Civil Works			
Expressway			
C1	0+000 - 14+800	14.8	ICB
C2	14+800 - 28+250	13.5	ICB
C3	28+250 - 42+386	14.1	ICB
C4	42+386 - 58+500	16.1	ICB
C5	58+500 - 69+500	11.1	ICB
C6	69+500 - 84+000	14.5	ICB
C7	84+000 - 95+675	11.9	ICB
C8	95+675 - 108+660	13.3	ICB
C9	108+660 - 123+900	15.2	ICB
C10	123+900 - 135+774	11.9	ICB
Class I Highway (EIB-financed)			
C11	135+774 - 152+000	16.2	ICB
C12	152+000 - 164+700	12.7	ICB
C13	164+700 - 183+202	14.1	ICB
Longzhou Class II Connector			
C14	0+000 - 15+000	15.0	ICB
C15	15+000 - 30+914	16.0	ICB
B. Equipment (Procurement and Installation)			
E1	Toll System		ICB
E2	Communications		ICB
E3	Emergency and Safety Equipment		ICB
E4	Road Maintenance Equipment 1		ICB
E5	Road Maintenance Equipment 2		ICB
E6	Road Maintenance Equipment 3		ICB
E7	Road Maintenance Equipment 4		ICB
E8	Road Safety Equipment		IS
E9	Operations and Safety Vehicles		IS
E10	Road Maintenance Trucks		IS
E11	Inspection and Testing Equipment		IS
E12	Office Equipment		IS
E13	Training Equipment		DP

DP=direct purchase international, EIB=European Investment Bank, ICB=international competitive bidding,

IS=international shopping.

^aAmounts of contract packages not disclosed, at the request of the Government.

^bSection limits correspond to design and may not match actual section lengths.

SUMMARY RESETTLEMENT PLAN

A. Status of the Resettlement Plan

1. The proposed Nanning to Youyiguan expressway project in southern Guangxi Zhuang Autonomous Region (GZAR) will consist of four main physical works components: (i) construction of about 136 kilometers (km) of expressway from Nanning to Ningming, and 43 km of class I road from Ningming to Youyiguan, including interchanges, toll stations, bridges and service areas; (ii) construction of 48 km of class II connector roads; (iii) construction or improvement of 110 km of village access roads in the expressway vicinity; and (iv) improvement of approximately 500 km of complementary roads in five counties. For the first two components, based on detailed survey, the resettlement impacts and measures are covered by the current resettlement plan. Due to still in early planning stage, the last two components are not covered in the plan. However, since both components will mainly involve upgrading on the existing township and village roads, little land acquisition will be expected. The GZAR government assured the Asian Development Bank (ADB) that if additional farmland will be required, the affected people will receive the same compensation and other assistance provided in the resettlement plan.

2. The Guangxi Communication Department (GCD) is the project Executing Agency. Xi'an Highway University prepared a resettlement plan in February 2000, based on the preliminary technical design, incorporating socioeconomic survey and village data collection of impacts. The resettlement plan has been updated to take into account subsequent design modifications requested by the Ministry of Communications and recently approved GZAR land administration directives.

B. Scope of Land Acquisition and Resettlement

3. The expressway and connector and link roads will affect 21 townships, 61 administrative villages, and 187 village groups in 6 counties: Chongzuo, Fushui, Longzhou, Ningming, Pingxian and Yongning. According to the initial detailed resettlement plan survey, which is being updated based on the changes proposed, nearly 1,200 hectares (ha) of land will be acquired, 65 percent of which is cultivated land, comprising paddy (15 percent), with the remaining 85 percent including dry fields, vegetables, and sugarcane. Other identified assets on the land include telecommunications and electrical infrastructure, ponds for fish and lotus cultivation, sheds, walls, graves, and economic trees. The assets will all be compensated for at replacement value. Approximately 196 ha of land will be borrowed temporarily during construction. Land acquisition will directly affect an estimated 30,600 people in about 6,440 households. However, given the relatively high farmland per capita ratios, which range from 0.10 ha per person in Ningming to 0.18 ha per person in Chongzuo, the number of people requiring full economic rehabilitation, defined as losing their share of farmland, is likely to be less than 10,000.

4. About 14,000 square meters of structures, including houses, will be demolished, necessitating relocation of about 200 households and 1,100 people. The households will generally be moved a short distance to another site within the same administrative village.

C. Policy Framework and Entitlements

5. For people unavoidably affected, the resettlement objective is to achieve equal, or better income and living standards in line with the 1998 Land Law of the People's Republic of China

and ADB's Policy on Involuntary Resettlement. GCD will ensure that any people losing land, housing, other assets or income will be assisted to restore their income and living standards. GZAR in 2000 issued a directive to implement the 1998 Land Law to cover large infrastructure projects, with the land compensation set at 7 times the annual average output value for cultivated land, and the resettlement subsidy will be 5-14 times the value, depending on the average per capita farmland. These rates are within the range set by the 1998 Land Law. Given the average yield and per capita farmland in the region, the total compensation (land and resettlement subsidy) will be set between 185,000 and 225,000 yuan per ha for rice; 360,000 and 540,000 yuan per ha for vegetable land; 150,000 and 170,000 yuan per ha for dryland; 550,000 and 630,000 yuan per ha for fish pond; and 170,000 and 220,000 yuan per ha for sugarcane. People losing land temporarily for borrow sites will receive a payment equivalent to production value foregone, for the period of loss, expected to be 1-2 years. The land used temporarily will be restored to the owner in the original condition, or funds will be provided to the owner to restore the land to its original condition. For structures lost, replacement value will be provided to the affected households. Those losing housing will be provided with a free new housing site serviced with road, electricity, and water within their own administrative village. There will be no depreciation for housing and people will be allowed to salvage materials from their old houses.

D. Resettlement Strategy

6. Efforts to minimize resettlement effects resulted from consultations with local officials during the setting of the alignment during the initial feasibility study. The amount of rice land to be acquired was kept to 15 percent of the total agricultural land lost, while the number of relocated households was kept to approximately 200. For those unavoidably affected, the resettlement strategy will replace losses of housing, land, other assets, infrastructure, and income.

7. Over 95 percent of affected people are losing agricultural land. Most of these people will be either reabsorbed back into agriculture, with the affected villages carrying out some village land adjustment to ensure that village members still have sufficient land to farm; or provided with cash compensation to develop cash trees and nonfarm activities. The survey has identified village groups that are severely affected, through losing 25 percent of their land or more, and will develop options for improving livelihoods on readjusted agricultural land. These options include, for example, the use of the cash compensation to enhance irrigation facilities and extend the area of higher producing rice land, and the purchase of more productive crop varieties, for example, sugarcane and marketable tree products such as star anise. Expressway contractors will be requested to give priority to resettlement-affected households in the allocation of unskilled jobs during construction, through consultation with the township and village leaders.

8. GCD will ensure that the resettlement entitlements are provided to the people affected before ground leveling and demolition commence. The land compensation and resettlement subsidy will be paid to the villages affected. Housing compensation and compensation for young crops and other assets will be provided directly to people losing those assets. Compensation for infrastructure such as electrical and communication fixtures will be paid to the concerned department.

E. Institutional Arrangements

9. The GZAR government will assume the responsibility for implementing the resettlement according to the agreed resettlement plan. A project management unit (PMU) within GCD will coordinate the planning, implementation, financing, and reporting of land acquisition and resettlement for the expressway and connector roads. GCD is responsible for any land acquisition and resettlement for the complementary roads. By early April 2001, leading groups for resettlement, each comprising 20 staff, had been established within the affected counties. The county offices will take the primary responsibility for the resettlement consultation, implementation, and timely delivery of entitlements.

F. Vulnerable Groups

10. Vulnerable households will be identified during final survey prior to implementation, including those below the poverty line, destitute households, and households headed by women. Under the resettlement plan, such households will receive special attention in the restoration of livelihood, for example, through preferential unskilled labor opportunities, providing they meet the other recruitment criteria. Those losing housing will also receive village assistance to construct a new house and are eligible for any ongoing welfare support, to which they are already entitled from the village or the Civil Affairs Bureau.

G. Consultation and Grievance Redress

11. The 1998 Land Law requires disclosure to and consultation with people affected. Some of the people affected have been notified about the key elements of the resettlement plan during meetings and interviews. Further consultations will include meetings, arranged by township and village officials, on the specific impacts to be felt in each area and how they will be addressed. The people losing housing will have been offered a choice of housing sites; and those losing agricultural land will have the opportunity to consider suitable income replacement alternatives.

12. In early April 2001, an information booklet about the resettlement plan was distributed to all affected townships, and will be further distributed to the people affected through the peasant economic collectives. The information booklet contains key information such as the resettlement scope; expected time frame; compensation rates for land and other assets; other assistance to replace assets, housing, and incomes; and the grievance redress mechanisms. The county, township, and village officials will ensure that any concerns raised by the people affected are addressed.

13. In case of grievance, people affected will submit their oral or written complaint first to the village committee or the township resettlement office. The village committee must write down any complaint presented orally. If a complaint is not settled in two weeks, the complainants can seek redress at the county resettlement office, within one month. If the matter remains unresolved within two weeks, the PMU will try to achieve a solution. The final redress would be sought, if necessary, in the civil courts, in accordance with the Civil Procedures Act.

H. Monitoring and Reporting

14. A monthly reporting system is being established in the PMU. The detailed plan for internal and external monitoring and evaluation is currently being developed. GCD will engage a qualified independent social research agency, with experience in resettlement assessments, to

conduct independent resettlement monitoring and evaluation. The purpose of this is to assess the extent to which the people affected have received their entitlements on time, as well as to ascertain the extent to which the resettlement objectives of full restoration of incomes and living standards have been achieved. The monitoring and evaluation method includes the conduct of a baseline study before the end of June 2001, to be followed by periodic survey updates at the end of years 1 and 2 and again after project completion. The survey will be conducted through household questionnaires, on a statistically valid sample of those affected. The survey will include a significant number of those severely affected by loss of land, as well as those losing housing, and will allow identification of the effects on the poor and vulnerable.

15. The PMU will report to ADB on progress in land acquisition and resettlement through quarterly progress reports, and will submit periodic reports from the independent monitoring and evaluation agency.

I. Finance and Implementation Schedule

16. The cost of the resettlement is estimated at Y321.7 million, equivalent to about \$38.8 million, for all costs including compensation, resettlement subsidy, payments for assets such as housing, fees, and monitoring and evaluation. Annual adjustments in the cost estimates, including compensation rates, will be made based on the inflation rate for the previous year. GCD will supplement the resettlement budget if necessary to meet any shortfall to achieving the resettlement objectives. The implementation schedule is being updated for the revised resettlement plan based on the new construction timetable.

PUBLIC CONSULTATIONS

Agency	Date	Participants	Number of People	Responses
Xi'an University (Environmental Impact Assessment Team) and Guangxi Communication Department	June 1998 September 1999	Farmers, county and village governments, and local enterprises	116	<p>1. Supported the Project , which is considered as a necessity to promote economic development and poverty reduction in the region, and hoped it will be carried out as soon as possible</p> <p>2. Highlighted the need for environmental protection, particularly provision of noise barriers near schools</p>
Xi'an University (Resettlement Plan Team) and Guangxi Communication Department	September 1999	Residents along the proposed alignment	796	<p>1. Already informed to some extent of the Project, and got better understanding of the significance of the Project</p> <p>2. In favor of the Project and hope that construction will start as soon as possible because it will bring wealth to the region</p>
	February 2001	Heavily affected villages	158	<p>3. Affected people wish to be resettled in the same village, and requested compensation for land acquisition and resettlement to be distributed promptly and directly</p>
Technical Assistance Consultants and Guangxi Communication Department	May - July 2000	County government agencies, village heads, farmers	150	Participated in selection of road links to be included in the complementary road program to improve access to existing road network and the project roads
ADB loan processing missions and Guangxi Communication Department	February - April 2001	County governments and residents along the alignment	80	<p>1. Supported the Project and its positive impact on health and education in the region, and hoped that construction will start as soon as possible</p> <p>2. Requested some modifications to the complementary road program to increase benefits to local population</p> <p>3. County governments will facilitate land acquisition and resettlement procedure and related compensation</p>

SUMMARY OF SOCIAL AND POVERTY IMPACT ANALYSIS

A. The Project Influence Area

1. The project influence area (PIA) consists of the four counties crossed by the expressway (Chongzuo, Fusui, Ningming, and Pingxiang) and Longzhou, which is crossed by the class II road linking the county town to the expressway. The expressway also crosses two townships in Yongning County (Suxu and Wuxu) just outside Nanning City. These have been included wherever statistical data permits. The PIA is the appropriate area to examine the impacts of the Project as a whole. Clearly part of the population that will be impacted by the construction of the expressway is not based in the identified areas. This part of the client population includes long distance passengers and drivers who pass through the PIA or who only stay temporarily within the area. It also includes nonresident freight, bus, and goods distribution enterprises that arrange for the transportation of goods and people in, out, and through the PIA. Vietnamese farmers and traders are also in this broad group.

B. Poverty Trends

2. Poverty levels in the project area have decreased considerably in recent years as they have done throughout the People's Republic of China (PRC). Since 1985, changes in the poverty situation in the PIA have arisen as a result of three principal factors: (i) changes in economic activity, (ii) improvements in infrastructure, and (iii) other initiatives.

3. **Changes in Economic Activity.** The most important change in production in terms of impact on the rural areas is almost certainly the increase in sugar cultivation. Production in 1998 in the PIA was around 7 million tons, a 9-10 fold increase over production in 1985. The PIA now produces almost 17 percent of the total Guangxi Zhuang Autonomous Region (GZAR) production and 6 percent of total PRC production. Sugar refineries are the most important industries of the PIA. The companies purchase all sugar products locally at a fixed price determined by the Government.¹ Fruit production has also increased dramatically (the cultivated area has increased 10-fold) as has vegetable cultivation in areas with good access to the urban areas, especially Nanning City. Other important factors have been the rapid increase in crossborder trade, urbanization in the county towns, and remittances from temporary migration to the large cities of the eastern PRC.

4. **Improvements to Infrastructure.** In parallel with the increases in productive capacity, there have been major improvements to infrastructure. Water supply has been improved through the construction of reservoirs, irrigation and wells, extensive road improvements, expansion of rural electrification to most villages, and construction and expansion of schools and health facilities.

5. **Other Initiatives.** These include (i) promotion of temporary migration to the large cities of the eastern PRC, which has increased rural incomes through remittances; (ii) a program to resettle residents of the most inaccessible and least productive areas (e.g., Tiandeng and Mashan) to more favorable locations; and (iii) considerable expansion of technical assistance and farmer's credit.

¹ This might change with the PRC's entrance in the World Trade Organization (WTO) and the influx of cheaper farm products from abroad. The PRC's Government commitment to the protection of the rural sector is one of the key unresolved issues regarding the PRC's entry in the WTO.

6. The combination of favorable economic circumstances, direct investment by the government, extensive technical advice and credit, and the willingness and ability of farmers to innovate and join together for community projects, has resulted in a positive change in the situation of the absolute poor of the PIA. Only 14 townships are now poor, compared with over 30 in 1985. Table A14.1 indicates the current poverty levels in the PIA.² The table shows that the PIA has a poverty incidence of about 9 percent.

Table A14.1: Poverty Incidence in the PIA

Area	Population	Poverty Incidence	Number of Poor
Wuxu	122,000	10.0%	12,200
Fusui	405,000	6.0%	24,300
Chongzuo	329,000	8.0%	26,320
Ningming	388,000	9.0%	34,920
Pingxiang	100,000	8.0%	8,000
Longzhou	267,000	15.0%	40,050
PIA	1,611,000	9.0%	144,990
GZAR	47,609,000	6.3%	3,008,900

GZAR = Guangxi Zhuang Autonomous Region, PIA = project influence area.

Source: Poverty Alleviation Office, Nanning Prefecture and Consultant's estimates.

7. A high percentage of people have an average income just slightly above the Y1,000 annual income level. Based on an income distribution analysis, approximately one third of the GZAR and PIA population earns an annual income between Y1,500 and Y2,000, and therefore is still vulnerable to shocks and economic fluctuations that could drag them into poverty.

C. Impact on Women and Ethnic Minorities

1. Women

8. The full participation of women in the economic and political life of rural areas implies that, to a very great extent, project benefits will accrue to women as much as to men. This is certainly true for benefits arising from improved access. Although women's role in construction works is estimated at 15 percent of the overall labor employment, women will be given equal opportunities and pay for construction and operation work during project implementation, in accordance with ADB's Policy on Gender and Development.

2. Minorities

9. The PIA population is dominantly the Zhuang minority who are fully assimilated into the mainstream economy. Zhuang dominance in the PIA is more pronounced than in the province as a whole; over 80 percent as against 61 percent. Consequently, project benefits will largely accrue to this group. In the PIA, although there are some Han villages, the majority of the Han people tend to reside in the urban areas. The other minorities mostly live in hilly and peripheral areas in small natural villages. There is only one Yao dominated administrative village in the PIA, Fenglui, in the south of Ningming County. A large proportion of the small Yao population will be affected by the construction of a new access road. The Yao population will benefit from

² Based on an annual income level of Y1,000 per capita.

the new access through increased economic activity and improved social and physical infrastructure and such access will not adversely affected their cultural identity.

D. Social and Poverty-Related Project Features

10. Social and poverty considerations have been an integral part of the project design. Through the complementary road program and the social and poverty measures, the Project will benefit local people, especially the poor, by addressing their needs and requests and by increasing their economic opportunities.

1. Complementary Road Program

11. Throughout GZAR and the project area are numerous examples of how improvements to road access have led to increased incomes and improvements in the living conditions of previously poor communities. The expressway will instigate some of these beneficial consequences, particularly to villages near the interchanges. A complementary road program directly targeting the poorest areas of the PIA has been formulated to spread these benefits to the remaining concentrations of poor households further away from the expressway corridor.

12. Because of major road construction efforts in recent years, the great majority of administrative villages are now accessible by road. However many village roads are substandard and poorly maintained, show signs of rapid deterioration, and are becoming impassable during bad weather. The complementary road program has been explicitly formulated to improve access to poor and recently poor townships and villages in the PIA. As a result of the Asian Development Bank's policy dialogue and through discussions with government officials and county officials and field surveys, road segments were prioritized to benefit the poor in the PIA. The proposed program (Appendix 7) involves improving 978 kilometers of roads, providing all-weather access to more than 80 villages. Nearly all settlements served are currently defined as poor or have only recently exceeded the official poverty line.

2. Social and Poverty Measures

13. During the preconstruction phase, three measures will be implemented. (i) A summary of this social analysis in Chinese, together with other general information about the Project, will be circulated to county governments and other relevant agencies to promote discussion and so that they can develop measures to maximize the potential benefits arising from the NanYou Expressway. (ii) Entrepreneurs along the national highway (NH) 322 will be given information describing the construction schedule of the expressway and the likely impact on traffic flows along this road in order to avoid unsound investment. (iii) Where townships will be near interchanges, county and township officials, with the full participation of local entrepreneurs, will develop land use plans for attractive road service areas just off the expressway. Where appropriate, these areas will include marketing points for local farmers to sell their produce to outside traders. Entrepreneurs on NH 322 will be given priority in the allocation of sites so developed.

14. During construction, three measures will be implemented. (i) Companies involved in civil works for the expressway will maximize the employment of the poor, in particular for unskilled labor. Teams of poor laborers will be recruited through the Poverty Alleviation and Development Office and the All-China Women's Federation. The two agencies will identify appropriate team leaders in poor natural villages in the project area and train them on their rights and

responsibilities, labor law, and other issues as deemed necessary. Team leaders will, for example, be responsible for keeping records of the names of people working in their teams, their salaries, and the working time. The team leaders will then select a labor team from poor households in their natural villages. (ii) The following clause, or a similar one, will be included in the contracts agreed with all successful bidders: "The contractor will distribute to all employees and casually-employed laborers, and display, in prominent positions, advice concerning the nature, dangers, and transmission of sexually transmitted diseases (especially HIV/AIDS) and information concerning precautionary measures. This material will be obtained directly from the Ministry of Health or supplied by the contracting organization. Similar material concerning the dangers of drug use and the penalties associated with its possession and trafficking should be distributed." (iii) Guangxi Communications Department (GCD) will extend procedures for grievance redress outlined in the resettlement plan (Appendix 12) to include any issues between contractors and local residents relating to the construction of the scheme.

15. Once the expressway is open, the expressway corporation will specifically invite businesses currently located along NH 322 to tender for service area concessions, which will form part of the expressway. The expressway corporation will employ as many residents from the directly affected villages as possible. The expressway corporation will prominently display material about HIV/AIDS and sexually transmitted diseases in rest rooms and service areas and consideration will be given to selling condoms in the service areas. GCD will also assist county governments in carrying out road improvements and traffic routing measures where heavy goods traffic from the expressway has a detrimental impact on existing roads and the environment of frontage properties.

3. Paid Labor

16. Laborers working on the project roads will receive a salary based on market rates. The share of labor budget will be reflected in semiannual progress report for each road segment and monitored during project implementation.

E. Poverty Impact Assessment

17. The following analysis focuses on the level of impact of the project roads on the lives of the poor. Since it is difficult to quantify benefits of village and county roads, a qualitative assessment of the significance of the benefits was undertaken. The analysis concludes that about 135,000 of the 1,050,000 people directly affected by the Project are poor and that the proposed complementary road program significantly contributes to the Project's poverty reduction impact. To define the nature and extent of these potential benefits to the poor in the PIA, the assessment will focus on:

- (i) identifying the number of poor who will directly benefit from the Project;
- (ii) identifying the benefits likely to accrue from the Project;
- (iii) distributing these benefits to the poor population; and
- (iv) quantifying the benefits (where possible).

1. Direct and Indirect Beneficiaries

18. Based on income distribution analysis, surveys, and review of official data, the poor population within the PIA is estimated to include 145,000 people (about 9 percent of the total PIA population). While it is realistic to assume that, over time, some project benefits, however small and however indirect, will accrue to the majority of the poor population of the PIA, it is

essential to identify groups who are likely to benefit more directly from the project roads. The four such groups are (i) residents in villages that will be served by the complementary road program, (ii) residents in villages adjacent to the NanYou expressway, (iii) residents adjacent to NH 322, and (iv) the urban poor. Table A14.2 provides estimates of the total and poor population in each of these groups. Total populations are based on estimates done during the analysis and the percentage of poor population derived from poverty proportions estimated by generating income distribution using average income for each category. Double counting has been eliminated where possible.

Table A14.2: Direct Project Beneficiaries

Item	Total Population	Poverty Incidence	Number of Poor
Village Residents ^a	420,000	22.0%	92,400
NanYou Expressway residents ^b	60,000	10.0%	6,000
NH 322 Residents	280,000	8.0%	22,400
Urban	290,000	5.0%	14,500
Direct Project Beneficiaries	1,050,000	12.9%	135,300

NH = national highway.

^a Benefiting from complementary road program.

^b Excludes section west of Ningming where NanYou expressway parallels NH 322 and excluding residents benefiting from village road improvements.

Source: Project Preparatory Technical Assistance.

19. The data show that approximately 135,000 poor people will directly and immediately benefit from the Project, accounting for about 13 percent of the total population directly affected by the Project. The data also shows the importance of the complementary road program in terms of overall impact of the project. The complementary road program will generate benefits as soon as individual schemes are completed, whereas benefits from the NanYou expressway will only accrue after 2005 when the road is opened.

2. Identification of Benefits

20. Potential benefits are divided into income and nonincome components. The former corresponds to higher incomes flows while the latter includes improved living conditions, access to social and community services, and greater interaction with the outside world.

21. **Income component.** The income impacts of village and county road improvements can further be divided into direct and indirect benefits. The direct income benefits are (i) enabling farmers to capture an increasing proportion of the value added by reducing the costs of marketing; (ii) reduced vehicle operating costs (VOCs) for owners of tractors and other motorized vehicles; (iii) higher agricultural productivity through a reduction in the transport cost of fertilizers and other inputs; (iv) farmers switching to higher value crops given their improved access to markets for cash crops;³ (v) development of nonagricultural economic activity, especially transportation; (vi) direct employment opportunities through construction labor; and (vii) purchase of local construction materials. Indirect income benefits are less tangible. These essentially involve multiplier and trickle-down effects arising from the Project as a whole. The most important of indirect income benefits arise from increased urbanization. The rapid

³ Either marketed directly or by reducing the transport costs of visiting traders.

expansion of the towns has increased job opportunities for urban residents and migrant rural labor.

22. **Nonincome component.** Nonincome impacts of road improvement essentially consist of the following. (i) Access to health, schools, and other community facilities will facilitate (a) attracting resident teachers and health personnel to villages, and visits by specialists; and (b) visiting by more remote people to the villages and such facilities. (ii) Improved access to villages for technical personnel and local officials will facilitate agricultural extension and visits to improve communications of government projects and address grievances. (iii) Time and effort involved in routine tasks will be reduced, especially for travelling to the local market. (iv) Overall interactions between villages and the outside world will increase. (v) The safety, environment, and ease of transportation along NH 322 will improve. The NanYou Expressway will lead to a marked reduction of traffic along NH 322. Almost all through traffic will be removed, which will reduce the risk of accidents, and make it safer, easier, and faster for local traffic and pedestrians using NH 322.

3. Distribution of Benefits

23. Table A14.3 provides a simplified allocation of the principal benefits to each group. It also indicates the group/benefit combinations likely to be the most significant and identifies benefits that are quantifiable to some extent.

Table A14.3: Allocation of Project Benefits to Categories of the Poor Population

Category of Poor Population	Income Impacts					Nonincome Impacts	
	Direct ^a				Indirect Multiplier/ Trickle-Down Effects	Access to Services	Safety, etc
	Increased Production ^b	VOC Savings	Construction Labor ^c	Sales of Construction Materials ^d			
Village Residents	LSW	LSW	No	CS	No	LSW	No
NanYou Expressway Residents	LSW	LSW	LSW	CS	No	LSW	No
NH 322 Residents	No	No	No	CS	E	E	LSW
Urban	No	No	No	No	LSW	No	No
Less affected	E	No	No	CS	E	E	No

CS = impact could be significant, E = impact is expected, LSW = impact likely to be significant and widespread, NH = national highway.

^a Some quantification may be possible for significant direct income impacts.

^b Whether through increased productivity, increased cash cropping, higher prices, non-agricultural activity.

^c Dependent on demand for local labor which may not be high; benefit will be transitory.

^d Dependent on location of borrow sites; benefits will be transitory and highly localized.

Source: Consultants' estimates.

4. Quantifiable Benefits

a. Complementary Road Program

24. **Increased Production.** Table A14.4 compares average incomes for all villages in a number of the poorest townships in the PIA. Villages with poor access have an income 8 percent lower than those with good access.

**Table A14.4: Incomes of Villages
with Better and Worse Road Access**

Administrative Villages	No.	Average Income (Y)	Income Ratios^a	Average Vehicle Ownership (per 100 households)
Poor Access	114	1,854	0.95	15
Good Access	119	1,957	1.04	23
Total/Ratios^b	233	0.95	0.92	0.67

^a Income of village relative to township average. Income ratios are used instead of actual incomes in order to avoid statistical anomalies.

^b Ratios of poor access to good access.

Source: Townships, Consultants' estimates.

25. Economic benefits arising from increased land cultivation and other nonagricultural activities, which will derive from improved accessibility, can be assumed to be equivalent to an increase by 8 percent of incomes in the area. This is equivalent to Y27 million per annum.

26. **Employment.** During construction, the Project will generate direct and indirect employment. Employment opportunities will be generated by the construction of 507 km of complementary road works, and a large share of unskilled jobs will be given to those below the poverty line living in the PIA. The construction of class II, III, and IV roads will require and estimated 9,000 person-years of unskilled labor. This is estimated to provide about 4,500 person-years of employment for unskilled poor laborers. Total additional income for these poor laborers is estimated to be around Y30 million, which will be assured by the covenant requesting the payment of market-level wages for all laborers on the project roads.

27. **VOC Savings.** As the use of the complementary road network is not charged, economic benefits will be passed on in full. All village residents will benefit.

b. Expressway and Connector Roads

28. **Employment.** The construction of the expressway and connector roads will require about 25,000 person-years of unskilled labor and 15,000 person-years of skilled labor. A large share of the unskilled jobs will be given to those living below the poverty line (about 13,000 person-years). Total additional income for these poor unskilled laborers is estimated around Y100 million during the construction phase. For the operation of the expressway, new employees will be recruited from within the PIA. Those below the poverty line will acquire at least half of the permanent operational positions required.

29. **VOC Savings.** Economic benefits (lower transport costs, accidents, etc.) will greatly affect consumers. Since the transport markets appear to be fairly competitive, most welfare gain will be absorbed by consumers rather than vehicle owners. Principal beneficiaries among the poor will be bus passengers who are village residents. Also, some of the poor, both village and urban residents, will benefit from lower costs of transport by light and medium goods vehicles.

30. **Construction Materials.** Some local financial gain to owners of quarry sites and service outlets is expected. However the effect of such benefits on poor people is likely to be minor.

ECONOMIC ANALYSIS

1. The proposed expressway has four principal rationales: (i) to link the National Trunk Highway System of the People's Republic of China to National Highway 1, Viet Nam's north-south artery; (ii) to reduce congestion on the existing NH 322, which is currently congested and flows exceed design capacities in several locations—expected economic growth and projected income elasticity will deter some travel by 2005, and more thereafter; (iii) to provide a better alignment that will (a) reduce the distance from Nanning to Youyiguan by 45 km, leading to expected time savings in 2005 of 3.25 hours for goods and passenger vehicles; and (b) move the alignment closer to the principal centers of population in the corridor; and (iv) to foster crossborder trade by reducing transport costs.

2. The complementary road program will support poverty reduction. The program will provide basic all-weather access to villages; upgrade deteriorated village roads; and improve access to townships, administrative villages, and other villages directly affected by the expressway. It will facilitate effective distribution of expressway benefits. Although the program will reduce transport costs, its wider role is that of fulfilling an essential precondition for improved access to social and health services.

A. Valuation of Costs and Benefits

1. Basis for Evaluation

3. The basis for evaluation of the expressway and Class I/II connecting roads is a comparison of the Project with a base case. The base case incorporates minimum improvements to the existing highway and planned improvements to the remainder of the network. In a situation where demand for transport is growing fast, this will lead to some journeys being diverted to other roads and some being suppressed. In the "with Project" case there will be little or no trip suppression. The difference between the two equilibrium levels of traffic is treated as generated traffic.

4. Quantified evaluation of the complementary road program is based on a comparison of vehicle operating costs (VOCs) with and without the proposed improvements. Network effects are not taken into account. Other unquantifiable benefits of the program will be (i) increased production due to better access to markets and agricultural officers, (ii) increased trading and transport opportunities, (iii) improved access to school and health facilities, and (iv) increased access to other information.

5. The evaluation period is 20 years following the expected opening early in 2005. The base case construction period is 40 months, from the end of 2001 to early 2005.

2. Costs

6. Economic costs are at mid-2000 prices and are expressed in domestic currency. For tradeable items an exchange rate of \$1=Y8.28 and a shadow exchange factor of 1.08 was used. In general, equipment was tax exempt and the overall conversion factor was 0.967; a lower conversion factor of 0.9 was used for local road construction and maintenance costs.

3. Benefits

7. The main economic benefits generated by the Project are VOC savings, reduced travel time, and accident cost savings for normal traffic. Half of the VOC benefits accrued to the generated traffic are included as a proxy for willingness to pay. Other benefits included working capital savings to freight in transit and resource cost savings arising from diversion from rail to road.

8. VOC savings were calculated for five vehicle types, taking into account the differences of terrain, road roughness, speed, and congestion. The economic costs of vehicles included in the VOC savings are derived from international prices with a quality adjustment for domestically produced vehicles. Parts, fuel, and oil were also calculated based on the current international prices. The benefits from VOC savings, which will initially accrue to vehicle owners and operators, will in the long term be passed on to users of transport services through reductions in transport rates and fares, given the increasingly competitive nature of the road transport industry in the project area.

9. Travel time saving will be enjoyed by the traffic on the project expressway and the existing roads. Saved travel time is valued using 70 percent of average after-tax salary for work-related trips only. Only 25 percent of bus passengers were assumed to be on work-related trips. No value was assigned to leisure trips.

10. The benefits from a reduction in number and severity of accidents constitute an important element of economic benefits. Accident reductions were estimated based on the findings of a study on accidents carried out by the Highway Planning and Design Institute of the Ministry of Communications. The cost of property damage (Table A15.1) is high. Although the economic cost of accidents is higher on the expressway than on the existing roads, with the Project, the number of accidents per vehicle-kilometer in the project corridor will be reduced substantially. Therefore, net cost saving will derive from avoided accident costs.

11. Working capital savings to freight in transit were estimated conservatively, taking only the actual time saved, rather than assuming that (for example) a proportion of overnight stays can be eliminated. The resource savings from diversion from rail to road are difficult to estimate but are considered to be small. Most rail freight is commodities in bulk; the scope for diversion and resource cost savings is negligible. Substantial diversion of passenger traffic is expected. However, the railway runs at well below capacity and marginal costs must be low. Resource cost savings using a historic rail conversion factor and derived bus VOCs were therefore reduced before inclusion in the evaluation.

B. Results and Conclusion

12. The economic internal rate of return (EIRR) for the Project is 20.0 percent (Table A15.4). The EIRR for the complementary road program alone is 22.7 percent. VOC savings are the major economic benefit, accounting for 76 percent, followed by generated traffic (11 percent), travel time savings (6 percent), local road component (4 percent), and accident cost savings (3 percent).

13. The sensitivity of the EIRR to changes in significant and uncertain variables is shown in Table A15.2. Switching values are identified. The project EIRR is highly robust in the face of adverse cost and benefit estimates. To reduce the EIRR to 12 percent would take:

- (i) an increase in costs to about double the base case, or
- (ii) a drop in benefits to 0.44 times the base case.

14. Tolls affect the volume of traffic on the expressway. Economic benefits are maximized with no toll, as this allows the maximum number of vehicles to take advantage of the superior travel conditions on the expressway. As expressway tolls increase, more drivers and operators will opt to use other routes. This effect has been tested, and the results are shown in Table A15.3. Below the base toll level, EIRRs are relatively insensitive to further changes in price (toll) level, i.e., demand for expressway travel is relatively inelastic. Above the base toll, elasticity increases, demand is ultimately choked off, and the EIRR falls sharply.

Table A15.1: Accident Rates and Costs in PRC

Road Class	Average Value of Direct Property Damage per Accident (Yuan)	Number of Accidents per 100 Million Vehicle-Kilometers
Expressway	14,000	20-50
Motorway Class I	10,000	55-70
Motorway Class II	7,750	105-120
Highway Class II	6,500	150-160
Highway Class III	4,500	More than 160

Source: The Highway Planning and Design Institute of the Ministry of Communication.

Table A15.2: Economic Evaluation: Sensitivity Tests

Project case	EIRR (percent)	NPV (Y billion)
Best estimate	20.0	2.61
EIRR with:		
(i) 10 percent increase in all project costs	18.8	2.37
(ii) 20 percent decrease in all project benefits	17.4	1.67
(iii) 20 percent decrease in the value of travel time savings	19.8	2.55
(iv) expressway construction over 4½ rather than 3½ years	18.6	2.32
(v) 20 percent drop in income elasticity of transport demand	18.8	2.40
(vi) combination of (i), (ii) and (iv)	15.1	1.36
Switching values ^a		
(i) Increase in all costs	base x 2.08	
(ii) Decrease in all benefits	base x 0.44	

EIRR = economic internal rate of return, NPV = net present value.

^a Factor that will reduce the project EIRR to 12 percent.

Source: Staff estimates.

Table A15.3: Effect of Tolls on Expressway EIRR

EIRR	Factor x base toll				
	0.5	0.75	1	1.5	2
Percent	20.4	20.2	20.0	19.0	17.9

Table A15.4: Economic Internal Rate of Return

Year	Annual Costs (million yuan)					Annual Benefits (million yuan)								
	Without Project Costs	With Project Costs			Incremental Cost	Vehicle Operating Cost Savings	Value of Time Savings	Accident Savings	Gen. Traffic	Freight Transit Savings	Benefits of Diversion from Rail	VOC Benefits of Comp. Roads	Total Benefit	Net Benefit
		Capital	O&M	Comp. Roads										
2001	0.0	269.1	0.0	20.6	289.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-289.7
2002	0.0	853.3	0.0	61.9	915.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-915.2
2003	0.0	861.4	0.0	61.9	923.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-923.3
2004	0.0	881.0	0.0	41.3	922.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-922.3
2005	20.2	174.6	12.6	20.6	187.6	368.9	28.8	17.1	14.7	1.2	3.0	40.0	473.7	286.1
2006	20.4	9.6	12.9	4.8	6.9	401.5	32.3	18.8	17.8	1.4	3.0	42.0	516.7	509.8
2007	20.6	9.6	13.2	4.9	7.1	436.9	36.3	20.6	21.5	1.5	3.0	44.1	564.0	556.9
2008	20.8	9.6	13.5	5.0	7.3	475.5	40.8	22.5	26.0	1.7	3.0	46.3	615.9	608.6
2009	21.0	9.6	13.8	5.1	7.5	517.4	45.9	24.7	31.4	2.0	3.0	48.6	673.0	665.5
2010	9.6	9.6	14.1	5.2	19.3	563.0	51.6	27.0	38.0	2.2	3.0	51.1	735.8	716.5
2011	9.8	9.6	14.4	5.3	19.5	612.6	58.0	29.5	45.9	2.5	3.0	53.6	805.1	785.6
2012	10.0	9.6	14.7	5.4	19.7	666.5	65.2	32.3	55.5	2.8	3.0	56.3	881.6	861.9
2013	10.3	9.6	15.0	5.6	19.9	725.1	73.3	35.3	67.1	3.2	3.0	59.1	966.1	946.2
2014	10.6	9.6	15.4	5.7	20.1	788.9	82.4	38.6	81.0	3.6	3.0	62.1	1,059.5	1,039.5
2015	10.9	104.4	15.7	5.8	115.1	858.2	92.6	42.1	98.0	4.1	3.0	65.2	1,163.1	1,048.0
2016	11.2	9.6	16.1	5.9	20.5	989.8	100.4	45.7	118.4	4.6	3.0	68.4	1,330.3	1,309.8
2017	11.5	9.6	16.6	6.1	20.7	1,137.8	108.6	49.7	143.1	5.1	3.0	71.8	1,519.1	1,498.3
2018	11.8	9.6	17.0	6.2	21.0	1,304.0	117.1	53.9	173.0	5.7	3.0	75.4	1,732.2	1,711.2
2019	12.2	9.6	17.4	6.3	21.2	1,490.5	126.0	58.6	209.1	6.4	3.0	79.2	1,972.7	1,951.5
2020	12.5	9.6	17.9	6.5	21.4	1,699.7	135.0	63.6	252.7	7.1	3.0	83.2	2,244.3	2,222.9
2021	12.9	9.6	18.3	6.6	21.7	1,934.0	144.2	69.1	305.4	7.9	3.0	87.3	2,550.9	2,529.2
2022	13.3	9.6	18.8	6.8	21.9	2,196.1	153.4	75.0	369.2	8.8	3.0	91.7	2,897.1	2,875.2
2023	13.7	9.6	19.3	7.0	22.1	2,489.3	162.3	81.4	446.2	9.7	3.0	96.3	3,288.3	3,266.1
2024	14.2	9.6	19.8	7.1	22.4	2,817.0	170.9	88.4	539.3	10.8	3.0	101.1	3,730.3	3,708.0
2025	14.7	-1,252.7	20.4	7.3	-1,239.7	3,182.8	178.6	95.9	639.3	11.8	3.0	106.1	4,217.7	5,457.4
Economic internal rate of return:													20.0%	

Comp=complementary, Gen=generated, O&M=operating and maintenance, VOC=vehicle operating cost.

All values are at 2000 prices.

Source: Staff estimates.

FINANCIAL PERFORMANCE AND PROJECTIONS

A. General

1. The proforma financial statements including income statement, cash flows, and balance sheet for the project expressway are based on the following assumptions and were prepared for 25 years from 2000 to 2025. All projections are in current terms. The domestic inflation rates used are 1.8 percent for 2000, 2.0 percent for 2001 and 3.0 percent for 2002 onward. The international inflation rate used is 2.4 percent throughout the projection period.

B. Financial Statements

2. The project expressway financial projections are based upon the following assumptions:
- (i) Corporate income tax¹ is assessed against the expressway operating entity at 33 percent of net profit per year.
 - (ii) Government grants consist of equity capital contributed by Ministry of Communications and Guangxi Communications Department (GCD).
 - (iii) The grants from Ministry of Communications and GCD will be Y836 million and Y777 million, respectively and will be invested during the first five years of construction to cover initial deficits.
 - (iv) The toll rates expected to be levied to the project expressway are in 2000 prices and based upon the traffic forecast estimated by GCD for various types of vehicles (Table A16.1). Traffic volumes were forecast to increase by 7.3 percent per year during 2005-2015 and 6.8 percent per year during 2016-2025.

Table A16.1: Projected Toll Rates
(Yuan per vehicle km)

Vehicle Type	Road Type	
	Expressway	Class I
Small Passenger	0.30	0.25
Large Passenger/Medium Truck	1.00	0.85
Large Truck	1.85	1.60
Truck with Trailer	2.60	2.40

Source: The Price Control Bureau of the Guangxi Planning Committee.

- (v) The operating and maintenance costs, including routine maintenance and environmental monitoring, are Y10 million per year in mid-2000 prices. Routine maintenance cost will amount to Y8.1 million per year. The operating costs are based on a staff of 127 people employed at toll stations, in the maintenance teams, and at the administrative offices. Annual salaries and benefits amount to an average of Y10,500 per employee. Operating costs will increase in line with traffic growth and domestic inflation. Maintenance costs will increase in line with domestic inflation.

¹ Business Tax was abolished, effective 1 January 2001.

- (vi) The bank loans repayments will begin in 2006. The interest rate charged on the Asian Development Bank (ADB) loan was estimated at 4.51 percent, based on the six-month LIBOR in US dollars in June 2001, and the interest rate on the domestic loan is 6.21 percent. The commitment fee of 0.75 percent per year and the 1.0 percent front-end fee for the ADB loan are also included.

C. Summary of Financial Statements

3. The projected financial statements in Tables A16.2 to A16.4 indicate that the expected revenues at the rates proposed are sufficient to cover the operating costs and debt repayments on the ADB and domestic loans. The debt-to-equity ratio of much less than 65:35 from the first year of the expressway construction and the decreasing of the debt-to-equity ratios thereafter indicates a sound financial condition for the expressway under the proposed financing plan. The return on equity will be positive from the beginning of operations. This ratio indicates that Guangxi Expressway Management Company, which will be created to operate the expressway, can sustain a totally commercial operation from year 2005, if GCD decides to privatize the expressway operation in the future.

Table A16.2: Income Statement for Nanning-YouYiGuan Expressway
(current Y million)

Million Yuan in Calendar Year (current prices)															
Item	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2015	2020	2025
Proportion of Full Year's Revenue						0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1. Revenue (net of exempt vehicles)															
Tolls						244.5	349.8	375.3	402.6	432.0	537.2	576.4	895.1	1442.6	2,322.3
Nontoll Revenue (Advertisements, etc)						1.9	3.7	4.0	4.2	4.5	5.7	6.1	9.4	15.2	24.4
Interest Income on Cash Balances						-	5.3	8.7	12.0	15.5	19.0	24.1	40.8	57.3	82.2
Total Revenue						246.5	358.8	387.9	418.9	452.0	561.9	606.5	945.2	1,515.3	2,428.9
2. Operating Costs															
a. Administration, Toll Collection, Traffic Management															
Labor Costs						0.9	1.0	1.1	1.2	1.3	1.4	1.6	2.2	3.3	5.0
Utilities and Office Costs						0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.9	1.3	2.0
Subtotal (administration and operations)						1.2	1.4	1.5	1.7	1.8	2.0	2.2	3.1	4.7	7.0
b. Maintenance and Environmental Monitoring						7.0	9.8	10.4	10.9	11.5	12.1	12.7	15.6	20.0	25.2
Total Operating Costs						8.2	11.3	11.9	12.6	13.3	14.1	14.9	18.7	24.7	32.2
Pretax Operating Profit/(Loss) before Capital Charges						238.3	347.6	376.0	406.3	438.7	547.8	591.6	926.5	1,490.6	2,396.8
3. Capital Charges															
Depreciation Charge						202.5	208.6	214.9	221.3	227.9	234.8	241.8	137.9	159.9	185.3
Profit/(Loss) before Interest and Tax						35.7	139.0	161.2	185.0	210.7	313.0	349.8	788.6	1,330.7	2,211.4
Interest on Long Term Debt						-	107.0	103.4	99.7	95.7	91.6	87.3	67.5	36.4	10.6
Pretax Operating Profit/(Loss) after Capital Charges						35.7	32.0	57.8	85.3	115.0	221.4	262.6	721.1	1,294.3	2,200.8
4. Corporate Income (Profit) Tax						-	10.6	19.1	28.2	37.9	73.1	86.6	238.0	427.1	726.3
Posttax Operating Profit/(Loss)						35.7	21.4	38.7	57.2	77.0	148.3	175.9	483.2	867.2	1,474.5
5. Appropriations of Net Income															
General Surplus Fund (may meet short term financing needs)						-	1.1	1.9	2.9	3.9	7.4	8.8	24.2	43.4	73.7
Legal Surplus Fund (for staff welfare)						-	1.1	1.9	2.9	3.9	7.4	8.8	24.2	43.4	73.7
Dividends						-	19.3	34.8	51.4	69.3	133.5	158.3	434.8	780.5	1,327.1
Retained Earnings (Loss)						35.7	-	-	-	-	-	-	-	-	-
Indicators:															
(i) Toll Rate (yuan/MTE-kilometer)						1.2	1.2	1.2	1.2	1.2	1.4	1.4	1.7	1.9	2.2
(ii) Traffic Volume (million MTE-kilometers/day)						0.8	0.8	0.9	0.9	1.0	1.1	1.2	1.6	2.2	3.0
(iii) Revenue Collection Efficiency						95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Working Ratio						3.4%	3.2%	3.2%	3.1%	3.0%	2.6%	2.5%	2.0%	1.7%	1.3%

MTE=medium truck equivalent unit.

Source: Staff estimates.

Table A16.3: Statement of Sources and Application of Funds for Nanning-YouYiGuan Expressway

Item	Million Yuan for Calendar Year (current prices)														
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2015	2020	2025
1. Sources of Funds															
a. Internal Cash Generation															
Revenue	-	-	-	-	-	246.5	358.8	387.9	418.9	452.0	561.9	606.5	945.2	1,515.3	2,428.9
Less: Operating Costs and Taxes	-	-	-	-	-	8.2	21.8	31.0	40.7	51.2	87.2	101.5	256.7	451.8	758.4
Adjust for Working Capital Changes	-	-	-	-	-	0.1	10.6	8.5	9.1	9.8	35.1	13.6	105.7	93.7	149.3
Subtotal (internal cash generation)	-	-	-	-	-	238.3	347.6	365.5	387.3	410.5	509.9	518.6	794.3	1,157.2	1,819.8
b. External Financing															
Domestic Loan Drawing	45.8	142.4	140.6	141.9	29.3										
ADB Subloan Drawing	154.0	477.0	474.8	478.8	98.5										
Capital Grants	149.7	459.5	449.6	445.4	94.6								87.8		
Short Term External Finance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal (external project financing)	349.5	1,078.9	1,065.0	1,066.1	222.4	-	-	-	-	-	-	-	87.8	-	-
Total Sources of Funds	349.5	1,078.9	1,065.0	1,066.1	460.7	347.6	365.5	387.3	410.5	509.9	518.6	882.1	1,157.2	1,819.8	
2. Application of Funds															
a. Construction of Expressway															
Infrastructure	308.2	984.5	998.6	1,035.4	219.9	-	-	-	-	-	-	-	87.8	-	-
IDC	37.9	85.9	56.7	24.2	1.5	-	-	-	-	-	-	-	-	-	-
Inventories	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal (project cost)	346.1	1,070.4	1,055.3	1,059.5	221.4	-	-	-	-	-	-	-	87.8	-	-
b. Debt Service															
ADB Subloan	-	-	-	-	-	-	125.7	125.7	125.7	125.7	125.7	125.7	125.7	125.7	125.7
Domestic Loan	-	-	-	-	-	-	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	-
Short Term Debt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal (debt service)	-	-	-	-	-	-	177.9	177.9	177.9	177.9	177.9	177.9	177.9	177.9	125.7
c. Distributions															
To Legal Surplus Fund	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Staff Welfare Fund	-	-	-	-	-	-	1.1	1.9	2.9	3.9	7.4	8.8	24.2	43.4	73.7
Dividends	-	-	-	-	-	-	-	19.3	34.8	51.4	69.3	133.5	241.7	609.2	1,054.4
Repayment of Short Term Debt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal (distributions)	-	-	-	-	-	-	1.1	21.2	37.7	55.3	76.7	142.3	265.9	652.6	1,128.1
Total Application of Funds	346.1	1,070.4	1,055.3	1,059.5	221.4	179.0	199.1	215.6	233.2	254.6	320.2	531.6	830.5	1,253.8	
3. Cash Flow Surplus (deficit)	3.4	8.5	9.7	6.6	239.3	168.6	166.4	171.7	177.3	255.2	198.4	350.5	326.7	566.0	
4. Short Term Capital Movements															
a. Working Capital (current assets-current liabilities):															
Beginning of Year	-	3.4	11.9	21.5	28.1	266.4	405.1	547.5	693.4	843.0	999.0	1,664.0	1,929.7	2,478.1	
End of Year	3.4	11.9	21.5	28.1	266.4	405.1	547.5	693.4	843.0	999.0	1,158.9	1,715.6	1,991.4	2,622.0	
b. Cash															
Beginning of Year	-	3.4	11.9	21.5	28.1	266.5	435.1	601.5	773.1	950.4	1,205.7	2,038.1	2,872.6	4,109.7	
End of Year	3.4	11.9	21.5	28.1	266.5	435.1	601.5	773.1	950.4	1,205.7	1,404.1	2,388.6	3,199.2	4,675.7	
Debt Service Coverage Ratio							2.0	2.1	2.3	2.5	3.1	3.3	5.2	8.4	19.1

IDC=interest during construction.
Source: Staff estimates.

Table A16.4: Balance Sheet for Nanning-YouYiGuan Expressway

Million Yuan at 31 December (current prices)															
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2015	2020	2025
1. Assets															
a. Current Assets:															
Cash		3.4	11.9	21.5	28.1	266.5	435.1	601.5	773.1	950.4	1,205.7	1,404.1	2,388.6	3,199.2	4,675.7
Accounts Receivable															
Inventories															
Subtotal (current assets)		3.4	11.9	21.5	28.1	266.5	435.1	601.5	773.1	950.4	1,205.7	1,404.1	2,388.6	3,199.2	4,675.7
b. Fixed Assets:															
Revalued Fixed Assets in Service	346.1	1,426.9	2,525.0	3,660.3	3,993.3	4,113.3	4,236.7	4,363.8	4,494.7	4,494.7	4,768.5	5,454.7	6,323.5	7,330.7	
Less: Cumulative Depreciation					202.5	417.2	644.6	885.2	1,139.7	1,408.7	1,692.8	2,855.8	4,089.2	5,646.5	
Subtotal (net value of fixed assets)	346.1	1,426.9	2,525.0	3,660.3	3,791.0	3,696.1	3,592.1	3,478.6	3,355.0	3,220.9	3,075.7	2,599.0	2,234.3	1,684.2	
Total Assets	349.0	1,439.0	2,547.0	3,688.0	4,057.0	4,131.0	4,194.0	4,252.0	4,305.0	4,427.0	4,480.0	4,988.0	5,434.0	6,360.0	
2. Liabilities and Equity															
a. Current Liabilities															
Taxes Payable							10.6	19.1	28.2	37.9	73.1	86.6	238.0	427.1	726.3
Dividends Payable							19.3	34.8	51.4	69.3	133.5	158.3	434.8	780.5	1,327.1
Claims on Legal Surplus Fund (for staff welfare)															
Short Term Debt															
Other Accounts Payable						0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3
Subtotal (current liabilities)						0.1	29.9	54.0	79.7	107.4	206.7	245.1	673.0	1,207.8	2,053.7
b. Long Term Debt															
ADB Subloan	154.0	631.0	1,105.7	1,584.5	1,683.6	1,633.8	1,581.8	1,527.4	1,470.6	1,411.2	1,349.1	1,071.6	648.2	120.3	
Domestic Loan	45.8	188.3	328.8	470.7	500.0	478.9	456.4	432.6	407.2	380.3	351.8	218.6	0.0	0.0	
Subtotal (debt)	199.8	819.2	1,434.5	2,055.3	2,183.6	2,112.7	2,038.2	1,960.0	1,877.8	1,791.5	1,700.9	1,290.2	648.2	120.3	
c. Equity															
Capital Contribution:															
Construction of NanYou Expressway	149.7	609.2	1,058.8	1,504.3	1,598.9	1,598.9	1,598.9	1,598.9	1,598.9	1,598.9	1,598.9	1,598.9	1,686.7	1,686.7	1,686.7
Reserves:															
General Surplus Fund							1.1	3.0	5.9	9.7	17.1	25.9	85.5	249.2	533.4
Retained Earnings (accumulated loss)						35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7
Adjustments:															
Add: Surplus on Revaluation			10.4	53.2	128.9	238.8	352.5	463.4	571.1	675.5	776.1	872.8	1,216.0	1,605.5	1,929.7
Less: Provision for Devaluation Loss on ADB Subloan			4.6	23.5	56.7	104.3	154.8	203.8	251.2	297.1	341.2	383.5	533.4	669.8	736.8
Subtotal (equity)	149.7	619.6	1,112.0	1,633.2	1,873.3	1,988.1	2,101.0	2,211.6	2,319.8	2,427.9	2,533.3	3,023.9	3,577.1	4,185.5	
Total Liabilities and Equity	349.0	1,439.0	2,547.0	3,688.0	4,057.0	4,131.0	4,193.0	4,251.0	4,305.0	4,426.0	4,479.0	4,987.0	5,433.0	6,360.0	
Debt to Equity Ratio	47:35	46:35	45:35	44:35	41:35	37:35	34:35	31:35	28:35	26:35	23:35	15:35	6:35	1:35	

Source: Staff estimates.

FINANCIAL ANALYSIS

1. The financial rate of return (FIRR) for the Project expressway is based on estimated incremental revenues and costs resulting from its operation. The major assumptions used in calculating the FIRR are as follows:

- (i) The FIRR calculation is in constant 2000 prices. The cash flows and financing plans are in real prices. They cover a period of 24 years, comprising 4 years of construction (2001 to 2005) and 20 years of operation (2006 to 2025).
- (ii) The FIRR was calculated after corporate income tax.
- (iii) Capital costs include all incremental capital expenditures related to the construction and equipment of the project expressway, but exclude price contingency provisions and interest during construction.
- (iv) Operation and maintenance costs include all incremental costs for operating the project expressway, but exclude depreciation provisions.
- (v) Operating revenues were projected based on forecast traffic for the toll rates for all vehicle types in real terms. The toll rates were applied to the whole project expressway in real terms during the period of analysis. The traffic volumes have taken into account vehicles that are exempt from tolls, such as military, emergency, and public security vehicles.

2. The results of the financial evaluation for the project expressway including the cost of complementary roads show an FIRR in real terms of 9.0 percent after corporate income tax (Table A17.1). This is higher than the real after tax weighted average cost of capital for the Project estimated at 3.1 percent. Sensitivity analysis of the financial return was carried out to test the effects of several scenarios on key parameters that determine costs and revenues (Table A17.2). The FIRR after tax varies between 4.8 and 11.1 percent, which is always above the after tax weighted average cost of capital. The Project is shown to be most sensible to the toll revenue stream and capital costs and the delay in completion. An increase of 20 percent in capital costs will decrease the FIRR to 7.5 percent and a decrease of 20 percent in revenues will decrease the FIRR to 6.5 percent, and a one-year delay in construction will decrease the FIRR to 8.3 percent. Under the most adverse scenario (one-year delay; capital, operation, and maintenance costs higher by 20 percent; and revenues lower by 20 percent) the FIRR would decrease to 4.8 percent. A devaluation of the yuan by 30 percent would reduce the FIRR to 8.1 percent. The financial evaluation without complementary roads shows an FIRR of 9.7 percent in real terms.

Table A17.1 Financial Internal Rate of Return

(Yuan million)

Year	Capital Investment	Operating and Maintenance Costs	Gross Revenue	Net Cash Flow	Corporate Income Tax	Net Cash Flow After Corporate Income Tax
2001	299.7	-	-	(299.7)		(299.7)
2002	931.7	-	-	(931.7)		(931.7)
2003	919.5	-	-	(919.5)		(919.5)
2004	928.1	-	-	(928.1)		(928.1)
2005	191.6	7.3	214.6	15.6		15.6
2006	-	10.1	298.0	287.9	8.9	279.0
2007	-	10.4	310.4	300.0	15.6	284.4
2008	-	10.6	323.3	312.7	22.4	290.3
2009	-	10.9	336.8	325.9	29.3	296.6
2010	-	11.2	406.6	395.5	54.7	340.8
2011	-	11.5	423.5	412.1	63.0	349.1
2012	-	11.8	441.2	429.4	71.2	358.2
2013	-	12.1	459.5	447.5	79.5	368.0
2014	-	12.4	478.6	466.3	88.0	378.3
2015	87.8	12.7	584.4	483.9	153.8	330.1
2016	-	13.0	606.0	593.0	163.6	429.4
2017	-	13.3	628.5	615.1	172.6	442.5
2018	-	13.7	651.7	638.0	181.9	456.1
2019	-	14.0	675.8	661.8	191.4	470.4
2020	-	14.4	812.5	798.1	238.0	560.1
2021	-	14.7	842.6	827.8	250.2	577.6
2022	-	15.1	873.8	858.7	261.7	597.0
2023	-	15.5	905.6	890.1	273.5	616.6
2024	-	15.9	939.7	923.7	285.7	638.0
2025	(1,308.2)	16.3	1,128.2	2,420.1	349.2	2,070.9
Financial Internal Rate of Return after Corporate Income Tax:						9.0%

Source: Staff estimates.

Table A17.2: Sensitivity Analysis

Case	FIRR
Base Case	9.0%
Changes in Capital Costs	
Plus 20%	7.5%
Plus 10%	8.2%
Minus 10%	10.0%
Minus 20%	11.1%
Changes in Revenues	
Minus 20%	6.5%
Minus 10%	7.8%
Changes in Operating and Maintenance Costs	
Plus 10%	9.0%
Plus 20%	9.0%
Project Delayed by 1 Year	8.3%
Combined Changes	
Capital Costs plus 20%, Revenues minus 20%	5.2%
Capital Costs plus 10%, Revenues minus 10%	7.1%
Project delayed 1 Year, Capital Costs plus 10% 10% and Revenues minus 10%, and O&M plus 10%	6.5%
Project delayed 1 Year, Capital Costs plus 20% and Revenues minus 20%, and O&M plus 20%	4.8%
Currency Devaluation by 30%	8.1%

FIRR=financial internal rate of return, O&M=operating and maintenance.

Source: Staff estimates.