



Completion Report

Project Number: 34561
Loan Number: 1784
October 2008

People's Republic of China: Chongqing-Guizhou Roads Development Project (Chongzun Expressway)

CURRENCY EQUIVALENTS

Currency Unit – yuan (CNY)

		At Appraisal	At Project Completion
		31 October 2000	23 March 2008
CNY1.00	=	\$0.1208	\$0.1411
\$1.00	=	CNY8.2799	CNY7.0894

ABBREVIATIONS

AADT	–	annual average daily traffic
ADB	–	Asian Development Bank
BME	–	benefit monitoring and evaluation
GAAS	–	Guizhou Academy of Social Science
GEDC	–	Guizhou Expressway Development Corporation
GHHAB	–	Guizhou High-Grade Highway Administration Bureau
GPG	–	Guizhou Provincial Government
EIA	–	environmental impact assessment
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
GDP	–	gross domestic product
ICB	–	international competitive bidding
M&E	–	Monitoring and evaluation
NCB	–	national competitive bidding
LIBOR	–	London interbank offered rate
MOC	–	Ministry of Communications
MTE	–	medium truck equivalent
NTHS	–	national trunk highway system
O&M	–	operation and maintenance
PCR	–	project completion report
PRC	–	People's Republic of China
PRCM	–	Asian Development Bank Resident Mission in the People's Republic of China
RP	–	Resettlement plan
TA	–	technical assistance
VOC	–	vehicle operating cost
WACC	–	weighted average cost of capital

WEIGHTS AND MEASURES

Mu	–	1/15 hectare
Km	–	kilometer
km/h	–	kilometer per hour

NOTES

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

Vice President	C. Lawrence Greenwood, Jr., Operations Group 2
Director General	K. Gerhaeusser, East Asia Department
Country Director	R. Wihtol, PRC Resident Mission, East Asia Department
Team leader	W. Zhang, Senior Project Officer, East Asia Department
Team members	F. Wang, Financial Management Officer, East Asia Department
	W. Zhu, Resettlement Officer, East Asia Department
	H. Hao, Assistant Project Analyst, East Asia Department

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BASIC DATA

A. Loan Identification

1.	Country	People's Republic of China
2.	Loan Number	1784
3.	Project Title	Chongqing-Guizhou Roads Development Project (Chongzun Expressway Project)
4.	Borrower	People's Republic of China
5.	Executing Agency	Guizhou Expressway Development Corporation
6.	Amount of Loan	\$200 million
7.	Project Completion Report Number	PRC 1037

B. Loan Data

1.	Appraisal	
	– Date Started	4 April 2000
	– Date Completed	19 April 2000
2.	Loan Negotiations	
	– Date Started	14 August 2000
	– Date Completed	18 August 2000
3.	Date of Board Approval	21 November 2000
4.	Date of Loan Agreement	26 June 2001
5.	Date of Loan Effectiveness	
	– In Loan Agreement	24 September 2001
	– Actual	24 September 2001
	– Number of Extensions	0
6.	Closing Date	
	– In Loan Agreement	30 September 2005
	– Actual	22 October 2007
	– Number of Extensions	2
7.	Terms of Loan	
	– Interest Rate	Pool-based based variable lending rate for US dollars ^a
	– Maturity	24 years
	– Grace Period	4 years
8.	Terms of Relending	
	– Interest Rate	Pool-based based variable lending rate for US dollars ^a
	– Maturity	24 years
	– Grace Period	4 years
	– Second-Step Borrower	Guizhou Expressway Development Corporation

^a Interest rate was changed to LIBOR-based loan on 31 July 2002 on the request of Guizhou Expressway Development Corporation.

9. Disbursements

a. Dates

Initial Disbursement	Final Disbursement	Time Interval
4 November 2002	13 August 2007	57 months
Effective Date	Original Closing Date	Time Interval
24 September 2001	30 September 2005	48 months

b. Amount (\$ million)

Category	Original Allocation	Last Revised Allocation	Amount Canceled	Amount Disbursed	Undisbursed Balance
1. Civil Works	163.10	163.10	12.91	150.19	12.91
2. Equipment	15.90	15.90	1.92	13.98	1.92
3. Consulting Services and Training	2.50	2.50	0.22	2.28	0.22
4. Front-End Fee	2.00	2.00	0.00	2.00	0.00
5. Interest and Commitment Charges	5.00	5.00	0.00	5.00	0.00
6. Unallocated	11.50	11.50	11.50	0.00	11.50
Total	200.00	200.00	26.55	173.45	26.55

Sources: Asian Development Bank and Guizhou Expressway Development Corporation.

C. Project Data

1. Project Cost (\$ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	356.00	343.70
Local Currency Cost	478.00	465.30
Total	834.00	809.00

Sources: Asian Development Bank and Guizhou Expressway Development Corporation.

2. Financing Plan (\$ million)

Cost	Appraisal Estimate	Actual
Implementation Costs		
Borrower-Financed	588.80	569.15
ADB-Financed	195.00	168.45
Other External Financing	0.00	0.00
Total	783.80	737.60
IDC Costs		
Borrower-Financed	45.20	66.40
ADB-Financed	5.00	5.00
Other External Financing	0.00	0.00
Total	50.20	71.40

ADB = Asian Development Bank, IDC = interest during construction

Sources: Asian Development Bank and Guizhou Expressway Development Corporation.

3. Cost Breakdown by Project Component (\$ million)

Component	Appraisal Estimate	Actual
A. Base Cost		
1. Expressway Civil Works	517.00	591.40
2. Buildings and Ancillary Facilities	11.30	11.30
3. Equipment	30.00	28.10
4. Land Acquisition and Resettlement	43.80	41.00
5. Consulting Services and Training	13.00	13.40
6. Feeder Road Upgrading	52.40	52.40
Subtotal (A)	667.50	737.60
B. Contingencies		
1. Physical Contingencies	66.80	0.00
2. Price Escalation	47.50	0.00
Subtotal (B)	114.30	0.00
C. Interest During Construction and Front-End Fee	52.20	71.40
Total	834.00	809.00

Sources: Asian Development Bank and Guizhou Expressway Development Corporation.

4. Project Schedule

Item	Appraisal Estimate	Actual
Date of Contract with Consultants	April 2000	June 2002
Completion of Engineering Designs	April 2000	April 2001
Civil Works Contract		
Date of Award	April 2001	June 2002
Completion of Work	April 2005	December 2005
Equipment and Supplies		
Dates		
First Procurement	June 2003	April 2005
Last Procurement	December 2004	August 2006
Completion of Equipment Installation	April 2005	June 2007
Start of Operations		
Beginning of Start-Up	May 2005	December 2005

Sources: Asian Development Bank and Guizhou Expressway Development Corporation.

5. Project Performance Report Ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
From 24 September 2000 to 31 December 2001	Satisfactory	Satisfactory
From 1 January 2002 to 31 December 2002	Satisfactory	Satisfactory
From 1 January 2003 to 31 December 2003	Satisfactory	Satisfactory
From 1 January 2004 to 31 December 2004	Satisfactory	Satisfactory
From 1 January 2005 to 31 December 2005	Satisfactory	Satisfactory
From 1 January 2006 to 31 December 2006	Satisfactory	Satisfactory
From 1 January 2007 to 31 March 2007	Satisfactory	Satisfactory

Source: Asian Development Bank.

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members ^a
Fact-Finding	7–22 September 1999	7	48	a, b, c, d, e, f, g
Appraisal	4–19 April 2000	6	49	a, b, c, d, f, g
Inception	27–30 May 2001	3	12	a, h, i
Review 1	16–21 November 2002	2	12	a, h
Review 2	21–29 November 2003	4	28	a, h
Midterm Review ^b	22–27 November 2004	6	25	a, h, i, j
Review 3	10–16 September 2005	2	14	a, h
Review 4	12–15 June 2006	2	8	a, h
Review 5	6–7 August 2007	1	2	a
Project Completion Review ^c	22–28 March 2008	4	24	a, h, j, k

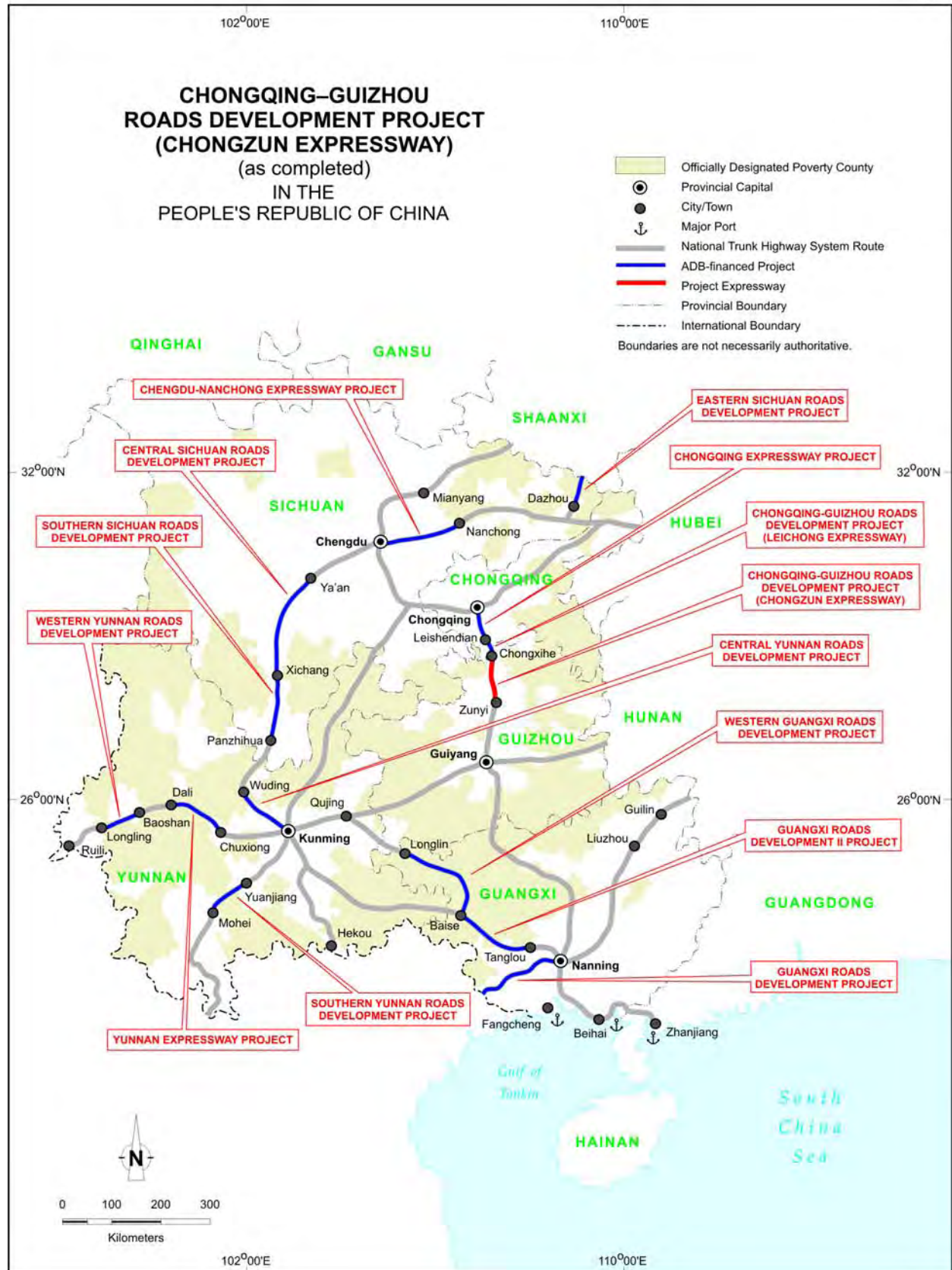
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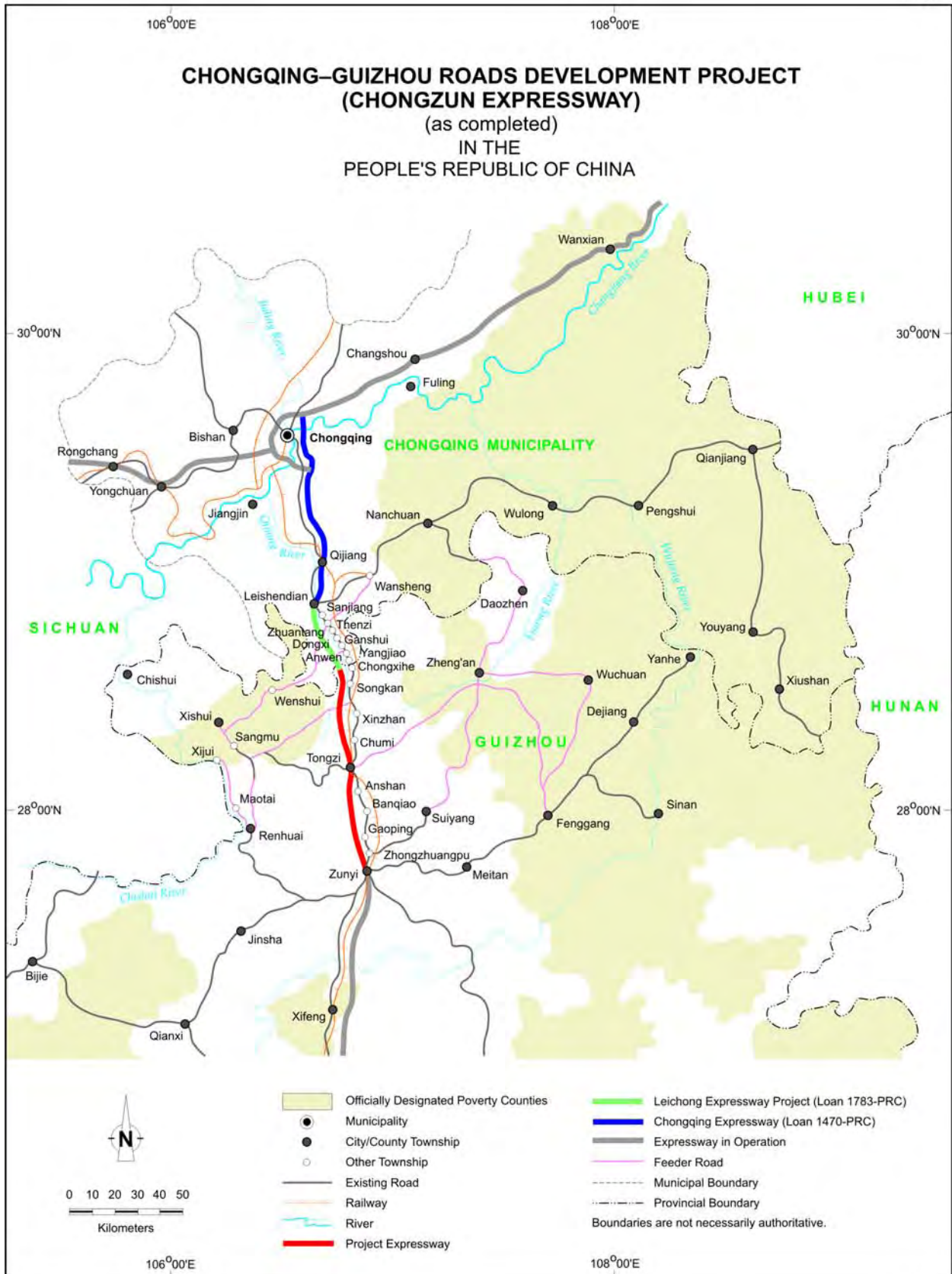
^a a - engineer, b - financial analyst, c - economist, d - program officer, e - environment specialist, f - counsel, g - social specialist, h - assistant project analyst, i - staff consultant, j - resettlement officer, k - finance officer

^b The Chongqing-Guizhou Roads Development Project (Chongzun Expressway) was transferred to the Asian Development Bank Resident Mission in the People's Republic of China (PRCM) for administration on 15 December 2004.

^c The project completion review mission consisted of W. Zhang, senior project officer/mission leader; W. Zhu, resettlement officer; F. Wang, financial management officer; and H. Hao, assistant project analyst.

Source: Asian Development Bank.





I. PROJECT DESCRIPTION

1. Economic growth in the People's Republic of China (PRC) since the 1980s has substantially increased the demand for transport infrastructure. The structure change in the economy and efforts to reduce the imbalance in developments among the coastal provinces and hinterland regions have generated a strong demand for infrastructure that will allow least-cost and direct flow of goods, passengers, capital, and information. To meet the demand, the Government initiated a long-term strategy in 1988 to implement a national trunk highway system (NTHS) about 35,000 kilometers (km) long. By 2004, the strategy had evolved into a plan for a national expressway network (NEN) 85,000 km long to be completed by 2020. With the completion of NEN, all major economic centers and municipalities will be connected by expressway, complemented by a network of local roads. Asian Development Bank (ADB) assistance in the road sector supports the Government's effort to expand and improve the NTHS and local roads network. From 2001 to 2007, the Government spent about CNY3.1 trillion to build new roads. As of end-2007, the total length of the PRC's road network is 3.58 million km, comprising 53,900 km of expressways, 50,100 km of class I highways, 276,400 km of class II highways, 363,900 km of class III highways, 1,791,000 km of class IV highways, and 1,048,300 km of unclassified highways. However, PRC's road network density was about 36 km per 100 km², about half of that in Brazil and less than half of that in India. The Government's policy for the road sector, as reflected in its 11th five-year plan for 2006–2010, called for (i) construction of 380,000 km of new roads to expand the total road network to about 4.0 million km; (ii) building 25,000 km of expressways for a total length of 65,000 km by 2010; (iii) completion of 35,000 km of NTHS by 2007; (iv) completion of 18,000 km of interprovincial western development corridors by 2010; and (v) completion of most sections of NEN by 2010.

2. Guizhou is one of the poorest provinces in the PRC. In 1999, Guizhou's per capita gross domestic product (GDP) was only about one third of the national average, the lowest among 31 provinces and municipalities in the PRC. The Chongzun expressway project is located in the northern part of Guizhou (Map 1 and Map 2). The expressway, which starts at the provincial border with Chongqing municipality and ends at Zunyi city, is an important NTHS section connecting the western provinces with coastal provinces. The Project involved (i) constructing an expressway across mountainous terrain; (ii) upgrading feeder roads linking the expressway with poor counties and townships; (iii) land acquisition and resettlement; and (iv) providing consulting services and training to enhance construction quality, road safety, and project monitoring and evaluation.

3. The principal objective of the Project was to support pro-poor economic growth and social development by enhancing incomes and reducing poverty in Guizhou Province through significant improvements in the road system. The Project was designed to (i) improve access of industrial and agricultural enterprises to markets and the southern seaports, (ii) improve access of the rural population to market opportunities and social services, (iii) attract investment through enhanced transport capacity, and (iv) reduce congestion and accidents on existing roads. The Project also supported sector reforms relating to road safety, vehicle emissions, and corporatization of expressway operations. The project framework is in Appendix 1.¹

4. In 2000, the Guizhou Provincial Communications Department (GPCD) carried out a feasibility study for the Project. At the same time, ADB approved a project preparatory technical

¹ The project framework in Appendix 1 is a consolidated project framework in the *Report and Recommendation of the President to the Board of Directors on Proposed Loans to the People's Republic of China for the Chongqing-Guizhou Roads Development Project* Manila. 2000.

assistance (TA) to review and assess the Project's technical feasibility and financial viability, including environmental impact and resettlement matters. These were completed in March 2001 and the TA outcome confirmed the technical, financial, and economic viability of the Project, and the adequacy of the environmental and social measures to be implemented. Subsequently, fact-finding and appraisal missions verified that the Project was in line with ADB's country strategy and sector policy. ADB's Board of Directors approved a loan for \$200 million for the Project on 21 November 2000. The loan became effective on 24 September 2001. The completion date for the Project was to be 31 March 2005. But due to prolonged procurement of civil works, the Project began construction late in July 2002 and was completed in December 2005, about 9 months behind the appraisal schedule. Further delays in equipment procurement and international training caused the Project's final completion date to be postponed to 31 March 2007. Appendix 2 provides a chronology of major events.

5. At appraisal, the Project comprised (i) constructing the Chongzun Expressway—126 km, four-lane, access-controlled, toll expressways, between Chongxihe (connecting point with the Chongqing component) and Zunyi, including interchanges, tunnels, bridges, and service areas; (ii) upgrading 704 km of feeder roads servicing poor counties and townships; (iii) procuring equipment for toll collection, traffic management and safety, communications, environmental monitoring, vehicle weigh stations, and administration; (iv) implementing land acquisition and resettlement; and (v) providing training and consulting services for construction supervision, traffic safety engineering, and monitoring and evaluation.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

6. ADB's country strategy at the time of appraisal called for the (i) construction of expressways and highways that connect major growth centers and promote linkages with hinterland economies; (ii) integration of the network so that NTHS is supported by a system of feeder 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 Project was designed to better connect western provinces to the coastal provinces, to connect growth centers in the poorest province of the PRC, and to support the development of feeder roads that would give the local population access to economic centers. The Project also included a component to build the capacity of institutions for expressway maintenance, operation, and management.

B. Project Outputs

1. Expressway

7. At appraisal, the project expressway was planned as a four-lane, access-controlled toll expressway with a total length of 126 km. Construction of the expressway civil works began in July 2002, 15 months behind the original schedule of April 2001 at appraisal, due to delayed loan effectiveness, clarifications on bid evaluation, and lengthy domestic procedure for approving detailed design. The civil works were implemented through 17 contract packages. The expressway passed through mountainous terrain with complicated geotechnical conditions. Within a 50 km section in the northern part of the expressway, the lowest point of the alignment

is 420 m above sea level and the highest is 1,450 m. The completed expressway consists of (i) a 117.9 km expressway; (ii) 121 bridges with a total length of 25,606 meters (m); (iii) 18 tunnels with a total length of 19,248 m; (iv) 346 overpasses and underpasses with a total length of 11,241 m; and (v) seven interchanges, three service areas, and two parking lots. In the mean time, civil works for traffic safety, telecommunication, landscaping, and buildings and ancillary facilities were implemented as planned. Despite the long start-up delay, effective measures as using more efficient equipment and advanced technologies were widely adopted and the construction period was shortened from 48 months to 42 months. The project expressway was opened to traffic for trial operation on 26 December 2005, about 9 months late for the estimated date of March 2005 at appraisal.

8. During project implementation, a three-level quality assurance mechanism was set up, with the quality and safety committee headed by the chief supervision engineer to administer and ensure smooth implementation. Contractors, supervision engineers, and resident engineers were given explicit responsibilities. A general engineering supervision office and four resident supervision offices were established. A detailed quality supervision procedure was established and implemented. The Ministry of Communications (MOC) carried out quality inspection for the expressway in April 2004 in the form of independent assessment. No major quality-related issues were identified. Before the trial operation, the executing agency (EA) organized a completion and delivery acceptance inspection and found that the project expressway met all technical requirements stipulated in the highway engineering technical standards issued by MOC. At present, the expressway has qualities for a satisfactory and comfortable ride, and all facilities, including tunnel lighting, ventilation, and traffic sign boards are functional and operating properly. The domestic project completion audit and project completion acceptance missions are scheduled in the second half of 2008.

2. Feeder Roads

9. At appraisal, 13 feeder roads totaling 704 km were identified for upgrading in the influence areas to maximize the project benefits and to improve the accessibility of remote villages. Upgrading started in September 2001 and was completed in 2007. Of the 13 feeder roads, 12 were completed to class III standard before the opening of the project expressway, and 1 was upgraded to class II standard in 2007. Completed feeder roads were integrated into the local road network and were linked with the project expressway through interchanges.

3. Equipment

10. Various equipment for (i) toll collection, traffic monitoring, and communications; (ii) road maintenance, vehicle weigh bridges and safety; and (iii) inspection, testing, and office administration were procured through international competitive bidding (ICB). Procurement started in April 2005 and was completed by December 2006. Delivery and installation were completed in June 2007. All pieces of equipment were installed and are operational. Procurement of equipment was delayed about 5 months compared with the implementation schedule, mainly because the EA was unfamiliar with domestic procedures, and bidding for one package was conducted twice after a failed bidding.

4. Consulting Services and Training

11. An international consulting firm was engaged in accordance with ADB's *Guidelines on the Use of Consultants* to provide 70 person-months consulting services to (i) assist the project management, (ii) provide expertise in bridge and tunnel construction, (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 formulating a human resource development and training program, (vi) help establish and implement a monitoring and evaluation system, (vii) assist in monitoring and assessing the impact on poverty reduction, and (viii) establish the maintenance organization and procedures for the Guizhou expressway network. The international consultant was fielded in July 2002 and the services ended in February 2006 with an actual input of about 68 person-months. In addition, domestic consulting services totaling 9,798 person-months were also engaged, using local procurement procedures acceptable to ADB. The international and national consultants worked closely in the areas of contract management, engineering supervision, material testing, quality control, traffic safety, environment protection, and monitoring. During implementation, the Guizhou Social Science Academy (GASS) was hired as the external monitor for resettlement and social impact.

12. Overseas training for 46 person-months was carried out with the assistance of the international consultant. Training fields included (i) construction management, (ii) project management and contract administration, (iii) tunnel and bridge construction, (iv) financial control and contract management, and (v) environment protection and project administration. Each overseas training group submitted reports on the training. Knowledge acquired was disseminated within the EA and concerned agencies. The EA organized 12 domestic training sessions focusing on construction supervision, quality control, application of Federation Internationale des Ingenieurs-Conseils (FIDIC) standards, tunnel construction, and pavement design. Domestic training had 587 staff participants.

C. Project Costs

13. The total project cost was \$809.00 million, \$25.00 million (or 3.0%) lower than the \$834.00 million estimated at appraisal. Differences between the preliminary design and detailed design resulted in substantial variations. The bill of quantities for civil works increased with total variations of \$74.40 million. However, awarded contract prices for civil works were about 33.0% lower than the cost estimate at appraisal; therefore, the total cost of civil works was lower than the cost estimates at appraisal. Other factors that affected project cost were (i) increased interest during construction and commitment charges, (ii) lower expenses for land acquisition, and (iii) reduced cost for equipment.

14. Under the financing plan envisaged at appraisal, ADB was to provide \$200.0 million (24.0% of the project cost) to finance 56.2% of the foreign exchange cost. The Guizhou provincial government (GPG) was to finance the rest of the foreign exchange cost (\$156.0 million equivalent). The local currency cost of \$478.00 million equivalent was to be financed by MOC (\$172.00 million equivalent) and GPG (\$50.0 million equivalent) through subsidies and domestic bank loans (\$256.0 million equivalent). Upon project completion, the ADB loan for \$173.45 million accounted for 21.4% of actual project costs and 50.4% of actual foreign exchange costs. GPG and China Construction Bank financed the remaining foreign exchange cost. The local currency costs (\$465.00 million equivalent) were financed by MOC (\$172.00 million equivalent) and loans from domestic banks (\$293.00 million equivalent). The domestic funds were mobilized on time. Appendix 3 presents the project costs and financing plan.

D. Disbursements

15. Of the \$200.00 million ADB loan proceeds, the amount of \$173.45 million was disbursed over the period October 2002–July 2007. Reimbursement procedures for civil works and equipment and direct payment for consulting services were adopted. The disbursement control

procedures were followed satisfactorily. Of the total ADB loan, 75.1% was utilized for civil works, 7.0% for equipment, and 1.1% for consulting services, while the balance were capitalized for interest during construction (IDC) and commitment charges. Actual IDC during construction and commitment charge comprised \$71.40 million, higher than that envisaged at appraisal due to the longer implementation period. To accommodate the delay in the start of construction and equipment procurement, the loan closing date was extended twice from 30 September 2005 at appraisal to 31 March 2007. A loan savings of \$26.55 million was cancelled in October 2007. Loan savings were mainly caused by lower contract award prices for civil works and unutilized loan proceeds under the contingency category. The projected and actual disbursements are presented in Appendix 4.

E. Project Schedule

16. Civil works began in July 2002, 15 months behind the appraisal schedule of April 2001 due to delayed loan effectiveness, clarifications on bid evaluation, and lengthy domestic procedures for approving the detailed design. Despite the long start-up delay, the total construction period was shortened from 48 months to 42 months. The project expressway was opened to traffic for trial operation on 26 December 2005, 9 months late compared with 31 March 2005 at appraisal. Procurement for equipment started in April 2005, and delivery and installation were completed in June 2007. Upgrading the feeder roads started in September 2001 and was completed in 2007. Of the 13 feeder roads, 12 were improved before 2006 and one was upgraded in 2007 to better technical standard than envisaged at appraisal. The appraisal and actual project implementation schedules are in Appendix 5.

F. Implementation Arrangements

17. At appraisal, it was envisaged that Guizhou Expressway Development Corporation (GEDC) would be the EA of the Project. GEDC is a state-owned enterprise and is responsible for financing, construction, and management of all expressways in Guizhou Province. GEDC has 14 divisions and 10 project offices, and a staff of 641, of whom 287 are experienced engineers and the others are technicians or administrative staff. There are 89 senior engineers in GEDC. GEDC is now responsible for the construction and management of 17 expressways (933 km) or high-grade highways (class II or class I roads) in Guizhou,. For the project expressway, GEDC established a project office at the site with engineering, supervision, and land acquisition divisions for all implementation tasks. The municipal government of Zunyi and its affiliated counties and districts were responsible for implementing the upgrading of feeder roads.

18. In Guizhou, all expressway operation and maintenance (O&M) tasks were assigned to Guizhou High-Grade Highway Administration Bureau (GHHAB), which is an affiliated agency of Guizhou Provincial Communication Department (GPCD). Under GHHAB are eight expressway management divisions and one expressway maintenance center. All expressway toll revenues were pooled and submitted to GEDC through GHHAB. GHHAB prepared the annual O&M budget and submitted it to GEDC for approval. Under GEDC and GPCD's overall guidance, GHHAB established Zunyi Expressway Management Division (ZEMD) for O&M of the project expressway. ZEMD has five management units: planning and engineering, toll collection, financial management, road property and safety, and administration with 416 staff members and 274 toll collectors. All toll collectors were from counties and townships in the project influence areas. In addition, about 120 affected persons and farmers were employed to clean roads, plant trees or shrubs, and supply other labor inputs. Routine maintenance tasks were assigned to the expressway maintenance center under GHHAB. Major maintenance tasks costing more than

CNY1 million were procured through bidding. The organization chart of the project is in Appendix 6.

G. Conditions and Covenants

19. No covenants were modified or waived during implementation. All loan covenants falling due were complied with or being complied with as of end-March 2008 except for non-compliance with nongovernment financing,² partial compliance with the covenant on land acquisition and resettlement,³ and delayed submission of the audit report for fiscal year 2006. At appraisal, it was expected that nongovernment financing options would be considered before the start of operations. The Project Agreement stipulated that GPCD through GEDC should analyze the feasibility of attracting nongovernment investment funds 6 months before the opening of the project facilities. To date no action has been taken to comply with this covenant. In reality, GEDC, established as a state-owned enterprise, does not have the legal right to transfer its assets to the nongovernment sector. The covenant should have assigned this role to Guizhou State Assets Administration Committee under GPG. There are some possibilities of nongovernment investment in the project expressway in the future. However, in view of current government policy,⁴ nongovernment investment may be interested in other infrastructure projects until the legal framework for the road sector is fully established. The Project Agreement stipulated that a baseline survey of land acquisition and resettlement should be conducted before land acquisition, but the survey was omitted because engagement of the external monitor was delayed. The financial loan covenants—pertaining to debt equity, debt service, working ratio—were assessed to be difficult to comply with before 2009. Compliance with the major loan covenants is presented in Appendix 7.

H. Related Technical Assistance

20. ADB provided a project preparatory technical assistance (TA) for preparing the Chongqing-Guizhou Expressway Project. The TA was to (i) refine the government's feasibility studies in line with ADB's requirements; (ii) identify the need to improve the feeder roads in the project hinterland to extend benefits to poor rural counties; (iii) recommend measures to improve road safety in the municipality and province; (iv) review the environmental impact assessment (EIA) and prepare a summary EIA in ADB's format; (v) carry out a social analysis and formulate a resettlement plan; (vi) carry out a study of the effect of toll levels on traffic flows

² Project Agreement, Schedule, paragraph 10: "Six months prior to the opening of the project facilities, GPCD through GEDC shall analyze the feasibility of attracting non-government investment funds including private sector participation in the operation, maintenance, and management of Chongzun expressway, and report its conclusions to ADB."

³ Project Agreement, Schedule, paragraph 15: "CMG through CMCC and CEDC shall ensure that a local institute carries out independent monitoring and evaluation of implementation of the Resettlement Plan, reports annually during resettlement implementation, and evaluates resettlement achievements, and shall ensure that such independent evaluation shall include a baseline sample household socioeconomic survey before the land is acquired, and survey updates as required in the Resettlement Plan. CEDC shall keep ADB informed of the progress of resettlement activities through quarterly progress reports and through a report to be submitted on completion of the Resettlement Plan and one year thereafter."

⁴ In December 2006, the Ministry of Communications issued a notice to temporarily hold leasing and transferring road operation rights to external investors due to soaring toll road mileages and incomplete legal framework. In addition, the following may be reasons for nonparticipation of the nongovernment sector: (i) adequate public fund, (ii) high risk associated with construction, (iii) inefficient traffic flow in the initial operation period, (iv) lower toll rate, and (v) lack of a legal framework. Nongovernment investors show greater interest in the investment through the shareholding or securities market of these assets based on highways with stable cash flow. This means that the policy dialogue on private participation may focus on how to structure the project company and assets to attract the abovementioned nongovernment investment.

and expressway revenues; and (vii) review the current status of policy reform in the sector and provide the basis for further policy dialogue covering the areas of nongovernment highway financing, corporatization and commercialization of expressways, and road safety. The TA provided 48 person-months of consulting services (20 person-months international and 28 person-months domestic). The TA experienced no delays and produced the required outcome. The subsequent loan processing was based on the TA findings and recommendations. ADB funded the TA as a grant for \$900,000 equivalent.

I. Consultant Recruitment and Procurement

21. **Consulting Services.** International consultants financed by the loan were recruited from an international consulting firm in accordance with ADB's *Guidelines on the Use of Consultants*. ADB approved the contract awards in February 2002. The international consultants were fielded in July 2002 and their services ended in January 2006. The recruitment process was conducted without delay. National consultants for design, construction supervision, and procurement were recruited following local procedures acceptable to ADB.

22. **Procurement of Civil Works.** Civil works for the expressway were divided into 17 contract packages. Each package included subgrade and pavement components. The contracts were procured using ICB in accordance with ADB's *Procurement Guidelines*. The first civil works contract was awarded in April 2002. Due to lengthy domestic processing procedures, the benefits of advance action approved by ADB on 31 March 2000 were not fully utilized. The total contract value of civil works was CNY2,876 million, which was 33.0% lower than the estimate at appraisal. Bidding for and executing the contracts encountered no major issues. National competitive bidding procedures were used in upgrading feeder roads. Contracts for equipment financed by ADB followed ICB procedures. The expressway civil works and equipment packages are shown in Appendix 8.

J. Performance of Consultants, Contractors, and Suppliers

23. The international and domestic consulting firms engaged to assist in project implementation performed satisfactorily and established good working relationships with GEDC. The international consultants organized overseas training programs efficiently and effectively. Well-designed presentations and site visits familiarized trainees from GPCD and GEDC with international practices on expressway design, construction, and management. The international consultants also provided expertise in environment protection and expressway safety measures, and helped integrate these measures into the project. National consultants, jointly working with international consultants, provided satisfactory services in implementing the project.

24. The civil works contractors performed well and completed construction with satisfactory quality about 6 months ahead of the schedule. In April 2004, MOC carried out quality inspection and was highly satisfied with the engineering quality of the project expressway. The domestic design institute was able to design the expressway in accordance with international standards. The civil works, including tunnels, bridges, and pavement, were well implemented. The tunnel facilities, communication, traffic monitoring, and toll collection system all met international standards. Environmental monitoring by national consultants during construction was satisfactory. The expressway also achieved international professional acknowledgment⁵ in 2005.

⁵ Engineering News Record (Vol. 255, no. 8). August 22/29. 2005. Pages 34–35 and 38–39. *Road Building in China's Mountains Is a Tall Order*. McGraw-Hill Information Systems Company.

The overall performance of the consultants, contractors, and suppliers was evaluated as satisfactory.

K. Performance of the Borrower and the Executing Agency

25. GEDC implemented the Project efficiently. Project management during construction was highly efficient. The expressway construction and maintenance practices met international standards. GEDC has sufficient capacity to manage FIDIC-based contracts. Internal project controls were put in place to ensure effective use of funds. An internal auditing unit was established in GEDC. Domestic funds were mobilized on time with no fund shortage during implementation. Withdrawal applications were submitted on time and contractors were paid promptly. In general, land acquisition and resettlement activities were completed on time to the satisfaction of the affected persons. The performance of the Borrower and GEDC were satisfactory.

L. Performance of the Asian Development Bank

26. ADB conducted regular loan review missions during project implementation and provided effective advice to GEDC on project implementation and procurement matters. However, ADB's supervision of resettlement was not carried out on time. ADB's resettlement review was conducted 2 years after completion of major activities on land acquisition and resettlement, which is the reason for the EA's partial compliance with the loan covenant on resettlement. ADB processed procurement efficiently. ADB also processed disbursement requests expeditiously and loan proceeds were disbursed on time. GEDC expressed satisfaction with the transfer of project administration responsibility to the ADB Resident Mission in the PRC (PRCM). The transfer resulted in closer and efficient communications. ADB's performance during project implementation was satisfactory.

III. EVALUATION OF PERFORMANCE

A. Relevance

27. The Project was assessed as highly relevant. It is located in the northern part of Guizhou Province and is the Government's top priority project for NTHS connecting western provinces with major seaports in the coastal provinces. The goal is to support pro-poor economic and social development by increasing incomes and reducing poverty in Guizhou; improving access of industrial and agricultural enterprises to markets and the southern seaports; improving access of the rural population, including those living in poverty counties, to market opportunities and social services; attracting investment by lowering transport costs in the project area; and reducing congestion and accidents on existing roads. The Project is also in line with ADB's past and present operational strategy for PRC's road sector, namely, the construction of highways that connect major growth centers and establish links with hinterland communities; capacity building to improve management efficiency and enhance commercial operation; improvement of highway design and promotion of road safety, private sector participation, and network integration. The Project has contributed partly to expanding the expressways in Guizhou from 311 km in 2001 to 682 km in 2006, and the interconnection of villages and counties with all-weather roads in the province. By 2006, about 65.9% of townships and 89.9% of administrative villages were connected with roads. Guizhou experienced robust economic development with average GDP growth of 10.2% from 2001 to 2005. The project influence area's GDP growth rate in the same period was 12.6%, higher than the average provincial growth rate. The higher growth rate in the project influence area confirmed the economic impacts of the Project.

Significant impacts to the area were also observed in the growing investment, rapid urbanization, and booming service and secondary industries. Accelerated economic development and rapid transformation of the industrial structure in the project influence areas led to improved living standards for residents and contributed to poverty reduction.

B. Effectiveness in Achieving Outcome

28. The Project is evaluated as effective because it (i) has contributed to an improved highway network for the nation and the region, (ii) effectively saves time—reduced travel time from 8 hours to 2 between Zunyi and Chongqing—for people living in the project area, (iii) is effective in both improving road safety and reducing vehicle emissions, and (iv) has contributed to strengthening the capacity of GEDC for construction of expressways.

29. The transport network in Guizhou Province, particularly the high-grade highways, has been improved significantly in the past decade. By the end of 2006, the province had 113,278 km of highways, with 682 km of expressways. Road density was 64 km per 100 km², about two times higher than the country's average. Rural road networks were also improved in the same period. A total of 75,130 km of rural roads were built or improved from 2002 to 2006. By the end of 2006, total rural roads had reached 109,785 km. The project expressway was supplemented by local road networks, including upgraded 704 km of local roads, and was integrated with the rural roads system. In addition, the municipal government of Zunyi launched a master rural roads development program starting from June 2004. As of June 2007, Zunyi had built 964 km of county roads, 97 township roads totaling 2,112 km, and 642 village roads totaling 6,008 km. The total investment for rural roads in Zunyi was about CNY2.17 billion. By 31 December 2007, 3 years ahead of the Government's target, all administrative villages and townships in the project influence areas were linked with paved roads.

30. The Project contributed to economic development and improved living standards in the project areas by (i) shortening from 1 day to 4 hours the round-trip from Zunyi to Chongqing; as a result, Zunyi and Chongqing established an agreement to foster economic cooperation, right after the expressway was opened; (ii) increasing economic, social, and cultural exchanges between local people and outsiders; (iii) boosting investments in industrial projects; (iv) developing many tourist attractions; (v) expanding the service sector including logistics, accommodation, restaurants, and commercial and retail services; (vi) accelerating urbanization in Zunyi; (vii) integrating the local road network with the expressway; and (viii) facilitating the adjustment of agricultural structure along national highway G210 in Tongzi county. The Projects also made skills development opportunities more accessible to farmers and the poor, thus improving their employment options in towns and cities.

31. The Project included safety measures, such as continuous metal guardrails in the median strip, reflective road signs, emergency telephones, and pedestrian bridges and underpasses. The traffic police were equipped with radar speed detectors, mobile weigh bridges, breath analyzers, and mobile cameras with speed recorders. A traffic surveillance system was installed to monitor and provide traffic information at all toll plazas and key locations along the expressway. The information includes road visibility, vehicle speed, emergency telephone usage, speed limit signs, and a message board. In 2006, the 52 accidents on the expressway resulted in 11 fatalities and injuries to 163. These were equivalent to 0.26 accident and 0.06 fatality per million vehicle km, lower than the corresponding 0.28 accident and 0.26 fatality per million vehicle km on the parallel national highway G210. When the expressway operator receives a report of a traffic accident through the emergency telephone, or when patrol units come upon an accident during regular inspection, emergency teams are dispatched to the site

to rescue victims and guide traffic. Vehicle emissions in the corridor were effectively reduced as a result of the transfer of traffic from national highway G210 to the project expressway. Without the expressway, national highway G210 would become more congested, thus reducing travel speeds and increasing vehicle emissions. Comparing emissions from vehicles on the project expressway with emissions from the same vehicles on the national highway in the without-expressway scenario (assuming traffic demand in this corridor remains flat) shows that total vehicle carbon dioxide (CO₂) emissions are about 10% less in the with-expressway scenario.⁶ To ensure that individual emission levels remain within allowable limits, vehicles in Guizhou are periodically inspected. The PRC plans to introduce more stringent vehicle emission standards.

32. GEDC was established as a separate company under the Company Law of the PRC and thus maintained its financial and management independence. Independence ensured strong accountability to the management of GEDC to implement the Project efficiently and manage the expressway effectively. GEDC acquired the capacity for international-standard project management by implementing the Project. Training by international consultants helped GEDC implement the Project in accordance with advanced expressway technical standards. As a result of good project and financial management, the Project cost less than the estimate.

C. Efficiency in Achieving Outcome and Outputs

33. On the basis of financial and economic reevaluations, the Project was rated as efficient.

34. Guizhou, with a population of 39.55.1 million in 2006, is the poorest province in the PRC. Its per capita GDP, rural net income, and urban disposable income, respectively, ranked lowest among 31 provinces since the 1990s. It has undergone robust socioeconomic development since the 1980s, and especially after 2000. Guizhou's GDP growth averaged about 11.0% annually from 2001 to 2006 and rose to CNY228.2 billion in 2006 from CNY113.3 billion in 2001. Per capita GDP rose from CNY2,895 in 2001 to CNY5,787 in 2006. The significant economic accomplishment also spurred development in the road sector.

35. At appraisal, annual average daily traffic (AADT) for the project corridor was projected to be medium truck equivalent (MTE) 5,881 in 2005, MTE 10,751 in 2014 and MTE 16,855 in 2024, with average annual increases of 6.9% in 2005–2015 and 4.6% in 2016–2024. However, actual traffic during the past 2.5 years was lower than the traffic forecast at appraisal. According to the traffic data, the AADT corridor traffic was passenger car unit (PCU) 6,994 in 2005, 8,583 in 2006 and 10,236 in 2007. Of that, traffic on the project expressway was PCU 3,794 in 2005, 4,743 in 2006, and 5,820 in 2007. The lower traffic was mainly due to the upgrading of the highway between Zunyi and Guiyang from 2006 to 2008, which significantly disrupted traffic in the transport corridor. Even under adverse situations, traffic growth rate for the project expressway was higher. The expressway traffic grew by 25% in 2006 and 23% in 2007. The sharp growth in expressway traffic was mainly due to fast socioeconomic development in the project area and completion of the expressway transport corridor, which attracted more through traffic. It was estimated that traffic on the project expressway would maintain an average growth of 22.0% per annum in 2008–2010, 10.0% in 2011–2015, 8.0% in 2016–2020, and 6.0% thereafter. Traffic on national highway G210 would increase annually by 12.0% in 2008–2010, 9.0% in 2011–2015, 4.0% in 2016–2020, and 3.0% in 2021–2025. According to the revised traffic forecast,

⁶ According to the Road Environmental Manual of the PRC, a passenger car's average CO₂ emission rate is 231 grams (g)/km at a speed of 100 km/hour, and 225 g/km at a speed of 60 km/hour. Average travel speed on the project expressway is conservatively estimated to be 100 km/hour, while speed on the national highway is assumed to be 60 km/h. If speed on the national highway is reduced to 50 km/h, the emission rate increases to 238 g/km; hence the total CO₂ reduction is likely to be more than 10%.

expressway traffic would reach AADT 7,549 in 2010, 17,863 in 2020, and 23,905 in 2025. The traffic analysis and forecast are in Appendix 9.

36. Based on the current toll rates and the actual and projected traffic flow, the recalculated financial internal rate of return (FIRR) after income tax was 4.2%, compared with 5.6% estimated at appraisal. The variation was mainly due to lower traffic volumes and lower tariff in the early years of operation and higher costs of major rehabilitation although the actual capital cost is lower than the appraisal estimates. The financial analysis assumed no increase in toll level in real terms, considering that the toll level would be affordable in Guizhou. The after-tax weighted average cost of capital (WACC), in real terms, was calculated as 2.95%. Since the Project's recalculated FIRR was higher than the WACC, the Project is considered financially viable. Sensitivity analysis indicated that the FIRR was very sensitive to traffic changes. A more than 15% negative change in traffic would result in a FIRR lower than the WACC. Detailed calculations for the financial reevaluation are in Appendix 10.

37. The reevaluated economic internal rate of return (EIRR) for the project expressway was 14.1%, compared with the 16.4% estimated at appraisal. The lower EIRR was due mainly to lower traffic in the early years of expressway operations. However, the reevaluated EIRR was still higher than the social discount rate of 12.0%. Thus, the Project is considered economically viable. Sensitivity analysis was carried out to test the impacts of (i) increase in O&M costs, (ii) decrease in benefits, and (iii) a combination of those two scenarios. The analysis showed that the Project would continue to be economically viable in all scenarios. The EIRR was more sensitive to changes in benefits than to changes in O&M costs. The EIRR would be 12.1% if the benefits decrease by 20%. At the worst case of combining a 20% increase in O&M costs and a 20% benefit reduction, the EIRR would be 12.1%, still higher than the social discount rate. Details of the economic reevaluation are in Appendix 11.

D. Preliminary Assessment of Sustainability

38. The Project is likely to be sustainable. The completion of the project expressway and local roads has removed a bottleneck of NTHS, relieved congestion in the project area, and improved the efficiency of road transport in the corridor. It has also given easier access to poor remote villages in the project area. Since the opening of the project expressway, a significant amount of traffic has been diverted from national highway G210. The expressway has contributed to a higher GDP growth rate in Zunyi, and to poverty reduction through robust economic growth. Continued economic growth in the region will ensure a steady stream of toll revenue for GEDC and GPCD, whose established ability to manage the expressway will ensure that the expressway continues to bring positive economic and social development impacts to the project areas.

39. The physical sustainability of the expressway is probable, given the sound engineering technology used in its construction, acknowledgment of achievements by international professional communities (para. 24), and the well-developed technical capacity of GEDC. GEDC is expected to continue practicing good management and sound financial administration in the future. Appendix 12 shows the financial performance of Chongzun expressway and GEDC.

40. GPCD and the local government are committed to developing and maintaining local roads and rural roads networks. In October 2005, the State Council launched a new rural-roads administration policy that aims to improve institutional arrangements, budgeting, and local governments' capacity for road management through outsourcing and market-oriented O&M.

GPCD, through local highway bureaus, is following this new policy, which will ensure the sustainability of the project local roads and rural road networks in the province. With solid fiscal budget support and GPCD's comprehensive administration, county and district governments will be able to keep the rural road network well maintained.

E. Impact

41. During project appraisal, GEDC prepared an environmental impact assessment (EIA). Based on the EIA, a summary EIA (SEIA) was prepared with the assistance of international consultants and circulated to ADB's Board of Directors and made public. The final alignment was selected to minimize construction costs, resettlement costs, and environmental damage. During implementation, environmental monitoring and mitigation measures were carried out in accordance with the EIA and SEIA.

42. The following measures were taken to minimize environmental damage: (i) optimizing the project design to mitigate impacts, (ii) treating the soil excavation and disposal sites, (iii) giving space limits for concrete mixing plants, (iv) streamlining construction procedures and building awareness among workers, and (v) applying advanced technologies to protect slopes. ADB's environmental procedures and guidelines were followed. GEDC appointed the Guizhou Communications Environmental Monitoring Station to monitor the environmental impacts of the Project since early 2003. The station monitored noise, air, and water conditions, and regularly advised GEDC of its findings. Noise level at representative noise-sensitive points met national standards. The results of water quality monitoring showed that the discharge of drains or channels along the expressway did not have any significant impact on the water quality of the receiving rivers. Overall environmental impacts were effectively mitigated.

43. The Project involved substantial land acquisition and resettlement. At appraisal, acquiring an estimated 591.6 hectares (ha) of land was envisaged for the construction of the expressway. In addition, an estimated 108,345 m² of structures would be demolished. At completion, the alignment of the completed expressway shared only about one tenth of the alignment at the feasibility study. Significant alignment change caused actual land acquisition to be 1,126.5 ha, about 190.0% higher than envisaged in the resettlement plan (RP). Meanwhile, the buildings that were actually demolished covered 432,521 m², about 400.0% higher than envisaged in the RP. The demolition caused the resettlement of 5,560 persons in 1,631 households. More land was acquired and more buildings demolished because (i) the alignment was moved to lower terrain and closer to town, and (ii) the RP was based on the feasibility study and had not been updated on the basis of the detailed measurement survey (DMS). Land compensation and resettlement costs were reduced from the estimated CNY362,623,025 to the actual CNY290,109,475 because of the adoption of the least-cost land compensation rates during implementation. About 74.6% of the affected persons were collectively relocated in 42 resettlement sites. Collective resettlement was accompanied by a local rural urbanization development plan. The remaining 25.4% were relocated within their own communities. In general, the new houses were larger with better architecture than the previous dwellings.

44. GASS, an independent domestic agency, was engaged as external monitor to monitor land acquisition and resettlement. The monitoring results showed that incomes of affected persons had not been fully restored compared with those of their non-affected neighbors. According to GASS, the affected persons were inferior to the non-affected neighbors. The monitored sample households had just been restored to their income levels or living standards in 2005. By 2006, the per capita income of the affected households, which was 98.7% in 2001, was 88% of the non-affected;. The objective of livelihood rehabilitation to restore the affected

households to the same level as the non-affected, if not better, was not fully achieved because of the reduced land resources for those affected, and because converting cash compensation into a sustainable restoring modality will take a longer time in such a mountainous area. The Zunyi municipal government was well aware of the status quo of the affected people. The Zunyi municipal county government committed itself to provide the affected people with training, job opportunities, and social security fund, and to assist them in achieving regular incomes. To evaluate the status of income restoration of affected households as of end-2008, a survey report will be prepared and submitted to ADB in March 2009.

45. Land acquisition and resettlement started in 2002 and were completed in 2005. GEDC was responsible for land acquisition and resettlement and Chongzun Expressway Construction Headquarters was established to manage the actual resettlement activities. In Zunyi municipality and three affected counties and districts, resettlement offices were formed to conduct group discussions with affected persons and carry out surveys. Through local county and district offices, GEDC distributed resettlement and compensation funds to the affected persons and entities directly or through township resettlement working groups. Overall, the resettlement was implemented satisfactorily. GASS performed satisfactorily and continuously monitored the sample households from 2002 to 2006.

46. Appendix 13 gives detailed information on land acquisition and resettlement and the results of surveys of the affected persons. Overall impacts of land acquisition and resettlement for the Project were effectively mitigated.

47. The construction of the expressway generated about 2,000 long-term positions for local labor. At peak construction season, about 13,000 local workers were temporarily employed for skilled and labor-intensive positions or to provide services. The operation of the expressway created 416 positions for local residents and another 120 for local labor in the affected villages.

48. The Project contributed much to poverty reduction in Zunyi municipality, particularly in townships along the alignment. Poverty incidence was reduced from 16.5% in 2001 to 12% in 2006. Meanwhile, per capita rural income of Tongzi county increased by 46.1% from 2001 to 2006, and poverty was reduced from 17% in 2001 to 11.8% in 2006. Appendix 14 presents the impacts of socioeconomic development and poverty reduction.

49. From 2001 to 2006, the Zunyi Municipal Ethnic Minority (EM) Development Department, with an accumulated input of CNY11 million implemented 560 projects in the EM counties and townships to develop infrastructure projects. Besides the EM development programs, the state poverty reduction program provided intensive fiscal support to EM counties. From 2001 to 2006, 376 rural roads funded by CNY719 million state bonds were constructed. The Zunyi municipal government initiated a partnership program between 70 agencies and 12 townships and has implemented 132 small-scale infrastructure projects costing CNY23.2 million since 2000. Appendix 15 presents ethnic minority development in Zunyi municipality.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

50. The Project was assessed as successful. It was rated (i) highly relevant to the current government's and ADB's development strategy, (ii) effective in achieving outcomes, (iii) efficient in achieving outcomes and outputs, and (iv) likely to be sustainable. The Project was implemented as planned. Construction of civil works was delayed due to lengthy processing of

procurement, but eventually caught up with the overall schedule. The main objectives of the Project were achieved. The Project removed a bottleneck section of the road transport network in the region and contributed to economic growth in the area. The expressway traffic maintained high growth, and the flow is generating economic benefits as expected. Project benefits were disseminated and trickled down to poor areas along the transport corridor. Both the construction of the expressway and the improvement of local roads were completed with satisfactory quality and in advance of the schedule. Training under the Project was effective. The reevaluated FIRR (4.2%) and the EIRR (14.1%) confirmed the financial and economic viability of the Project.

B. Lessons Learned

51. The bidding documents should have been based on detailed design. Variations in civil works occurred during construction because of changes in detailed design, particularly in foundations, tunnels, and protection works which were based on rough geotechnical information at preliminary design, while actual site investigation presented a different layout. On the basis of lessons and experiences from other road projects, ADB suggested that bidding documents should include detailed design to avoid unnecessary variations. MOC's regulation on bidding incorporated this suggestion, and present road projects carry out bidding after completion of detailed design.

52. The fast growth of the local economy and associated chain impacts caused by completion of a major transport corridor should have been thoroughly envisaged at appraisal. Few toll lanes were set due to terrain constraints at the provincial border with Chongqing. As a result, there has been congestion during peak seasons. Now GEDC has added two more toll lanes to accommodate the growing traffic.

53. The RP should have been based on precise estimates, and ADB's resettlement review should have been timely. The RP should be updated after a detailed measurement survey to assess if adequate provisions and cost adjustments were made. ADB should have supervised the resettlement more effectively to stay informed of the progress and to ensure that implementation complied with the RP. More attention should have been given to resettlement monitoring and timely submission of monitoring reports. Requirements for systematic data collection should be established so that basic data about resettlement is collected on time. That would allow a more comprehensive review and assessment of resettlement during the project completion review.

54. Adopting uniform land compensation rates along the alignment proved unsuitable. In the suburb of Zunyi, the adopted rate was higher than that for other projects in rural areas, but was much lower than that for commercial real estate development projects in the urban area. In future projects, compensation rates should be differentiated by considering land values in different locations.

C. Recommendations

1. Project-Related

55. The debt service coverage ratio will be less than 1.0 from 2008 to 2012, indicating that the project expressway would have serious cash shortage for debt services. GEDC should work out a rescheduled debt scheme to enable the expressway to comply with the debt service coverage ratio of not less than 1.2; otherwise, this covenant cannot be complied with until 2016.

56. **Future Monitoring.** The income of affected households was not fully restored. More favorable policies and measures are being set to evaluate the status of income restoration of affected households. A survey report on income restoration will be prepared and submitted to ADB by March 2009.

57. **Covenants.** Most loan covenants can be maintained in their existing forms except those on financial matters. Covenants should be designed to reflect sector features and financial indicators of roads that might be weak in their early years after completion; however, medium- and long-term financial indicators of road projects are still optimistic. It is suggested that the financial performance of GEDC be monitored to ensure full compliance with financial covenants.

58.. **Timing of the Project Performance Evaluation Report.** It is recommended that the project performance evaluation report be prepared by 2010. After about 4 years of operation, a more objective evaluation of the Project can be made.

59. **Procurement.** The mismatch between domestic and ADB procedures delayed the procurement of equipment, and the loan closing date was extended twice. As PRCM recommended in its procurement review and country portfolio review, harmonization of Government and ADB procurement procedures should be continually explored.

60. **Consulting Services.** Domestic agencies gained enormous expertise in road, bridge, and tunnel design and construction during the past 20 years. It is recommended that the Government and ADB check if consulting services should provide more value-added knowledge in fields such as environment protection, resource and energy saving, and financial management. Current engineering-related inputs might be minimized or nominal, except for tailor-made value-added expertise.

2. General

61. Because of a rough project cost estimate and lower contract prices, \$26.55 million of the loan amount was cancelled. The contingency envisaged at appraisal was not utilized. To ensure effective and efficient use of loan proceeds in future road projects, it is recommended that a more precise project cost estimate be obtained and that the appropriate amount of loan proceeds be allocated to each category.

PROJECT FRAMEWORK^a

Design Summary	Performance Indicators/Targets		Monitoring Mechanisms	Assumption or Risk
	Appraisal	Actual		
<p>Goals</p> <p>1. Promote pro-poor economic growth in Chongqing municipality and Guizhou Province by facilitating trade and attracting investment for the project area.</p> <p>2. Reduce poverty by improving living standards and creating employment in poor and minority counties and townships in the south of Chongqing municipality and north of Guizhou Province.</p> <p>Purpose</p> <p>1. Improve road infrastructure and provide increased capacity for more efficient movement of freight and passengers at lower cost.</p>	<p>Economic growth in affected towns, cities, and counties during 2005–2020. Tonnage of interprovincial and international trade by road. Increase in domestic and foreign direct investment in the project area.</p> <p>Per capita incomes, number of poor people, and access to social services in the counties of the project area</p> <p>6,000 jobs created by expressway construction, 16,000 jobs by feeder road upgrading, and 500 jobs by expressway operation and maintenance</p> <p>About 402,000 people out of poverty by the end of 2015</p> <p>Serious congestion on existing road National Highway (NH) 210 between Leishendian and Zunyi removed through the construction of a four-lane controlled-access expressway</p> <p>North-south corridor capacity increased to 32,000 medium truck equivalents (MTEs) per day at opening in year 2005.</p> <p>Improved access to townships and villages through interchanges to connecting roads and complementary rural road</p>	<p>Gross domestic product (GDP) of Guizhou and Zunyi maintained high growth rates of 10.29% and 12.6%. More investment attracted in the project area.</p> <p>Per capita of Guizhou increased from CNY2,895 in 2001 to CNY 5,787 in 2006. Access to social services was improved.</p> <p>2,000 jobs created for Chongzun expressway construction and 13,000 employment at peak season, 536 jobs created by expressway operation and maintenance</p> <p>Poverty incidence decreased by 16.5% in 2002 to 12.0% 2007 in Zunyi.</p> <p>Travel time was reduced significantly from 1-day trip to 2 hours, and no congestion occurred.</p> <p>Corridor capacity increased to 32,000 MTEs at opening in 2005.</p> <p>Upgrading of local roads completed and Government building more rural roads during 2006–2010</p>	<p>Annual economic reporting at provincial and national levels, municipal and provincial statistical yearbooks, and county statistics</p> <p>Participatory rural appraisal results, monitoring and evaluation, project performance management system</p> <p>Project completion report</p> <p>Traffic counts and travel time survey for expressway and other roads in corridor including existing NH210.</p> <p>Annual reports of transport enterprises. Project completion report.</p>	<p>Continued rapid economic growth in the People's Republic of China, particularly in the southwestern provinces</p> <p>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.</p> <p>Demonstrated implementation capacity of Chongqing Expressway Development Company (CEDC) and Guizhou Expressway Development Corporation (GEDC)</p>

Design Summary	Performance Indicators/Targets		Monitoring Mechanisms	Assumption or Risk
	Appraisal	Actual		
	improvement program			
2. Provide improved access to officially designated poverty and minority counties.	Average travel time between Leishendian and Zunyi (176 km) reduced from 8 to 3 hours in 2005. Reduced vehicle costs and freight and passenger charges in the project area.	Travel time was reduced from 8 hours to 2 hours and travel costs were reduced.	Direct measures of cost and travel time for truck and bus. Direct measures of freight and passenger charges.	Traffic surveys undertake.
	Safer roads in the project area through separation of slow and fast-moving traffic and separation of opposing flows. Improved all-weather access on complementary feeder roads under the program.	Less accident compared with the case in existing national highway G210. Local roads with concrete or asphalt pavement for all-weather access	Accident statistics for road corridor by number and severity Participatory rural appraisal results, project administration missions, and reports of supervision consultants. Direct measurement of cost and time for small truck on road network.	Better traffic enforcement and accident reporting procedures CEDC and GEDC are not responsible for rural socioeconomic development. Local governments below the municipality and provincial levels may not recognize the importance of rural capacity development issues and may not mobilize adequate resources to secure the full impact of improved transportation.
	More reliable and reduced delivery time and lower transport costs for rural and agricultural inputs and outputs.	Achieved	Project performance management system process.	
	Increased volume and higher proportions of high value agricultural products marketed.	Increased production of fruit and other value-added agricultural products.	Agricultural statistics.	
	Increased mobility of the relatively poor and minorities.	Fast development of urbanizations extends social benefits to the poor.	Vehicle registrations.	
	Increased ownership of motorized vehicles in rural communities.	Vehicle ownerships growing fast. Guizhou had 1,453,600 private vehicles by 2007 with a growth of 15.0% over 2006.		
3. Catalyze restructuring of expressway agencies, as corporations improve expressway management, and create conditions to attract private sector financing.	Expansion of CEDC and GEDC and establishment of project companies to manage the expressways.	GEDC is responsible for building, operating and maintaining the expressway.	Annual updates of corporate plans and financial accounts and financial projections for project expressways as part of ongoing monitoring and evaluation by individual project companies. Audits of corporation and project companies.	These companies will build on the experience of the private sector initiatives already existing in Chongqing and Guizhou road sector and actively seek private sector financing.
	Financial self-sufficiency with positive net income within three years of project completion.	GEDC is currently committing to build a dozen roads at the same time.		

Design Summary	Performance Indicators/Targets		Monitoring Mechanisms	Assumption or Risk
	Appraisal	Actual		
Outputs 1.Civil Works and Equipment. a. 176 km of controlled access expressway including 39 km of tunnels (2-lane) and 53 km of bridges, interchanges, link roads service areas, under- and overpasses. b. Completion of about 826 km of feeder road upgrading. c. Equipment for road maintenance and safety, toll collection, communications, traffic management, vehicle weight and emissions testing, and office administration. 2.Consulting Services a. Strengthen CEDC, GEDC, and national consultants' capacity in project management, tunnel design and construction, quality control, traffic engineering and safety, and monitoring and evaluation.	Construction completed and open to traffic by the end of March 2005. Pavement roughness index lowered to < 2m/km. Upgrading completed by 2005 Equipment operational and incident response plans implemented. On-the-job training of CECC and GEDC staff and national consultants. Implementation of a human resources development plan.	Construction completed and opened to traffic in December 2005. Pavement roughness met international standard. Upgrading completed by 2006 and 2007. One feeder was upgraded to better technical standard. Equipment were procured and installed. Equipment for weight based toll was operational. Emergency response plan was prepared and implemented. GEDC carried out on-the-job training and implemented human resources development plan.	Project administration missions, progress reports, and project completion report. Independent review of design by international consultants. Project administration missions, progress reports, and project completion report. Project administration missions, progress reports, and project completion report. Midterm review and project administration missions. Supervision consultants' reports.	Technical difficulty of the Project in mountainous terrain (bridges and tunnels represent 52 percent of the alignment) and complex geological conditions. Implementation capacity of the CEDC and GEDC. Good performance of contractors, and strict construction supervision and quality control. Guizhou Provincial Communications Department (GPCD) plans and coordinates with local governments the timely implementation of provincial and county feeder roads. Funding availability and commitment of local government agencies. Completion of equipment procurement and installation at project opening. Selection of competent consultants who perform well.

Design Summary	Performance Indicators/Targets		Monitoring Mechanisms	Assumption or Risk
	Appraisal	Actual		
b. Establish and upgrade operations, maintenance, and management systems.	Monitoring of operations and maintenance costs Level of service meets international standards.	O&M costs were monitored and managed. Level of services met international practice.	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 feeder roads.	Monitoring and evaluation were carried by consultants and external monitor.	Survey results.	Adequate organizational skills within CEDC and GEDC supplemented by international and national consultants, particularly in social and environmental assessment.
3. Resettlement and Compensation				
a. About 917 ha of land acquired.	Implementation of land acquisition and resettlement plan.	About 1,127 ha of land acquired for Chongzun Expressway Project.	Monitoring and evaluation, project performance management system, and participatory rural appraisal.	Adequate land for new house sites is available within villages for resettlement.
b. 38,000 people resettled including 17,200 losing housing.	Welfare of those resettled reestablished at least to level prevailing before acquisition. Less than 10 percent of resettled people will be transferred to urban areas.	1,631 households were affected. A total of 5,560 resettled people were resettled or transferred to urban areas.	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				
a. Environmental mitigation measures	Implementation and monitoring plan based on summary environmental impact assessment (SEIA) agreed by Executing Agencies (EAs) and then Asian Development Bank. Mitigation measures included in contractors' contracts.	SEIA was implemented and monitored.	Project administration missions, project completion report, monitoring and evaluation.	No unexpected environmental effects. Commitment of EAs, supervision consultants, and contractors to implementation of mitigation measures. Environmental mitigation implementation plan designed and included in contract documents.
b. Pilot modeling study of travel emissions.	Air quality within national standards.	Surveyed air quality was within class II national standards.	Actual measurements before and after construction.	

Design Summary	Performance Indicators/Targets		Monitoring Mechanisms	Assumption or Risk
	Appraisal	Actual		
8.Acquire land, agree on compensation levels, restore livelihoods, and replace lost assets.	Resettlement plan and compensation measures completed by November 2000. Minimized relocation in final alignment selection and interchange design.	Land acquisition and demolition were higher than RP.	Project midterm review and project administration missions. EAs' and consultant's reports. 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.	Measures were taking to mitigate adverse environment impacts.	Environmental monitoring reports and management by trained staff from relevant offices, EAs and national consultants.	Cooperation and coordination between EAs and consultants. Adequate environmental monitoring.

ADB = Asian Development Bank, CEDC = Chongqing Expressway Development Company, CMCC = Chongqing Municipal Communications Commission, CMG = Chongqing municipal government, EA = executing agency, GEDC = Guizhou Expressway Development Corporation, GPCD = Guizhou Provincial Communications Department, GPG = Guizhou provincial government, MOC = Ministry of Communications, NH = national highway, PRC = People's Republic of China, SEIA = summary environmental impact assessment.

Note:

^a Project frameworks for Loan 1783 and Loan 1784 were consolidated into one project framework in ADB, 2000. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Chongqing-Guizhou Roads Development Project*. Manila.

Source: Asian Development Bank.

CHRONOLOGY OF MAJOR EVENTS

Year	Date	Event	
1998	26 November	Approval of project preparatory technical assistance	
1999	7–22 September	Fact-Finding Mission fielded	
2000	31 March	Management Review Meeting held	
	4–19 April	Appraisal Mission fielded	
	15 May	Procurement notice published on China Daily and People's Daily	
	5 June	Staff Review Committee Meeting held	
	14–18 August	Loan negotiations held	
	31 October	Board circulation	
	21 November	Loan approval	
	2001	17 April	Project preliminary design approved
		27–30 May	Inception Mission fielded
26 June		Loan Agreement signed	
24 September		Loan effectiveness	
20 November		Bids opening for civil works packages	
2002	6 February	Contract for consulting services approved	
	17 April	First civil works contract approved	
	25 June	Civil work contracts signed	
	1 July	Start of construction of civil works	
	31 July	Interest rate changed to LIBOR-based on the request of GEDC	
	4 November	First disbursement	
	16–21 November	Loan Review Mission fielded	
2003	11 February	GPCD carried out quality inspection	
	4 April	GCSS carried out quality inspection	
	21–29 November	Loan Review Mission fielded	
2004	15 April	MOC carried out quality inspection	
	10 June	Girder of Chumi bridge installed by turning 90 degrees	
	29 June	Qingangshao tunnel (3,560 meters) went through	
	28 July	Liangfengya tunnel (4,107 meters).went through	
	13 August	Girder of Anshan bridge (9,498 tons) installed by turning 90 degrees	
	18 August	GCSS carried out quality inspection	
	22–27 November	Midterm Review Mission fielded	
	15 December	Transfer of the project administration to PRCM	
2005	21 March	First extension of loan closing date approved	
	4 April	First equipment contract approved	
	15 May	First repayment of loan principal	

Year	Date	Event
	28 June	GPCD and GEDC carried out engineering acceptance mission
	1 July	South section of the project expressway opened to traffic
	25 July	GEDC carried out engineering quality inspection
	10 August	GPCD carried out safety and quality inspection
	10–16 September	Loan Review Mission fielded
	15 November	Second repayment of loan principal
	20 December	GPCD and GEDC conducted acceptance inspection mission
	26 December	Project expressway opened to traffic for trial operation
2006	12–15 June	Loan Review Mission fielded
	25 August	Last equipment contract approved
	18 September	Second extension of loan closing date approved
2007	6–7 August	Loan Review Mission fielded
	22 October	Cancellation of loan savings and actual loan closing date
2008	22–28 March	Project Completion Review Mission fielded

GCSS = Guizhou Communications Supervision Station, GPCD = Guizhou Provincial Communications Department, GEDC = Guizhou Expressway Development Corporation, LIBOR = London interbank offered rate, MOC = Ministry of Communications, PRCM = Asian Development Bank Resident Mission in the People's Republic of China.
Sources: Asian Development Bank and Guizhou Expressway Development Corporation.

PROJECT COSTS AND FINANCING PLAN

Table 3.1: Appraised and Actual Project Costs
(\$ million)

Item	Appraisal			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
A. Base Cost						
1. Expressway Civil Works	243.00	274.00	517.00	271.90	319.50	591.40
2. Buildings and Ancillary Facilities	5.70	5.60	11.30	5.70	5.60	11.30
3. Equipment	15.90	14.10	30.00	14.00	14.10	28.10
4. Land Acquisition and Resettlement	0.00	43.80	43.80	0.00	41.00	41.00
5. Consulting Services and Training	2.50	10.50	13.00	2.30	11.10	13.40
6. Feeder Road Upgrading	15.70	36.70	52.40	15.70	36.70	52.40
Subtotal (A)	282.80	384.70	667.50	309.60	428.00	737.60
B. Contingencies						
1. Physical Contingencies	28.30	38.50	66.80	0.00	0.00	0.00
2. Price Escalation	20.10	27.40	47.50	0.00	0.00	0.00
Subtotal (B)	48.40	65.90	114.30	0.00	0.00	0.00
Interest and Other Charges						
C. During Construction and Front-End Fee	24.80	27.40	52.20	34.10	37.30	71.40
Total (A+B+C)	356.00	478.00	834.00	344.00	465.00	809.00

Sources: Asian Development Bank and Guizhou Expressway Development Corporation.

Table A3.2: Financing Plan
(\$ million)

Source	Appraised			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
Asian Development Bank	200.00	0.00	200.00	173.45	0.00	173.45
Ministry of Communications	0.00	172.00	172.00	0.00	172.00	172.00
Provincial Government	156.00	50.00	206.00	114.00	0.00	114.00
China Development Bank	0.00	171.00	171.00	0.00	160.00	160.00
China Construction Bank	0.00	85.00	85.00	56.55	133.00	189.55
Total	356.00	478.00	834.00	344.00	465.00	809.00

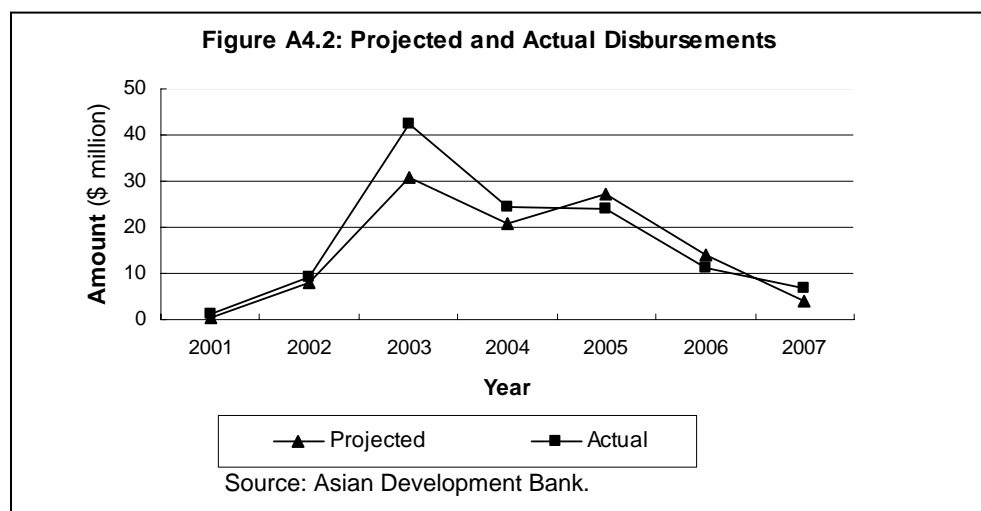
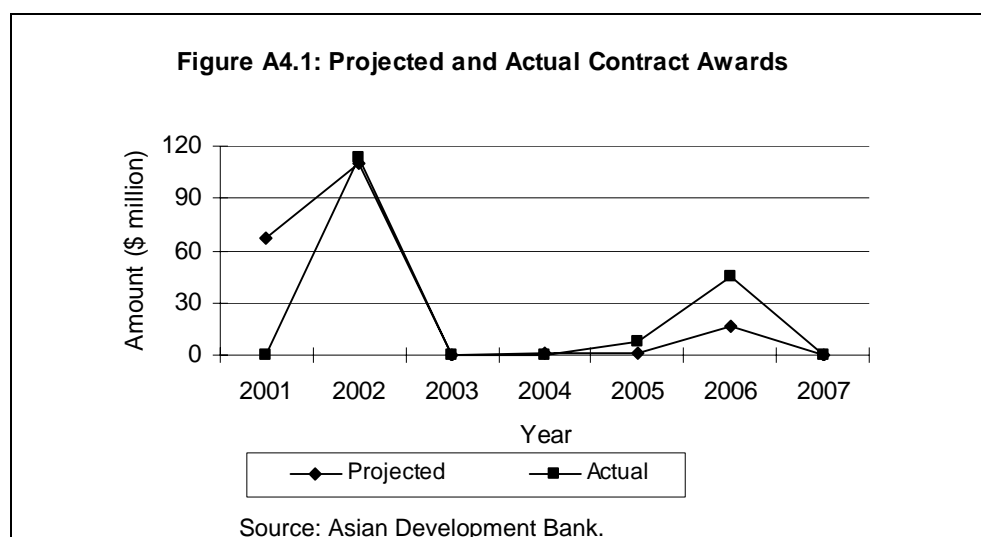
Sources: Asian Development Bank and Guizhou Expressway Development Corporation.

PROJECTED AND ACTUAL CONTRACT AWARDS AND DISBURSEMENTS

Table A4.1: Projected and Actual Contract Awards and Disbursements
(\$ million)

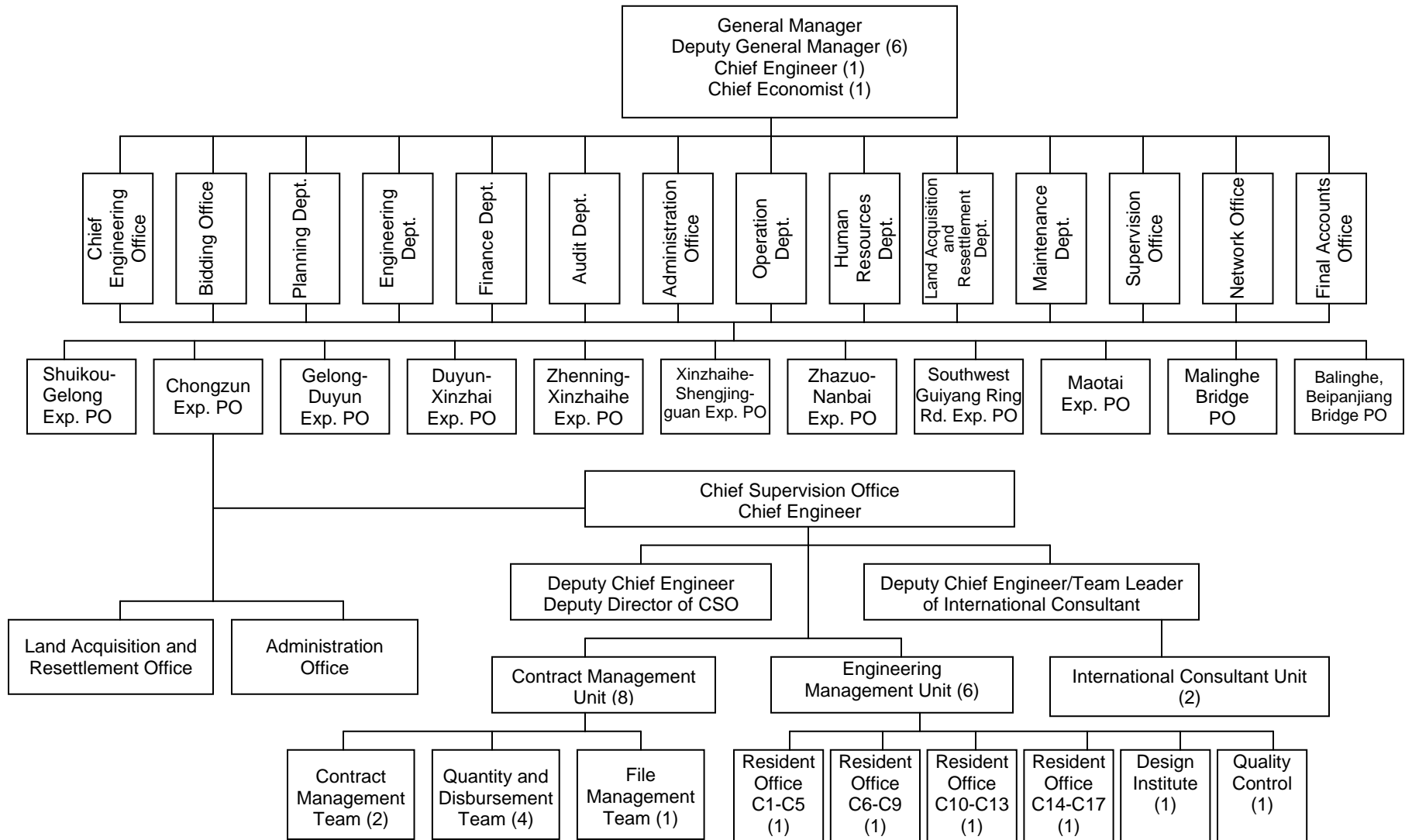
Year	Contract Awards			Disbursements		
	Projected	Actual	Actual/Projected (%)	Projected	Actual	Actual/Projected (%)
2001	67.5	0.0	0.0	0.3	2.1	689.0
2002	110.0	113.6	103.3	11.0	0.9	8.2
2003	0.0	0.0	0.0	23.6	50.3	213.1
2004	1.5	0.0	0.0	48.0	56.8	118.3
2005	1.6	7.5	468.8	52.0	35.4	68.1
2006	16.5	45.3	274.5	22.0	9.7	44.1
2007	0.0	0.0	0.0	28.0	18.2	65.0
Total	197.1	166.4	84.4	184.9	173.4	93.8

Source: Asian Development Bank.



ORGANIZATION CHART OF THE PROJECT

Figure A6.1: Organization Chart of Guizhou Expressway Development Corporation

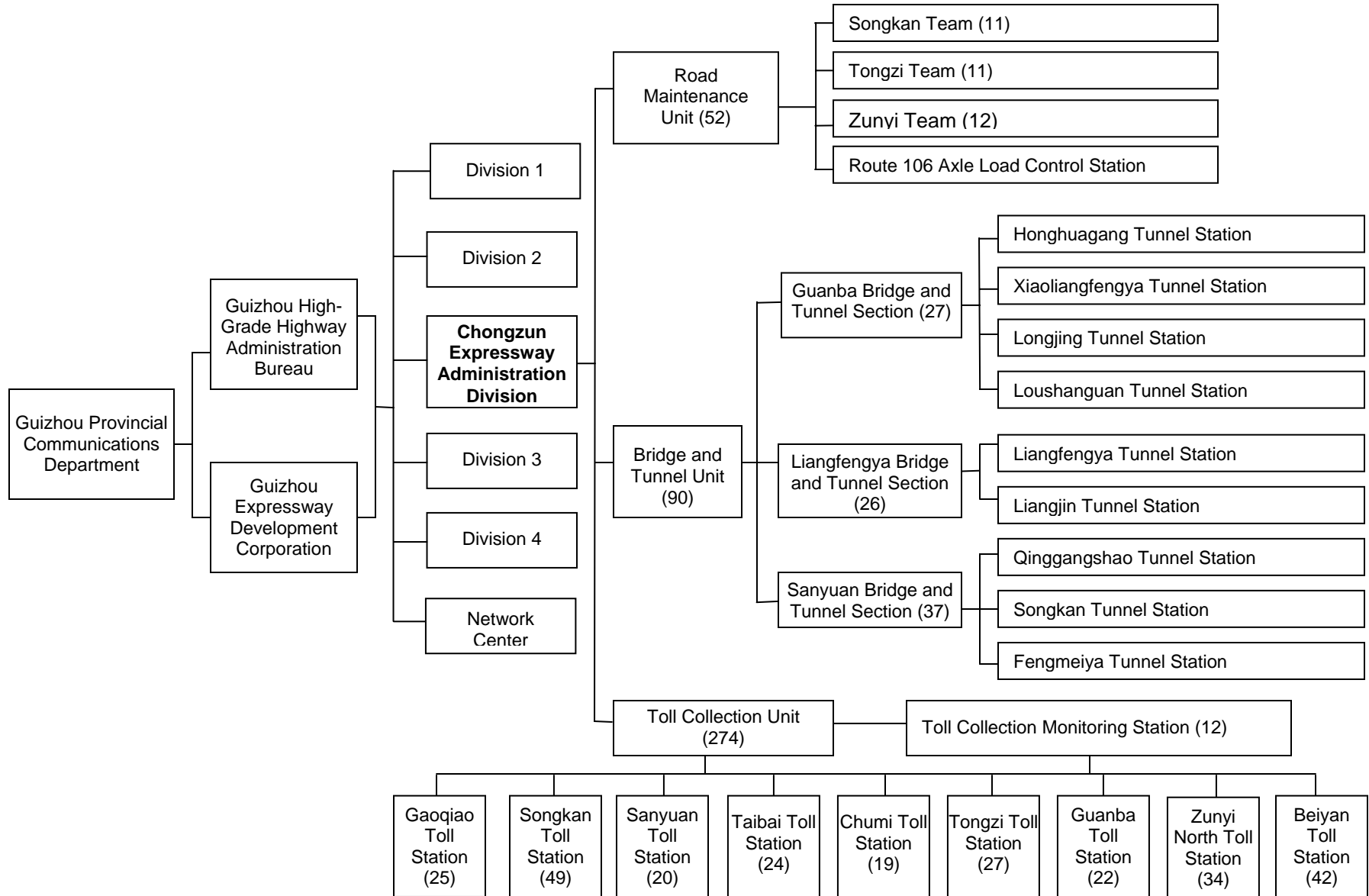


C = contract package, CSO = chief supervision office, Dept. = department, Exp. = expressway, PO = project office, Rd. = road.

Note: Numbers in parentheses show the number of staff in the division.

Source: Guizhou Expressway Development Corporation.

Figure A6.2: Organization Chart of Chongzun Expressway Administration Division



Note: Numbers in parentheses show the number of staff in the division.

Source: Guizhou Expressway Development Corporation.

COMPLIANCE WITH LOAN COVENANTS

Covenants	Reference to Loan Documents	Status of Compliance
The Borrower shall cause GPG, and through GPG cause GEDC, to carry out the Project with due diligence and efficiency and in conformity with sound administrative, financial, engineering, environmental and expressway construction and operation and maintenance practices. In the carrying out the Project and operation of the Project facilities, the Borrower shall perform, or cause to be performed, all obligations set forth in Schedule 6 to this Loan Agreement.	LA, Section 4.01 (a)–(b)	Complied with.
The Borrower shall make available to GPG, and through GPG to GEDC, promptly as needed and on terms and conditions acceptable to ADB, the funds, facilities, services, land and other resources which are required, in addition to the proceeds of the Loan, for the carrying out of the Project.	LA, Section 4.02	Complied with
The Borrower shall ensure that the activities of its departments and agencies with respect to the carrying out the Project and operation of the Project facilities are conducted and coordinated in accordance with sound administrative policies and procedures.	LA, Section 4.03	Complied with
The Borrower shall furnish, or cause to be furnished, to ADB all such reports and information as ADB shall reasonably request concerning (i) the Loan, the expenditure of the proceeds and maintenance of the service thereof; (ii) the goods and services and other items of expenditure financed out of the proceeds of the Loan; (iii) the Project; (iv) the administration, operations and financial condition of GPG and any other agencies of the Borrower responsible for the carrying out of the Project and operation of the Project facilities, or any part thereof; (v) financial and economic conditions in the territory of the Borrower and the international balance-of-payments position of the Borrower; and (vi) any other matters relating to the purposes of the Loan.	LA, Section 4.04	Complied with
The Borrower shall enable ADB's representatives to inspect the Project, the goods financed out of the proceeds of the Loan, and any relevant records and documents.	LA, Section 4.05	Complied with

Covenants	Reference to Loan Documents	Status of Compliance
<p>The Borrower shall take all action which shall be necessary on its part to enable GPG and GEDC to perform their obligations under the Project Agreement, including the establishment and maintenance of tariffs as stipulated in paragraph 5 of Schedule to the Project Agreement, and shall not take or permit any action which would interfere with the performance of such obligations.</p>	LA, Section 4.06	Complied with
<p>The Borrower shall cause GPG to exercise its rights under the Onlending Agreement in such a manner as to protect the interests of the Borrower, GPG and ADB and to accomplish the purposes of the Loan. The Borrower shall ensure through GPG that rights or obligations under the Onlending Agreement shall not be assigned, amended, abrogated or waived with out the prior concurrence of ADB.</p>	LA, Section 4.07 (a)–(b)	Complied with
<p>(a) It is the mutual intention of the Borrower and ADB that no other external debt owed a creditor other than ADB shall have any priority over the Loan by way of a lien on the assets of the Borrower. To that end, the Borrower undertakes (i) that, except as ADB may otherwise agree, if any lien shall be created on any assets of the Borrower as security for any external debt, such lien will <u>ipso facto</u> equally and ratably secure the payment of the principal of, and interest and other charges on, the Loan; and (ii) that the Borrower, in creating or permitting the creation of any such lien, will make express provision to that effect; provided, however, that if for any constitutional or other legal reason, such provision cannot be made with respect to any lien on assets of its political subdivision, the Borrower shall, at no cost to the and, promptly secure the principal of, and interest and other charges on, the Loan by an equivalent lien on assets of the Borrower satisfactory to ADB.</p>	LA, Section 4.08	Complied with
<p>(b) The provisions of paragraph (a) of this Section shall not apply to (i) any lien created on property, at the time of purchase thereof, solely as security for payment of the purchase price of such property; or (ii) any lien arising in the ordinary course of banking transactions and securing a debt maturing not more than one year after its date.</p>	LA, Section 4.08	Complied with

Covenants	Reference to Loan Documents	Status of Compliance	
<p>(c) The term “assets of the Borrower” as used in paragraph (a) of this Section includes assets of any political subdivision or any agency of the Borrower and assets of any agency of any such political subdivision, including the People’s Bank of China and any other institution performing the functions of a central bank for the Borrower.</p>	LA, Section 4.08	Complied with	
<p>Change in Ownership</p>	<p>In the event that (i) any change in ownership of the Project facilities; or (ii) any sale, transfer, or assignment of GPG’s and GEDC’s interest in Leichong expressway, is anticipated, the Borrower shall, and shall ensure that GPG and GEDC shall consult ADB at least six months prior to the implementation of such change. The Borrower shall ensure that any proposed change in the ownership of the Project facilities is carried out in a transparent manner.</p>	LA, Schedule 6, para. 1	Complied with
<p>Coordination with Chongqing Municipal Government</p>	<p>The Borrower shall ensure that GPG shall coordinate with Chongqing Municipal Government to complete the construction of Chongzun expressway at about the same time as that of Leichong expressway and ensure that Chongzun expressway and Leichong expressway meet the same technical and safety standards as acceptable to ADB.</p>	LA, Schedule 6, para. 2	Complied with
<p>Counterpart Financing</p>	<p>GEDC shall obtain, on a timely basis, all funds and resources necessary for construction, operation and maintenance, and management of the Chongzun expressway. GPG shall take all necessary measures; including making available additional funds, to ensure that GEDC can successfully construct the Chongzun expressway, and operate and manage it after completion. GPG shall, through and GPCD, to take all necessary measures, including making available funds to the relevant prefecture and county communication bureaus, to ensure that the feeder road upgrading is completed before opening Chongzun expressway.</p>	PA, Schedule para. 1–2	Complied with

Covenants	Reference to Loan Documents	Status of Compliance
<p>Construction Quality GEDC shall ensure that Chongzun expressway is constructed in accordance with MOC's Technical Standards of Highway engineering and taking into account the Highway Design Manual developed under ADB-financed TA 2527-PRC, and that construction supervision, quality control, and contract management are performed in accordance with national standards and internationally accepted practices. GPC, through GPCD, shall ensure that the feeder roads under the Project are upgraded in accordance with appropriate Government standards.</p>	PA, Schedule Para. 3	Complied with
<p>Road Safety To ensure safe road facilities, GPG and GEDC, shall implement the road safety signage, communication, hazard barriers, traffic monitoring, vehicle weighing, and other design features of the Project facilities. GPG and GEDC shall ensure that highway patrol unit or public security bureaus cooperate closely to implement all road safety measures and that Chongzun expressway is adequately patrolled. Prior to opening Chongzun expressway, GEDC shall submit a report on their emergency response system to ADB for review.</p>	PA, Schedule para. 4	Complied with
<p>Tolls GPG and GEDC shall ensure the tolls for Chongzun expressway be set at levels sufficient to fully satisfy debt service obligations, operation and maintenance costs, and depreciation in excess of debt service, and go generate a reasonable return on assets as adjusted from time to time for inflation. Six months prior to opening of Chongzun expressway, GPCD through GEDC shall prepare and submit for ADB's concurrence a report on the proposed toll structure and levels, prior to submission of the application for GPG's approval. For the first five years of operation, GPCD through GEDC shall review the toll structure and levels annually and submit a report to ADB. If an adjustment of the toll levels is required in accordance with the above-mentioned principle, GPCD through GEDC shall submit for ADB's concurrence the toll adjustment plan, prior to finalizing and submitting the plan to GPG for their approval.</p>	PA, Schedule para. 5	Complied with

Covenants	Reference to Loan Documents	Status of Compliance
<p>Governance To promote good governance, GPCD shall maintain the internal audit unit within GEDC during the construction and operation of the Project. GPCD shall provide the international consultant recruited as the team leader-cum-assistant chief supervision engineer with all the necessary powers to review and certify variation orders and contractors' monthly payments, prior to their approval by the Chief Supervision Engineer.</p>	PA, Schedule para. 6	Complied with
<p>Financial Ratio To ensure its financial sustainability, GEDC shall maintain for the project expressway (i) a ratio of equity to debt of not less than 60:40 from the 4th fiscal year of the full operation of Chongzun expressway; (ii) a working ratio (operation and annual, but excluding periodic, maintenance cost, to revenue) of not more than 12 percent during the period of Chongzun expressway operation; and (iii) a debt-service ratio of not less than 1.2 during the period of the project expressway operation except for the first 3 years of operation. GEDC shall also maintain their debt-service ratio of not less than 1.2 from 2008 onward or the fourth year of operation of the project expressway, whichever earlier.</p>	PA, Schedule Section 2.16–2.19	Being complied with
<p>Financial Reporting GEDC shall provide ADB annually with audited project accounts and financial statements of the project expressway, during project implementation and for the first five years of operation. GEDC shall also provide their audited overall annual financial statements during construction and for the first five years of operation of the project expressway. Such statements, including the project account, income statement, funds statement, and balance sheet, shall be audited by independent auditors. The audited accounts and financial statements shall be submitted to ADB within nine months of the end of each related fiscal year.</p>	PA, Section 2.09	Partially complied with. Audit report for fiscal year 2006 was submitted late.
<p>Human Resource Development and Training GEDC in consultation with GPCD shall prepare a human resource development plan based on its future requirements and corporate strategy. International training shall be provided for selected staff related to</p>	PA, Schedule para. 9	Complied with

Covenants	Reference to Loan Documents	Status of Compliance
<p>Project activities. Prior to undertaking international training financed under the loan, GEDC shall prepare for the concurrence of ADB (i) a training plan and a list of candidates nominated for international training; (ii) a program of workshops to be delivered at GEDC by those trained internationally; and (iii) a list of training equipment and aids required to strengthen GEDC's domestic training programs. Upon completion of each workshop, GEDC shall provide ADB with an evaluation of the international training and the workshop, and identify subjects that are appropriate for formal incorporation into GEDC's regular staff training curricula.</p>		
<p>Non-Government Financing Six months prior to the opening of the project facilities, GPCD through GEDC shall analyze the feasibility of attracting non-government investment funds including private sector participation in the operation, maintenance, and management of Chongzun expressway, and report its conclusions to ADB.</p>	PA, Schedule para, 10	Not complied with
<p>Environment GPG, through GPCD and GEDC, shall ensure that Chongzun expressway is constructed and operated in accordance with national and local government environmental procedures and guidelines. GEDC shall also ensure that any adverse environmental impacts arising from construction and operation of Chongzun expressway shall be minimized by implementing the mitigation measures, environmental monitoring program, and other recommendations presented in the EIA. GPCD, together with the provincial and county environmental protection bureaus, shall ensure that the provincial and county feeder roads are constructed and operated in accordance with the appropriate national and local government environmental procedures and guidelines.</p>	PA, Schedule para. 11	Complied with
<p>Land Acquisition and Resettlement GPG shall ensure that all land and rights-of-way required for the Project are made available in a timely manner. GPG, through GPCD, and GEDC shall ensure that the RP agreed with ADB is carried out promptly and efficiently in</p>	PA, Schedule para. 12–15	Complied with GEDC will prepare and submit an

Covenants	Reference to Loan Documents	Status of Compliance	
<p>line with the Borrower's Land Administration Law, other relevant Government regulations, and ADB's Policy on Involuntary Resettlement. GPG shall ensure that all persons are compensated in a timely manner and shall guarantee that sufficient budget shall be made available to meet the resettlement plan objectives. GPG shall ensure that all affected people are consulted and their concerns addressed at least two months before ground clearing commences. GPG, through GEDC, shall ensure that the resettlement required for the provincial and county feeder roads also ensures that those affected people are at least as well off as they would have been in the absence of the Project. GPG, through GPCD shall ensure that a local institute carries out independent monitoring and evaluation of implementation of the Resettlement Plan, reports annually during resettlement implementation, and evaluates resettlement achievements, and shall ensure that such independent evaluation shall include a baseline sample household socioeconomic survey before the land is acquired, and survey updates as required in the Resettlement Plan. GPCD, through GEDC, shall keep ADB informed of the progress of resettlement activities through quarterly progress reports and through a report to be submitted on completion of the RP and one year thereafter.</p>		<p>additional evaluation of income restoration of affected people in March 2009.</p>	
<p>Minority People</p>	<p>GPCD, through GEDC, shall implement the agreed measures, including consultation, monitoring, and evaluation, to maximize the project benefits to the minorities and to encourage minority peoples living in the project area to participate in planning and implementation the Project as described in the minority peoples' development plan in accordance with ADB's applicable policy. In particular, GPCD, through GEDC, shall consult closely with the minority and religious bureaus and the poverty alleviation offices of Guizhou Province and Zunyi Municipality, and minority representatives at Tongzi, Daozhen, and Wuchuan counties; township; and village levels to address the preferences of affected minority households. GPCD, through GEDC, shall monitor effects of the Project on minorities during and after project implementation through the project performance management system.</p>	<p>PA, Schedule para. 16</p>	<p>Complied with</p>

Covenants	Reference to Loan Documents	Status of Compliance
<p>Gender and Development GPG through GPCD, and GEDC shall follow ADB's Policy on Gender and Development during implementation of the Project, and take all necessary actions to encourage women living in the Project area to participate in planning and implementing the Project, including construction work. GPG through GPCD shall monitor the 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 municipal and local levels</p>	PA, Schedule para. 17	Complied with
<p>Health Risks GPCD, and GEDC, together with the appropriate authorities, shall ensure that contractors disseminate information on the risks of socially transmitted diseases to those employed during Project implementation. GPCD, and GEDC, shall also ensure that similar information is disseminated to transport operators during operation of the Project facilities.</p>	PA, Schedule para. 18	Complied with
<p>Axle Loads GPCD, through GEDC, shall take appropriate measures to prevent overloading on Chongzun expressway by installing vehicle axle weighing equipment at selected entry points. GPCD through GEDC shall make suitable arrangements with the public security bureau for operation of such equipment. GEDC shall submit to ADB before opening Chongzun expressway, the plan for operation of the vehicle weigh stations, including a statement of the axle load limits and penalties for their infringement.</p>	PA, Schedule para. 19	Complied with
<p>Vehicle Emissions GEDC shall cooperate with and assist the concerned environmental protection bureau(s) in controlling vehicle emissions on Chongzun expressway. GEDC shall submit to ADB, before opening Chongzun expressway, a statement of the emission regulation limits, penalties for their infringement, and the plan for operation of the vehicle emissions testing stations.</p>	PA, Schedule para. 20	Complied with

Covenants	Reference to Loan Documents	Status of Compliance
<p>Monitoring and Evaluation GPCD, and GEDC, shall monitor and evaluate Project impacts through a monitoring and evaluation system to ensure that the Project facilities are managed effectively and the benefits are maximized. GPCD, through GEDC, shall collect data agreed with ADB prior to implementation, at completion, and one year and three years later.</p>	PA, Schedule para. 21	Partially complied with. Baseline survey not conducted before land acquisition.
<p>Change in Ownership In the event that (i) any change in ownership of the Project facilities, or (ii) any sale, transfer, or assignment of of GPG's and GPCD's interest in Chongzun expressway, is anticipated, each GPG and GEDC, shall consult ADB at least six months prior to the implementation of such change. GPG, and GEDC, shall ensure that any proposed change in the ownership of the Project facilities is carried out in a transparent manner.</p>	PA. Schedule para. 23	Complied with

ADB = Asian Development Bank, EIA = environment impact assessment, GEDC = Guizhou Expressway Development Corporation, GPCD = Guizhou Provincial Communications Department, GPG = Guizhou Provincial Government, LA = Loan Agreement, MOC = Ministry of Communications, PA = Project Agreement, para. = paragraph, PRC = People's Republic of China, TA = technical assistance.
Source: Asian Development Bank.

DETAILS OF PACKAGES FOR CIVIL WORKS AND EQUIPMENT

Table A8.1: Expressway Civil Works

No.	Contractor	Mode of Procurement	Contract Date	Country	Original Contract Amount (CNY)	Variations (CNY)	Final Contract Amount (CNY)
C1	The First Engineering Bureau of MOR	ICB	25 June 2002	PRC	164,410,760	70,017,196	234,427,956
C2	The Zhongtie Twentieth Engineering Bureau	ICB	25 June 2002	PRC	194,930,936	88,234,587	283,165,523
C3	The Second Highway Engineering Bureau of Road and Bridge Group	ICB	25 June 2002	PRC	248,041,185	87,928,015	335,969,200
C4	China Road and Bridge Corporation	ICB	25 June 2002	PRC	284,094,755	66,164,811	350,259,566
C5	The Second Department of the Third Eng. Bureau of MOR	ICB	25 June 2002	PRC	205,550,751	102,783,459	308,334,210
C6	Guizhou Provincial Bridge Engineering Corporation	ICB	25 June 2002	PRC	231,438,858	95,118,208	326,557,066
C7	The Third Engineering Department of Zhongtie Sixteenth Engineering Bureau	ICB	25 June 2002	PRC	167,144,350	41,070,295	208,214,645
C8	The Twelfth Bureau Limited Eng. Corporation Group of Chinese Railway	ICB	25 June 2002	PRC	236,427,255	76,543,040	312,970,295
C9	The Third Engineering Department of the Zhongtie Twentieth Engineering Bureau	ICB	25 June 2002	PRC	151,737,531	54,048,345	205,785,876
C10	Guizhou Provincial Road and Bridge Engineering Corporation	ICB	25 June 2002	PRC	118,356,933	59,296,160	177,653,093
C12	Yunnan Highway and Bridge Engineering Division	ICB	25 June 2002	PRC	149,835,139	55,002,795	204,837,934
C13	The Zhongtie Thirteenth Engineering Bureau	ICB	25 June 2002	PRC	76,891,535	65,481,378	142,372,913
C14	Guizhou Provincial Bridge Engineering Corporation	ICB	25 June 2002	PRC	164,065,780	51,045,855	215,111,635
C15	Guizhou Provincial Bridge Engineering Corporation	ICB	25 June 2002	PRC	213,910,572	36,128,540	250,039,112
C16	China Road and Bridge Corporation	ICB	25 June 2002	PRC	94,502,342	28,804,638	123,306,980
C17	Guizhou Provincial Road and Bridge Engineering Corporation	ICB	25 June 2002	PRC	174,795,680	123,158,894	297,954,574
Total					2,876,134,362	1,100,826,216	3,976,960,578

ADB = Asian Development Bank, CNY = yuan, ICB = international competitive bidding, Ltd. = limited, No. = Number, MOR = Ministry of Railways, PRC = People's Republic of China.

Sources: Asian Development Bank and Guizhou Expressway Development Corporation.

Table A8.2: Equipment

No.	Item	Mode of Procurement	Date of Contract	Country	Contractor	Contract Amount
1.	Traffic Engineering Works (Traffic Surveillance, Communications, and Tolling System)	ICB	9 April 2005	PRC	Bright Oceans Corporation	CNY14,733,454.77
2.	Tunnel Electrical and Mechanical Works	ICB	28 June 2005	PRC	Beijing RHY Technology Development Company Limited	CNY16,330,000.00 and \$210,500.00
3.	Tunnel Electrical and Mechanical Works	ICB	19 April 2005	PRC	Shanghai Communications Technology Development Company Limited	CNY14,273,684.10
4.	Tunnel Electrical and Mechanical Works	ICB	19 April 2005	PRC	Guangdong Xinyue Communications Investment Company Limited	CNY13,277,932.30
5.	Asphalt Paver, Cold Road Planer	ICB	5 December 2005	Germany	Wirtgen Hong Kong Limited	€1,056,983.42
6.	Platform Bridge Inspection Vehicle	ICB	5 December 2005	Italy	New Motion Limited	€704,540.00
7.	Slurry Fill Machine VSS, Asphalt Recycling Equipment Bagela	ICB	5 December 2005	PRC	Shanghai Changxing International Trading Company Limited	\$447,621.16.00
8.	Dynamic Strain-meter Collection	ICB	5 December 2005	PRC	Earth Products China Limited	\$1,203,497.00
9.	Vehicular Automatic Deflect Meter	ICB	5 December 2005	PRC	Greatech International Limited	\$600,030.00
10.	Maintenance Equipment (Asphalt Mixing Plant)	ICB	11 August 2006	PRC	Greatech International Limited	\$2,293,000.00

ICB = international competitive bidding, No. = number, PRC = People's Republic of China, VSS = Valley Slurry Seal.
Sources: Asian Development Bank and Guizhou Expressway Development Corporation.

TRAFFIC ANALYSIS AND FORECAST

A. Traffic Analysis

1. At appraisal, the annual average daily traffic (AADT) for the project corridor was projected for each road section and for three key years (2005, 2014, and 2024) on the basis of traffic surveys during project preparation and anticipated socioeconomic development in the Project areas. The corridor traffic was forecast to have an AADT of medium truck equivalent (MTE) 5,881 in 2005, MTE 10,751 in 2014, and MTE 16,855 in 2024, with average annual increase rates of 6.9% in 2005–2015 and 4.6% in 2016–2024. However, the actual corridor traffic in the early years of operation of the project expressway was much lower than projected at appraisal. According to statistics, the corridor traffic had an AADT of passenger car unit (PCU¹) 6,994 in 2005, PCU 8,583 in 2006, and PCU 10,236 in 2007. Of that, the AADT on the project expressway was PCU 3,794 in 2005, PCU 4,743 in 2006, and PCU 5,820 in 2007. One major reason for the lower traffic volume was the upgrading to expressway standard of the existing highway between Guiyang and Zunyi (Guizun highway). The Guizun highway connects the project expressway with the coastal provinces via Guiyang. The upgrading seriously disrupted all local and through traffic. Guizun highway was closed and all traffic had to be diverted to other roads. In particular, most through traffic had to take circuitous and longer routes in neighboring provinces. The upgrading was expected to be completed by the end of 2008 when Guiyang and Chongqing would be connected by a four-lane expressway. Even under such adverse circumstances, traffic growth rates on the project expressway during the last 2 years were still much higher (25% in 2006 and 23% in 2007) than the projections at appraisal. The sharp growth of expressway traffic implied significant impacts due to the completion of a major transportation corridor, removal of a transport bottleneck, fast socioeconomic development in the project influence areas, and attracted as well as diverted through traffic. Table A9.1 presents the actual and revised traffic forecast for the project expressway and existing highway G210. Estimated average traffic growth rates are shown in Table A9.2.

Table A9.1: Actual and Revised Traffic Forecast
(AADT, PCU)

Year	Traffic Forecast at Appraisal	Traffic Forecast at Project Completion Review		
		Expressway	Highway G210	Total
2005	11,761	3,794	3,200	6,994
2006	12,576	4,743	3,840	8,583
2007	13,449	5,820	4,416	10,236
2010	16,444	10,568	6,204	16,772
2015	21,502	17,020	9,546	26,566
2020	26,923	25,008	11,614	36,622
2024	33,710	33,466	13,464	46,930

AADT = annual average daily traffic, PCU = passenger car unit.

Sources: Estimates of Asian Development Bank and Guizhou Expressway Development Corporation.

¹ 1 MTE=2 PCU.

Table A9.2: Estimated Average Annual Traffic Growth Rates
(%)

Year	Growth Rates at Appraisal	Growth Rates at Project Completion Review		
		Expressway	Highway G210	Total
2005–2010	6.9	22	12.0	19.1
2011–2015	6.9	10	9.0	9.6
2016–2020	4.6	8	4.0	6.6
2021–2024	4.6	6	3.0	5.1

Sources: Asian Development Bank and Guizhou Expressway Development Company.

B. Revised Traffic Forecast

2. The project expressway runs through Zunyi municipality, which is in the north of Guizhou Province. The opening of the project expressway has brought substantial socioeconomic development in the project influence areas. The gross domestic product (GDP) per capita in Zunyi municipality increased from CNY3,520 in 2001 to CNY6,239 in 2006. In the mean time, socioeconomic activities continued booming, which resulted in more investment, more traffic, real estate development, and urbanization in the project influence areas. The boom in socioeconomic activities contributes to traffic growth on the project expressway as well as on national highway G210. The project expressway is one section of the national trunk highway GZ50, which is the only completed transport corridor from the western provinces to the coastal provinces and seaports in the southern part of the People's Republic of China (PRC). By the end of 2007, all sections of this transport corridor in Guizhou Province had been completed except for the upgrading of Guizun highway. It is envisaged that more traffic would be generated and induced after full completion of this corridor. Future traffic trends for the project expressway and the parallel national highway were analyzed and estimated according to such factors as actual traffic in recent years, future socioeconomic development in the project influence areas, and overall future traffic demand in the transport corridor. A national survey conducted by the Ministry of Communications in 2003 found that actual traffic in the initial years after the new expressways opened was generally lower than estimated. However, traffic grew rapidly within 3 to 5 years for most expressways in the PRC, except for those in remote regions. ADB-financed road projects showed similar trends.² It was estimated that traffic on the project expressway would increase by an average 22% per annum in 2008–2010, 10% in 2011–2015, 8% in 2016–2020, and 6% thereafter. Traffic on national highway G210 would have an annual growth of 12% in 2008–2010, 9% in 2011–2015, 4% in 2016–2020, and 3% in 2021–2025. In the revised traffic forecast, expressway traffic would reach an AADT of 7,549 vehicles in 2010, 17,863 vehicles in 2020, and 23,905 in 2025. The result of the revised traffic forecast is presented in Table A9.3.

² Loan 1484-PRC: Jiangxi Expressway Project (ADB. 1996. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Jiangxi Expressway Project*. Manila) found that actual traffic increased by 56% in 2001, 16% in 2002, and 17% in 2003; Loan 1387-PRC: Hebei Expressway Project (ADB. 1995. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Hebei and Liaoning Expressways Projects*. Manila) showed that actual traffic increased by 27% in 2001, 29% in 2002, and 10% in 2003; Loan 1470-PRC: Chongqing Expressway Project (ADB. 1996. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and a Technical Assistance Grant to the People's Republic of China for Chongqing Expressway Project*. Manila) found that actual traffic increased by 49% in 2003 for the Tongjiyuanzi-Jieshi Section.

Table A9.3: Revised Traffic Forecast
(AADT, Vehicle)

Year	Small		Medium		Large		Super Truck	Trailer Truck	Total
	Car	Truck	Bus	Truck	Bus	Truck			
2005	965	284	241	112	762	342	78	147	2,932
2006	1,153	339	288	134	910	409	94	176	3,502
2007	1,369	403	342	159	1,080	485	111	209	4,157
2008	1,670	491	417	193	1,318	592	136	254	5,072
2009	2,037	599	509	236	1,608	722	165	310	6,188
2010	2,485	731	621	288	1,961	881	202	379	7,549
2011	2,906	664	498	332	2,076	996	415	415	8,304
2012	3,197	731	548	365	2,284	1,096	457	457	9,134
2013	3,517	804	603	402	2,512	1,206	502	502	10,047
2014	3,868	884	663	442	2,763	1,326	553	553	11,052
2015	4,255	973	729	486	3,039	1,459	608	608	12,157
2016	5,252	788	788	525	3,020	1,444	656	656	13,130
2017	5,672	851	851	567	3,261	1,560	709	709	14,180
2018	6,126	919	919	613	3,522	1,685	766	766	15,315
2019	6,616	992	992	662	3,804	1,819	827	827	16,540
2020	7,145	1,072	1,072	715	4,109	1,965	893	893	17,863
2021	8,142	947	947	757	4,166	2,083	947	947	18,935
2022	8,631	1,004	1,004	803	4,416	2,208	1,004	1,004	20,071
2023	9,148	1,064	1,064	851	4,681	2,340	1,064	1,064	21,275
2024	9,697	1,128	1,128	902	4,961	2,481	1,128	1,128	22,552
2025	10,279	1,195	1,195	956	5,259	2,630	1,195	1,195	23,905

AADT = annual average daily traffic.

Note: According to standard issued by Ministry of Communications, conversion factors for vehicle and passenger car unit (PCU) are: 1 vehicle = 1.0 PCU for small car, 1 vehicle = 1.5 PCU for medium vehicle, 1 vehicle = 2.0 PCU for large vehicle, 1 vehicle = 3.0 PCU for trailer and super large truck.

Source: Asian Development Bank estimates.

FINANCIAL REEVALUATION

A. Basic Assumptions

1. The financial internal rate of return (FIRR) was reevaluated based on actual and revised future financial and operational data from the Guizhou Expressway Development Corporation (GEDC) and Guizhou High-Grade Highway Administration Bureau (GHHAB). The capital cost was based on actual expenditures incurred for the Project, excluding the cost of feeder roads and financial charges during construction. GHHAB provided data on the actual expressway operation and maintenance expenses for 2006 and 2007. It was assumed that the operation cost and routine maintenance cost would increase by 5% and 8% in real terms each year to cope with traffic growth in future years and ensure the good condition of the expressway. Major rehabilitation was assumed to take place every 8 years. GHHAB provided data on the actual toll revenues for 2005, 2006, and 2007. Future toll revenues were estimated to increase along with the traffic level and there would be no increase in toll levels in real terms. All revenues and expenses were expressed in 2007 prices. The calculation period covered the construction phase and 20 years of operation.

2. The project revenues comprised toll revenues and non-toll revenues. Starting from 1 June 2007, a toll scheme based on axle load for freight vehicles was applied to all expressways in Guizhou Province to curb overloading. The scheme has four parts: (i) a base toll set at CNY0.09 per ton-km and rates for tunnels and bridges set according to their specific capital costs; (ii) a flat toll rate for standard load; (iii) toll rate for overloaded freight, set with a multiplier up to four times of base toll; and (iv) zero or graded toll level for special vehicles (non-toll vehicles, trucks for fresh agriculture products, container vehicles, etc.). The basic toll rate for passenger vehicles is CNY0.55 per vehicle-km. The non-toll revenue was assumed to be 0.5% of the toll revenue. In the recalculation, a business tax of 5.5% and a corporate income tax of 33.0% were applied.

B. Financial Internal Rate of Return

3. The FIRR after income tax was recalculated as 4.2%, compared with 5.6% estimated at appraisal. The variation was due mainly to lower traffic volumes and lower tariff in the early years of operation, and higher costs for maintenance and major rehabilitation although the actual capital cost is lower than the appraisal estimates. The after-tax weighted average cost of capital (WACC) in real terms was calculated as 2.4%. Since the Project's recalculated FIRR was higher than the WACC, the Project is considered financially viable. Sensitivity analysis indicated that the FIRR was very sensitive to traffic changes. A more than 20% negative change in traffic would result in a FIRR close to the WACC. The detailed financial reevaluation and sensitivity analysis are in Table A10.1 and Table A10.2.

Table A10.1: Financial Reevaluation
(CNY million)

Year	Costs			Revenue			Business Tax	Net Cash Flow	Corporate Tax	Net Cash Flow After Tax
	Capital	O&M	Total	Toll	Non-Toll	Total				
2001	1,172.70		1,172.70					(1,172.70)		(1,172.70)
2002	592.34		592.34					(592.34)		(592.34)
2003	902.96		902.96					(902.96)		(902.96)
2004	1,169.20		1,169.20					(1,169.20)		(1,169.20)
2005	935.43	14.41	949.84	23.55	0.12	23.67	1.30	(927.47)	0.00	(927.47)
2006	787.03	19.54	806.57	159.56	0.80	160.36	8.82	(655.03)	0.00	(655.03)
2007	121.09	28.12	149.22	265.12	1.33	266.45	14.65	102.58	33.85	68.73
2008		30.07	30.07	323.45	1.62	325.06	17.88	277.12	91.45	185.67
2009		32.16	32.16	394.60	1.97	396.58	21.81	342.61	113.06	229.55
2010		34.39	34.39	481.42	2.41	483.82	26.61	422.82	139.53	283.29
2011		36.79	36.79	529.56	2.65	532.21	29.27	466.15	153.83	312.32
2012	707.40	39.36	746.76	582.52	2.91	585.43	32.20	(193.53)	0.00	(193.53)
2013		31.58	31.58	640.77	3.20	643.97	35.42	576.98	190.40	386.57
2014		33.69	33.69	704.84	3.52	708.37	38.96	635.71	209.79	425.93
2015		35.96	35.96	775.33	3.88	779.20	42.86	700.39	231.13	469.26
2016		38.39	38.39	837.35	4.19	841.54	46.28	756.87	249.77	507.10
2017		40.99	40.99	904.34	4.52	908.86	49.99	817.89	269.90	547.99
2018		43.77	43.77	976.69	4.88	981.57	53.99	883.82	291.66	592.16
2019		46.75	46.75	1,054.83	5.27	1,060.10	58.31	955.04	315.16	639.88
2020	707.40	49.94	757.34	1,139.21	5.70	1,144.91	62.97	324.59	107.12	217.48
2021		38.07	38.07	1,207.56	6.04	1,213.60	66.75	1,108.78	365.90	742.88
2022		40.51	40.51	1,280.02	6.40	1,286.42	70.75	1,175.15	387.80	787.35
2023		43.12	43.12	1,356.82	6.78	1,363.60	75.00	1,245.48	411.01	834.47
2024	(2,365.18)	45.91	(2,319.28)	1,438.23	7.19	1,445.42	79.50	3,685.20	435.60	3,249.59
FIRR (before tax)								6.7%	(after tax)	4.2%

() = negative, CNY = yuan, FIRR = financial internal rate of return, O&M = operation and maintenance.

Sources: Asian Development Bank estimates.

Table A10.2: Sensitivity Analysis

Scenario	FIRR (%)	
	Before Tax	After Tax
WACC=2.4%		
Base Case	6.7	4.2
1. Traffic Decrease by 20%	4.8	2.6
2. O&M Cost Increase by 20%	6.6	4.1
3. Major Rehabilitation Cost Increase by 20%	6.5	4.0

FIRR = financial internal rate of return, O&M = operation and maintenance, WACC = weighted average cost of capital.

Sources: Asian Development Bank estimates.

ECONOMIC REEVALUATION

A. General

1. Economic reevaluation of the Project was carried out for the with- and without-Project cases using the updated data. In the without-Project case, it was assumed that no expressway was constructed and all corridor traffic would use the existing national highway G210. In the with-Project case, the project expressway was constructed and opened to traffic as planned, which would allow vehicles to travel faster at lower operating cost and shorter travel time, and experience more comfortable and safer travel. More traffic was induced and generated due to better transport condition and lower vehicle operation cost (VOC). The methodology and parameters for economic reevaluation were based on discussions with the Guizhou Expressway Development Corporation (GEDC) and the local highway design institute during the project completion review (PCR).

B. Costs

2. The project costs consist of capital, and operation and maintenance (O&M) costs. The cost of constructing the feeder roads was included. The actual capital costs were about 3.0% lower than anticipated at appraisal. Actual O&M cost for the project expressway in past years were used. In addition, it was assumed that the operation and routine maintenance costs would increase by 8.0% each year to accommodate the future traffic increase. Periodic maintenance was assumed to be once in 8 years with the investment of 30.0% of the capital cost. Financial costs were converted into economic costs using a standard conversion factor of 0.95. All economic costs were estimated in constant 2007 prices.

C. Traffic Forecast

3. Actual traffic (2005, 2006, and 2007) and revised traffic forecast (2008–2024) for the project expressway and parallel national highway G210 were used in the reevaluation. In the revised traffic forecast, it was assumed that traffic on the project expressway would increase by an average 22.0% per annum in 2008–2010, 10.0% in 2011–2015, 8% in 2016–2020, and 6.0% thereafter. Traffic on national highway G210 would increase annually by 12.0% in 2008–2010, 9.0% in 2011–2015, 4.0% in 2016–2020, and 3.0% in 2021–2025. These assumptions were supported by GEDC and the local highway institute. Considering the revised traffic forecast, expressway traffic would reach an average annual daily traffic (AADT) of 7,549 vehicles in 2010, 17,863 vehicles in 2020, and 23,905 in 2025.

D. Benefits

4. Four types of VOC savings and two types of passenger travel time cost savings were recalculated. The VOC savings included regular expressway traffic, induced and generated expressway traffic, short travel distance of expressway traffic, and traffic on national highway G210. The passenger travel time cost savings were calculated for passenger vehicles on both expressway and national highway G210. A total of 10.0% extra benefits were added to reflect other benefits, such as fewer accidents, reduced maintenance cost for national highway G210, freight travel time cost savings, and the additional benefit of feeder roads.

5. The VOC savings were estimated using the unit VOC data for different types of vehicles under different road and traffic conditions. These unit VOCs were used for similar recent road projects financed by the Asian Development Bank in the People's Republic of China (PRC), and

were adjusted for the Project. The VOC savings per vehicle kilometer were estimated to be CNY0.45–CNY1.01 for different types of vehicles in the expressway traffic. It was assumed that 80% of the expressway traffic was diverted from the parallel national highway and the railway. The rest (20%) of the expressway traffic was assumed to be induced by the Project, for which only half of the VOC savings were considered. The project expressway is about 49.1 km shorter than the parallel national highway. VOC savings from the reduced travel distance were calculated accordingly. Only diverted traffic was considered and half unit VOC was applied. The VOC savings for the traffic on national highway G210 were calculated at the unit VOC savings of CNY0.12–CNY0.36 per vehicle kilometer.

6. Passenger travel time savings were estimated for different types of passenger vehicles. The average passenger travel time costs were derived from the gross domestic product (GDP) per capita of Guizhou Province in 2006. The time value of car passengers and small bus passengers were estimated at five times and three times the average passenger time value. The incremental rates of increase for passenger time values were between 10.0% and 6.0% for 2008–2024, which were consistent with the anticipated GDP growth rates. This value was used as a proxy for increasing real incomes. Factors taken into account in recalculating travel time cost savings included average vehicle load, percentage of working trips, and speed for the with- and without-Project cases for different types of passenger vehicles.

7. Other benefits of the Project, such as reduced accident cost, reduced maintenance cost for G210, freight travel time cost savings, economic benefits of feeder roads, could not be recalculated during the PCR Mission because data was unavailable. However, 10% of extra benefits were added to the total of VOC and passenger travel time cost savings to reflect such non-calculated benefits.

8. The passenger time cost savings generated by the project expressway account for the major share of total benefits, about 49.5% in the early years of expressway operation, which was due mainly to significant reduction in travel time. Such time cost savings also showed an increasing trend in future years and would be about 68.6% of the total benefit in 2025.

E. Reevaluation of the Economic Internal Rate of Return

9. The reevaluated economic internal rate of return (EIRR) for the project expressway was 14.1%, compared with the 16.4% estimated at appraisal. The lower EIRR at reevaluation was mainly due to less traffic in the early years of expressway operations. However, the reevaluated EIRR was still higher than the social discount rate of 12.0%. Thus, the Project is considered economically viable. The economic reevaluation is presented in Table A11.1.

10. Sensitivity analysis was carried out to test the impacts of (i) increase in O&M costs, (ii) decrease in benefits, and (iii) a combination of the two scenarios. The analysis indicates that the Project would continue to be economically viable under all tested conditions. The Project EIRR was more sensitive to changes in benefits than to changes in O&M costs. The EIRR would be 12.1% if the benefits decrease by 20.0%. At the worst case of combining a 20.0% increase in O&M costs and a 20.0% reduction of benefits, the EIRR would be 12.1%, still higher than the social discount rate. The results of the sensitivity analysis are shown in Table A11.2.

Table A11.1: Economic Reevaluation
(CNY million)

Year	Costs			Benefits								Net Benefit	
	Capital	O&M	Total	VOC Saving			Time Cost Saving						
				Express-way Diverted	Express-way Induced	Less Distance	G210	Express-way	G210	Others	Total		
2001	1,230.15	0	1,230.15										(1,230.15)
2002	621.36	0	621.36										(621.36)
2003	947.19	0	947.19										(947.19)
2004	1,226.48	0	1,226.48										(1,226.48)
2005	981.26	6.85	988.11	19.70	2.46	4.10	5.50	33.39	4.57	6.97	76.69		(911.42)
2006	825.59	12.06	837.65	94.12	11.77	19.60	26.38	159.53	21.95	33.33	366.68		(470.98)
2007	127.02	13.56	140.59	111.72	13.97	23.26	30.34	189.36	25.25	39.39	433.29		292.70
2008	0	15.69	15.69	136.30	17.04	28.38	33.98	231.02	28.28	47.50	522.50		506.81
2009	0	16.95	16.95	166.29	20.79	34.63	38.05	281.84	31.67	57.33	630.60		613.65
2010	0	18.30	18.30	202.87	25.36	42.24	43.10	343.85	41.11	69.85	768.39		750.09
2011	0	19.77	19.77	224.31	28.04	46.71	46.98	517.41	65.60	92.90	1,021.95	1,002.19	1,002.19
2012	1,787.72	21.35	1,809.07	246.75	30.84	51.38	51.21	569.15	71.51	102.08	1,122.91	(686.16)	(686.16)
2013	0	19.42	19.42	271.42	33.93	56.52	55.81	626.06	77.94	112.17	1,233.85	1,214.43	1,214.43
2014	0	20.97	20.97	298.56	37.32	62.17	60.84	688.67	84.96	123.25	1,355.76	1,334.79	1,334.79
2015	0	22.65	22.65	328.42	41.05	68.39	66.31	757.53	92.60	135.43	1,489.74	1,467.09	1,467.09
2016	0	24.46	24.46	358.53	44.82	74.66	68.97	1,163.93	141.51	185.24	2,037.65	2,013.19	2,013.19
2017	0	26.41	26.41	387.22	48.40	80.63	71.72	1,257.04	147.17	199.22	2,191.40	2,164.99	2,164.99
2018	0	28.53	28.53	418.19	52.27	87.08	74.59	1,357.61	153.05	214.28	2,357.08	2,328.55	2,328.55
2019	0	30.81	30.81	451.65	56.46	94.05	77.58	1,466.22	159.17	230.51	2,535.63	2,504.82	2,504.82
2020	1,787.72	33.27	1,820.99	487.78	60.97	101.57	80.68	1,583.51	165.54	248.01	2,728.07	907.07	907.07
2021	0	32.88	32.88	521.02	65.13	108.49	83.10	2,159.82	228.18	316.57	3,482.32	3,449.44	3,449.44
2022	0	35.51	35.51	552.29	69.04	115.00	85.59	2,289.41	235.02	334.63	3,680.98	3,645.47	3,645.47
2023	0	38.35	38.35	585.42	73.18	121.90	88.16	2,426.77	242.07	353.75	3,891.26	3,852.91	3,852.91
2024	0	41.42	41.42	620.55	77.57	129.22	90.81	2,572.38	249.34	373.99	4,113.84	4,072.42	4,072.42
2025	(8,304.35)	44.74	(8,259.62)	657.78	82.22	136.97	93.53	2,726.72	256.82	395.40	4,349.45	12,609.06	12,609.06
												Economic Internal Rate of Return:	14.1%
												Discount Rate:	12.0%

() = negative, G210 = highway G210, O&M = operation and maintenance, VOC = vehicle operating cost.

Source: Asian Development Bank estimates.

Table A11.2: Sensitivity Analysis
(%)

Item	Test		EIRR	NPV (CNY million)	
	O&M Cost	Benefits			
Base Case	0	0	14.1	5,024	
	10		14.1	5,004	
	20		14.1	4,984	
Changes (+/-)		10	15.0	6,241	
		20	15.8	7,457	
		(10)	13.2	3,808	
		(20)	12.1	2,592	
		10	(10)	13.1	3,788
		20	(20)	12.1	2,552

() = negative, CNY = yuan, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Asian Development Bank estimates.

**FINANCIAL PERFORMANCE
OF CHONGZUN EXPRESSWAY
AND GUIZHOU EXPRESSWAY DEVELOPMENT CORPORATION**

A. General

1. Guizhou Expressway Development Corporation (GEDC) is the Executing Agency (EA) of the Project. GEDC is a state-owned enterprise responsible for planning, financing, constructing, and operating expressways in Guizhou Province in the People's Republic of China. GEDC has implemented more than 17 expressway projects in Guizhou, 933 kilometers (km) of which have been opened to traffic. GEDC assigned the operation and maintenance (O&M) of these expressways, including Chongzun Expressway, to Guizhou High-Grade Highway Administration Bureau (GHHAB), which is under the Guizhou Provincial Communication Bureau (GPCD). GEDC is responsible for repaying the loans of Chongzun Expressway and channels the funds for the O&M works done by GHHAB. Under GHHAB are one expressway maintenance center and eight regional expressway management divisions. The expressway maintenance center carries out maintenance work on the project expressway

2. The project expressway was opened for trial operation in December 2005 (the south section had been opened in July 2005). By the project completion review, the expressway had been in trial operation for about 2.5 years. In consultation with GEDC and GHHAB, the financial projections for Chongzun Expressway and GEDC were prepared based on the initial performance during the trial operation and on assumptions highlighted in this Appendix. The financial projections in current terms are presented in Table A12.1 and Table A12.2.

B. Assumptions for Financial Projections

3. The major assumptions underlying the financial projections are the following.
- (i) Actual domestic inflation rates for 2001–2007 were used and 5.0% was assumed for 2007 and thereafter.
 - (ii) Actual toll revenues for 2005, 2006, and 2007 were used. Since 1 June 2007, axle load-based expressway toll level has been applied to freight vehicles in Guizhou Province. It was assumed that the future toll will be adjusted to domestic inflation and there will be no increase in toll level in real terms.
 - (iii) The non-toll revenue comes mainly from advertisements. The existing non-toll revenue on the project expressway is small. It was assumed that non-toll revenue would be about 0.5% of the toll revenue.
 - (iv) The maintenance costs were estimated in consultation with GHHAB and were based on the experience of other expressways in the project area. Maintenance costs comprise costs for routine maintenance and major rehabilitation. Routine maintenance costs were forecast to increase by 8.0% every year in real terms to reflect the traffic situation and road deterioration. Major rehabilitation was assumed to take place every 8 years at the cost of CNY6 million per km, which was treated as capital costs. Operation costs included the costs for toll collection staffs, materials and utilities, and management. Actual operation costs were

used ; it was assumed that they would increase by 5.0% annually in real terms to reflect the traffic growth.

- (v) Depreciation expenses were calculated using the straight-line method, assuming 30 years of economic life for civil works, 20 years for building and ancillary facilities, and 10 years for equipment.
- (vi) The business tax was 5.5% on gross revenue. The income tax rate was 33.0% on taxable income.
- (vii) Repayment of the Asian Development Bank loan was estimated based on the prescribed schedules, starting from 2005 with completion in 2024. The domestic loan was from the China Development Bank (CDB) and China Construction Bank (CCB). The domestic loans will be repaid during 2008 to 2017 at an interest rate of 5.8%.

C. Projected Financial Performance

4. As covenanted in the Project Agreement, Chongzun Expressway shall maintain (i) a ratio of debt-to-equity of not more than 60:40, starting from the fourth year of full operation (2009); (ii) a working ratio (O&M cost to revenue) of not more than 12%, starting from the first year of full operation (2006); and (iii) a debt service coverage ratio of not less than 1.2, also starting from the fourth year of full operation (2009). The financial projection indicated that Chongzun Expressway could not comply with the working ratio covenant in 2006 due to low traffic and low tariff level, but will be able to comply with it starting from 2007 because of the rapid traffic growth and the higher toll level resulting from the application of the load axle-based toll scheme. The debt-to-equity ratio can generally be complied with. The debt service coverage ratio will be less than 1.0 from 2008 to 2012, indicating that Chongzun Expressway will have serious cash shortage for debt services. The domestic loans of Chongzun Expressway have a term of 10 years for repaying the principal; that stretches the cash flows for the period from 2008 to 2017. GEDC was advised to consider extending the repayment period of domestic loans to 15–20 years. Without such rescheduling, Chongzun Expressway would not be able to comply with the debt service coverage ratio of not less than 1.2 until 2016. The financial projections in current terms on pro-forma basis are presented in Table A12.1 and Table A12.2.

5. As covenanted in the Project Agreement, GEDC, in respect to its overall operations as a corporation, shall maintain a debt service coverage ratio of not less than 1.2, starting from 2008. According to audited financial statements for 2005 to 2007, GEDC experienced severe cash shortages in the past 3 years. It had resorted to borrowings, and debt-to-equity had increased from 64.0% in 2005 to 75.0% in 2007. The net revenues were far from being enough to meet the need for interest expenses and loan repayments. The debt service coverage ratio was 0.22 in 2007 and will not be more than 0.35 in 2008. Obviously GEDC would not be able to comply with this covenant in the coming years.

Table A12.1: Chongzun Expressway Pro-forma Financial Statements
(CNY million)

Income Statements	2001	2002	2003	2004	2005	2006	2007
Operating Revenues							
Toll Revenue					23.6	159.6	265.1
Other Revenue					0.1	0.8	1.3
Total Operating Revenues					23.7	160.4	266.4
Less: Business Tax (5.5%)					1.3	8.8	14.7
Net Operating Revenue					22.4	151.5	251.8
Operating Expenses							
Operation Cost					4.2	8.5	10.2
Maintenance Cost					10.2	11.0	18.0
Depreciation					157.3	157.3	157.3
Total Operating Expenses					171.7	176.8	185.4
Net Operating Income					(149.3)	(25.3)	66.4
Total Interest Expenses					84.5	82.2	79.7
Income before Income Tax					(233.8)	(107.5)	(13.4)
Corporate Tax (25%)					—	—	—
Net Income after Corporate Tax					(233.8)	(107.5)	(13.4)
Working Ratio					64.4%	12.9%	11.2%
Cash Flow Statements	2001	2002	2003	2004	2005	2006	2007
Net Cash Inflows from Operating							
Net Income after Income Tax					(233.8)	(107.5)	(13.4)
Depreciation					157.3	157.3	157.3
Net Changes in Working Capital					0.3	(5.9)	(4.2)
Cash Inflows from Financing							
ADB Loan	17.1	7.7	416.0	460.5	284.4	79.2	143.0
Domestic Loan	600.0	50.0	300.0	700.0	350.0	850.0	0.0
Equity Input	767.5	641.7	350.1	220.0	670.0	0.0	0.0
Cash Inflow Total	1,385	699	1,066	1,380	1,228	973	283
Cash Outflows							
Construction Cost	1,385	699	1,066	1,380	1,104	929	143
Debt Service							
ADB Loan					38	41	43
Domestic Loan							
Cash Outflow Total	1,385	699	1,066	1,380	1,143	970	186
Net Cash Flows	—	—	—	—	86	3	97
Opening Balance	—	—	—	—	—	86	89
Closing Balance	—	—	—	—	86	89	186
Debt Service Coverage Ratio					0.06	1.08	1.82
Balance Sheets	2001	2002	2003	2004	2005	2006	2007
Current Asset							
Cash	—	—	—	—	86	89	186
Account Receivable					1.1	7.6	12.6
Fixed Asset							
Accumulated Fixed Asset		1,385	2,084	3,150	4,530	5,635	6,564
Less Accumulated Depreciation					157	315	472
Net Fixed Asset		1,385	2,084	3,150	4,373	5,320	6,092
Work in Progress	1,385	699	1,066	1,380	1,104	929	143
Total Asset	1,385	2,084	3,150	4,530	5,564	6,346	6,434
Current Liability							
Account Payable					1.4	2.0	2.8
Long-term Loans							
ADB Loan	17	25	441	901	1,147	1,186	1,286
Domestic Loan	600	650	950	1,650	2,000	2,850	2,850
Equity							
Paid-in Capital	767	1,409	1,759	1,979	2,649	2,649	2,649
Retained Earnings					(234)	(341)	(355)
Total Liabilities and Equity	1,385	2,084	3,150	4,530	5,564	6,346	6,434
Debt–Equity Ratio	44.6	32.4	44.1	56.3	56.6	63.6	64.3

() = negative, ADB = Asian Development Bank, CNY = yuan.

Sources: Actual figures were provided by Chongqing Expressway Development Company. Projected figures were estimated by Asian Development Bank.

Table A12.2: Chongzun Expressway Pro-forma Financial Statements
(CNY million)

Income Statements	2008	2009	2010	2011	2012	2013	2014	2015
Operating Revenues								
Toll Revenue	339.6	414.3	505.5	556.0	611.6	672.8	740.1	814.1
Other Revenue	1.7	2.1	2.5	2.8	3.1	3.4	3.7	4.1
Total Operating Revenues	341.3	416.4	508.0	558.8	614.7	676.2	743.8	818.2
Less: Business Tax (5.5%)	18.8	22.9	27.9	30.7	33.8	37.2	40.9	45.0
Net Operating Revenue	322.5	393.5	480.1	528.1	580.9	639.0	702.9	773.2
Operating Expenses								
Operation Cost	11.2	11.7	12.3	13.0	13.6	14.3	15.0	15.7
Maintenance Cost	20.4	22.0	23.8	25.7	27.7	18.9	20.4	22.0
Depreciation	158.3	158.3	158.3	158.3	180.7	180.7	180.7	161.1
Total Operating Expenses	189.9	192.1	194.4	197.0	222.1	213.9	216.1	198.9
Net Operating Income	132.6	201.4	285.6	331.1	358.8	425.1	486.8	574.3
Total Interest Expenses	242.5	227.1	210.8	193.5	175.3	156.0	135.5	113.9
Income before Income Tax	(109.8)	(25.7)	74.9	137.6	183.6	269.1	351.2	460.4
Corporate Tax (25%)	-	-	24.7	45.4	60.6	88.8	115.9	151.9
Net income after Corporate	(109.8)	(25.7)	50.2	92.2	123.0	180.3	235.3	308.5
Working Ratio	9.8%	8.6%	7.5%	7.3%	7.1%	5.2%	5.0%	4.9%
Cash Flow Statements	2008	2009	2010	2011	2012	2013	2014	2015
Net Cash Inflows from								
Net Income after Income Tax	(109.8)	(25.7)	50.2	92.2	123.0	180.3	235.3	308.5
Depreciation	158.3	158.3	158.3	158.3	180.7	180.7	180.7	161.1
Net Changes in Working	(3.2)	(3.3)	(4.1)	(2.1)	(2.4)	(3.7)	(3.0)	(3.3)
Cash Inflows from Financing								
ADB Loan								
Domestic Loan								
Equity Input	100	100	100	100	700			
Cash Inflow Total	145	229	304	348	1,001	357	413	466
Cash Outflows								
Construction Cost					707			
Debt Service								
ADB Loan	46	48	51	54	58	61	65	69
Domestic Loan	218	231	244	258	273	289	306	324
Cash Outflow Total	264	279	296	313	1,038	350	371	392
Net Cash Flows	(119)	(50)	9	36	(37)	7	42	74
Opening Balance	186	67	17	26	62	25	32	74
Closing Balance	67	17	26	62	25	32	74	148
Debt Service Coverage Ratio	0.57	0.71	0.83	0.88	0.95	1.02	1.09	1.15
Balance Sheets	2008	2009	2010	2011	2012	2013	2014	2015
Current Asset								
Cash	67	17	26	62	25	32	74	148
Account Receivable	16.1	19.7	24.0	26.4	29.0	31.9	35.1	38.7
Fixed Asset								
Accumulated Fixed Asset	6,707	6,707	6,707	6,707	6,707	7,415	7,415	7,415
Less Accumulated	630	789	947	1,105	1,286	1,467	1,647	1,808
Net Fixed Asset	6,077	5,919	5,760	5,602	5,421	5,948	5,767	5,606
Work in Progress					707			
Total Asset	6,160	5,956	5,810	5,690	6,182	6,011	5,876	5,793
Current Liability								
Account Payable	3.2	3.4	3.6	3.9	4.1	3.3	3.5	3.8
Long-term Loans								
ADB Loan	1,240	1,192	1,141	1,087	1,029	968	903	835
Domestic Loan	2,632	2,401	2,156	1,898	1,625	1,335	1,029	705
Equity								
Paid-in Capital	2,749	2,849	2,949	3,049	3,749	3,749	3,749	3,749
Retained Earnings	(464)	(490)	(440)	(348)	(225)	(44)	191	499
Total Liabilities and Equity	6,160	5,956	5,810	5,690	6,182	6,011	5,876	5,793
Debt-Equity Ratio	62.9	60.3	56.7	52.5	42.9	38.3	32.9	26.6

() = negative, ADB = Asian Development Bank, CNY = yuan.

Sources: Actual figures were provided by Chongqing Expressway Development Company. Projected figures were estimated by Asian Development Bank.

6. The financial situation would improve if GEDC can (i) increase traffic volume by providing better services; (ii) improve efficiency in O&M of expressways and have effective control on its operating costs, while ensuring adequate budget allocation for road maintenance; (iii) explore ways to generate more non-toll revenues from associated services; (iv) negotiate with domestic banks to reschedule loan terms to be consistent with the cash-flow situation of the corporation; and (v) explore ways to invite equity investment to improve the capital structure of the corporation.

**Table A12.3: Summary Financial Statement and Projection
for Guizhou Expressway Development Corporation**
(CNY million)

Item	Actual			Projected				
	2005	2006	2007	2008	2009	2010	2011	2012
Toll Revenue	672	746	1,295	2,000	2,800	3,640	4,368	5,023
Expenses	613	726	1,075	1,267	1,498	1,729	1,960	2,191
Depreciation	423	504	687	802	934	1,065	1,197	1,329
Working Expenses	189	221	388	465	564	664	763	862
Taxes	29	25	45	49	57	65	73	80
Interests	160	392	629	863	1,097	1,332	1,566	1,800
Net Internally Generated Cash	293	108	233	623	1,082	1,580	1,967	2,280
Principal Repayment	1,110	1,238	3,221	3,420	3,607	3,775	3,921	4,052
Net Cash Flows	(817)	(1,130)	(2,989)	(2,797)	(2,525)	(2,195)	(1,955)	(1,772)
Debt Service Coverage Ratio	0.36	0.31	0.22	0.35	0.46	0.57	0.64	0.70

() = negative, CNY = yuan.

Sources: Guizhou Expressway Development Company provides actual figures. Asian Development Bank estimates projected figures.

EVALUATION OF LAND ACQUISITION AND RESETTLEMENT

A. Scope of Land Acquisition and Resettlement

1. The resettlement plan (RP) for the Chongzun Expressway was prepared in May 2000. According to the RP, the project impacts were estimated on the basis of an initial survey conducted by Guizhou High-Grade Construction Corporation in 1998. The total permanent land acquisition was estimated to be 8,874 mu,¹ including 2,430 mu paddy, 3,940 mu dry agriculture land, and 2,140 mu other lands. A total of 108,345 square meters (m²) of houses and buildings were to be demolished. Demolition would affect 8,964 persons.

2. Land acquisition and resettlement activities for the Chongzun Expressway were largely completed before the end of 2002. Land measuring 16,898 mu (1,127 hectares) was permanently acquired and 432,521 m² of houses were demolished. House demolition required the relocation of 8,699 persons of 2,467 households. The figures were significantly higher by 90% and 299%, respectively, than those in the RP. The reasons for the variation are that (i) the revised expressway alignment was closer to towns and residence areas, and was in lower elevations where land was flat and most lands to be acquired were cultivated land; and (ii) the estimated figures were based on a feasibility study, which was revised later. Table A13.1 compares the RP estimates and the actual land acquisition and resettlement impact.

Table A13.1: Comparison between Resettlement Plan Estimations and Actual Scope

Items	Unit	Indicative Estimations of RP	Actual	Variation
Permanent Land Acquisition	mu	8,874	16,898	90%
Farmland	mu	6,370	13,295	109%
Houses/Building Demolition	m ²	108,345	432,521	299%
Relocated Population/Households	persons/hh	8,964/—	8,699/2,467	(3%)

() = negative, hh = household, m² = square meter, mu = 1/15 hectare, RP = resettlement plan.

Sources: Guizhou Academy of Social Science. 2006. *Monitoring Report*. ADB. 2000. *Resettlement Plan for Chongzun Expressway Project, Supplementary Appendix D of Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Chongqing–Guizhou Roads Development Project*. Manila.

3. There was no data on temporarily acquired land, but compensation for such land had been settled with the contractors. During the construction period, whenever the need for temporary acquisition arose, the construction contractor signed an agreement directly with farmers, groups, or villages by negotiating a temporary land compensation rate according to relevant policies. Since the executing agency (EA) and implementation agency (IA) were not involved in making such an agreement, there was no related data on the exact amount of temporary land acquired and temporary land compensation.

B. Resettlement Policy and Compensation Rates

4. Land acquisition and resettlement were implemented based on the Land Administration Law (1998) of the People's Republic of China (PRC) and government rules, regulations, and agreements including (i) Guizhou Provincial Government Circular on Land Acquisition and

¹ 1 mu = 1/15 hectare.

Resettlement for Zunyi-Chongxihe Expressway Project (No.124 Decree of Guizhou Provincial Government, 2001), and (ii) No. 4 Circular for Land Acquisition, House Relocation and Compensation Rates of Zunyi-Chongxihe Expressway issued by the Zunyi municipal government in February 2002. Table A13.2 compares the actual land compensation rates under the Project with the rates outlined in the RP. The main reason for the differences in compensation rates was that the multiples of average annual output values estimated in the RP² are different from those issued by the Zunyi municipal government.

Table 13.2: Land Compensation Rates
(CNY/Mu)

Item	Resettlement Plan	Actual
Vegetable Land	—	11,000
Irrigated Paddy	32,300	10,000
Non-irrigated Paddy	—	7,000
Dry Land	20,550	6,800
Upland	—	4,500
Orchards	20,550	4,500
Forestland	10,275	1,000–3,000
Residential Land	—	6,500
Fishpond	—	10,000
Grassland	10,275	200
State-Own Land	—	6,500

1 mu = 1/15 hectare, CNY = yuan, m² = square meters.

Sources: ADB. 2000. *Resettlement Plan for Chongzun Expressway Project, Supplementary Appendix D of Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Chongqing–Guizhou Roads Development Project*. Manila. Zunyi Municipal Government. 2002. *No. 4 Circular for Land Acquisition, House Relocation and Compensation Rates of Zunyi–Chongxihe Expressway*. Zunyi.

5. Compensation rates for land temporarily occupied by the Project included both compensation funds and funds for restoring the land to its original use. The compensation funds were formulated taking into consideration the duration of occupation, average annual output value of the land, as well as damage to the land. Contractors paid compensation directly to the affected persons.

6. Higher compensation rates for house demolition and relocation were implemented after negotiations with the affected households. In addition, each affected household received a piece of free housing plot either in a concentrated resettlement site or within a group as requested by the affected household. The detailed comparison of the house compensation rates in the RP and during implementation is presented in Table A13.3.

² “The provincial compensation standards were not approved by April 2000. Detailed remarks on compensation standards were made in paragraph 66 of *Supplementary Appendix D of Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Chongqing–Guizhou Roads Development Project*. Manila. ADB.

Table A13.3: Building Compensation Rates

Item	Unit	Resettlement Plan	Actual
Building Compensation			
Brick-Concrete	CNY/m ²	120–140	200
Brick-Wood	CNY/m ²	100	140
Earth-Wood	CNY/m ²	80	90
Simple	CNY/m ²	60	50
Relocation Subsidy	CNY/hh	—	800
Bonus	CNY/hh	—	800

CNY = yuan, hh = households, m² = square meters, RP = resettlement plan.

Sources: ADB. 2000. *Resettlement Plan for Chongzun Expressway Project, Supplementary Appendix D of Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Chongqing–Guizhou Roads Development Project*. Manila. Zunyi Municipal Government. 2002. No. 4 *Circular for Land Acquisition, House Relocation and Compensation Rates of Zunyi–Chongxihe Expressway*. Zunyi.

7. The External Resettlement Monitoring and Evaluation (M&E) Report, prepared by Guizhou Academy of Social Science (GASS), assessed the level of satisfaction of affected households with their current situations and indicated that most of them are generally happy with their current housing conditions.

C. Resettlement Measures and Restoration of Income

8. The relocated households received compensation for buildings and attached properties from the county government agencies along the expressway. They also received relocation subsidies and a bonus. The affected households reconstructed their new houses with a free piece of curtilage in the same group. All taxes and fees related to house construction were waived. In addition to scattered relocation in the same group, a total of 44 group resettlement sites were prepared by the implementation agency and local governments along national highway G210 for the purpose of improving communication conditions and saving farmland. All the costs of land flattening, pipe water, and power supply for 44 group resettlement sites, costing about CNY8 million, were financed by the expressway project. Consequently a total of 1,840 affected households, 75% of the total affected households, settled in the group resettlement sites.

9. The GASS survey found that most of the new houses are brick and concrete multistory buildings, which are much better than the houses before relocation as well as the houses of non-affected households in the same village. The per capita living space of the affected households increased from 31 m² to 49 m² in 2001; that for the non-affected increased from 25 m² to 37 m². In addition, as shown in Table A13.4, the brick and concrete houses of affected households increased from 46.1% in 2001 to 72.5% in 2004, while those for the non-affected households increased from 40.0% to 55.0%.

Table A13.4: House Structure and Facility Change
(%)

Item	Affected Households			Non-Affected		
	2001	2003	2004	2001	2003	2004
Brick and Concrete	46.1	70.7	72.5	40.0	44.0	55.0
Brick and Tile	16.4	9.1	8.1	16.0	24.0	15.0
Soil and Wooden	13.3	8.5	4.0	32.0	24.0	20.0
Stone and Wooden	4.4	2.0	2.4	8.0	4.0	5.0
Wooden	12.6	6.1	7.2	4.0	4.0	5.0
Soil Compacted	5.1	2.0	3.6	0	0	0
Thatched Cottage and Other	2.1	1.6	2.2	0	0	0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Guizhou Academy of Social Science. 2006. *External Resettlement Monitoring and Evaluation Report*. Guiyang.

10. The counties along the alignment are cropland-scarce areas where the average cultivated area is less than 1.0 mu per rural resident. GASS found that the per capita cultivated land area of the affected sample households decreased remarkably from 0.98 mu in 2001 before land acquisition to 0.47 mu in 2002 after land acquisition. The figure for non-affected households remained at about 0.96 mu per capita. Consequently, the per capita grain output of affected households was reduced from 327 kilograms (kg) in 2001 to 210 kg in 2003 and 199 kg in 2006. The households could not maintain their grain self-sufficiency and had to purchase grain for half of the year. The external resettlement M&E reports showed that, given the reduced income from agriculture, more and more affected people resorted to non-agriculture employment. The result was a rapid growth of non-agriculture income.

11. The external resettlement M&E reports found that per capita income of the sample affected households dramatically dropped by 18.5% from CNY2,301 in 2001 to CNY1,878 in 2003. The affected households could only manage to restore their 2001 income level 3 years after land acquisition and resettlement. As shown in Table A13.5, the per capita income from agriculture of the sample affected households declined by CNY309, while that of the non-affected increased by CNY19. From 2001 to 2006, the per capita income of affected households increased only by 7.8% or CNY180, while that of the non-affected increased by 20.9% or CNY487. It appears that the income of the affected households had not been fully restored by the end of 2006.

Table A13.5: Income Restoration
(CNY/Person)

Item	Affected Sample Households						Non-Affected		
	2001	2003	2,004	2005	2006	Growth	2001	2006	Growth
Agricultural income	712	401	423	401	403	(309)	750	769	19
Non-agricultural Income	1,589	1,477	1,911	1,989	2,078	489	1,581	2,050	469
Total Net Income	2,301	1,878	2,334	2,390	2,481	180	2,332	2,819	487

() = negative, CNY = yuan.

Source: Guizhou Academy of Social Science. 2006. *External Resettlement Monitoring and Evaluation Report*. Guiyang.

12. Responding to the slow progress in income restoration reflected in the external resettlement M&E report, ADB repeatedly reminded the EA in 2005 and 200 that income restoration for the affected people was the key objective of the RP. ADB requested the EA and

local governments to adopt necessary measures to hasten income restoration for the affected households. The EA and Zunyi municipal government adopted measures as providing training, more job opportunities, and social security funds to the affected people, and would assist the affected people in obtaining permanent income sources to fully achieve income restoration.

13. Vulnerable households received additional support from local governments and financial institutes from 2002 to 2006. Among the sample monitoring households of GASS, (i) 21 households (7% of total affected households) obtained microcredit of about CNY1,350 per household; (ii) 12 households were given a poverty reduction loan of CNY240 per household or grant; (iii) 13 households received other types of support from government and nongovernment organizations equivalent to CNY265 per household; and (iv) almost all households participated in at least two sessions of technical training programs.

D. Land Acquisition and Resettlement Cost

14. The increase in the amount of land acquired and structures demolished did not increase the overall cost. Instead, the actual cost—CNY290,109,475—was about 80% of the CNY362,623,025 estimated in the RP. Table A13.6 presents the actual resettlement expenses as of end-2007.³ The major reason for the lower cost is that the resettlement budget in the RP was not based on the detailed design,⁴ and the estimated compensation rates are much higher than those subsequently issued by the Zunyi municipal government. In addition, the consultants for the project preparatory technical assistance assisted GEDC to prepare a revised estimate of land acquisition, which was five times higher than the original RP prepared by a local design institute in May 1999.

Table A13.6: Land Acquisition and Resettlement Cost
(CNY)

Item	Tongzi County	Huichuan District	Honghuagang District	Total
Land Compensation and Taxes	65,790,394	43,297,744	6,170,635	115,258,773
Standing Crops	10,237,713	4,496,287	202,439	14,936,439
Attached Structures	6,644,922	7,057,753	1,307,002	15,009,677
Rural House Demolition	33,072,867	22,352,332	4,840,148	60,265,347
Entity House Demolition	26,951,970	1,508,740	5,726,540	34,187,250
Pipelines	5,324,981	4,452,759	858,781	10,636,520
Transitional Assistance	1,664,500	1,537,398	372,418	3,574,316
House Plot Compensation	2,092,181	— ^a	297,083	2,389,264
Miscellaneous Engineering Works	— ^a	— ^a	2,570,124	2,570,124
Administrative Cost	4,116,948	2,434,908	687,288	7,239,145
Other Compensations	15,129,136	8,894,266	19,217	24,042,619
Total	171,025,612	96,032,187	23,051,675	290,109,475

CNY = yuan.

^a Included in other items.

Source: Guizhou Academy of Social Science. 2006. *External Resettlement Monitoring and Evaluation Report*. Guiyang.

³ Final figures were not available since final auditing of land acquisition was scheduled in late 2008.

⁴ Permanent land acquisition in the resettlement plan was given as 12,070 mu under the budget and 8,874 mu under the project impact.

E. Institutional Arrangement

15. Chongzun Expressway Construction Headquarters (CECH) with offices in the respective land resource bureaus was established in Zunyi municipality and three counties and districts to handle resettlement activities. The headquarters included officials from the land resource bureau and concerned government agencies. In each affected township, a working group was also established to handle most of the resettlement work within its territory on behalf of the county and district units. GEDC and CECH adopted a contract system. The main responsibilities of CECH, based on a formal agreement with GEDC, were to coordinate and guide county and district units and to manage resettlement funds received from GEDC. County and district units then worked together with the township working groups to process land acquisition and resettlement activities, with compensation coming from the municipal headquarters. In general, the resettlement process was implemented satisfactorily.

F. Monitoring and Evaluation

16. GEDC engaged an independent agency, Guizhou Academy of Social Science (GASS), to undertake external resettlement M&E. GASS had carried out a remedy baseline survey and annual regular monitoring of affected and non-affected sample households from 2002 to 2006. GASS's monitoring was comprehensive and professional. In addition to resettlement progress, GASS continuously monitored the sample households' changes in (i) income and expenditure, (ii) cropland area and grain output, (iii) housing area and conditions, (iv) production assets and durable goods, (v) social support network, (vi) perception of the current situation, and (vii) expectation as to future changes.

G. Participation and Disclosure of Information

17. To implement the resettlement, the implementing agency, Zunyi municipality, three affected county and district government agencies, and the external monitor carried out consultation and public awareness activities. From 2002 to 2006, (i) about 1,900 copies of notices and announcements were posted; (ii) over 1,900 copies of public awareness materials were distributed to the affected households; and (iii) more than 18,000 persons were cumulatively consulted through meetings or interviews.

H. Lessons Learned

18. Effective institutional arrangements for resettlement ensured smooth implementation of land acquisition and house relocation. The local governments and local headquarters expended great efforts in consulting with affected persons and disclosing land acquisition policies, rates related to land acquisition, house demolition, and relocation, as required by the local and central governments and ADB. However, the implemented resettlement policies and compensation rates were not consistent with those stipulated in the RP, which indicated that the local governments did not have the opportunity to endorse or approve the RP. Prior endorsement of the RP by the local government became a standard ADB requirement.

19. The project impacts changed significantly compared with those in the RP. The project impacts in the RP were rough estimates by consultants according to the survey based on preliminary design. After project construction started, the RP was not updated on the basis of a detailed measurement survey (DMS). ADB learned another lesson. Timely updating of the RP has become a requisite, and the loan covenant stipulated a similar requirement for the RP prepared on the basis of a feasibility study or the preliminary design.

20. Adoption of uniform land compensation rates along the entire alignment created some potential issues during implementation, particularly in the suburbs of Zunyi city. The uniform land compensation rates were higher than those of other projects in the rural areas, but much lower than those of commercial real estate development projects in the same suburb of Zunyi city. The lesson here is that, when processing future projects, compensation rates should be formulated, taking into account the varied land values in different locations in the same region.

21. External resettlement M&E was conducted late. Conclusions and recommendations in the later M&E reports did not draw the attention of either GEDC or Zunyi municipal government. Most land acquisition and resettlement activities were completed by the end of 2002, but the external M&E agency had not yet been hired. In addition, the comprehensive analysis and recommendations for livelihood restoration in the external resettlement reports were ignored. Sound and feasible measures to ensure the timely recruitment of an external resettlement M&E agency and to make use of the conclusions of the M&E reports are still current issues.

22. ADB's resettlement review was weak. ADB resettlement specialists did not visit the project sites when resettlement was in progress. A resettlement officer in the ADB Resident Mission in the PRC visited sites at end-2004, which was 2 years after completion of most land acquisition and house relocation activities. ADB should strengthen its resettlement safeguard management at the early stage of project implementation.

23. Given that the income of the affected households had not been fully restored, ADB expressed serious concern to the EA and Zunyi municipal government. The latter stated that it would continue to provide training, job opportunities, and a social security fund to the affected people, and assist them to achieve sustainable income similar to or better than what they had before the resettlement. To evaluate the status of income restoration as of end-2008, a survey report on the income of the affected people will be prepared and submitted to ADB in March 2009.

SOCIOECONOMIC AND POVERTY IMPACTS

A. Introduction

1. The project expressway crosses 13 townships in three counties and districts situated in a mountainous area that is underdeveloped and poor. During project processing, a poverty impact analysis (PIA) was conducted. The analysis found that the Project would facilitate regional socioeconomic development and contribute to poverty reduction in the project areas by (i) providing fast and highly efficient expressway transport for three impact zones, i.e., immediate, intermediate, and perimeter areas; (ii) upgrading feeder roads to link the project areas to the expressway and improve access to wider markets; and (iii) attracting external investments and easing the transport constraint. Consequently, development of secondary industries, agricultural industrialization, energy and mining, tourism, as well as other traditional livelihood in the region will particularly benefit from the Project. The development of potential local industries will increase the fiscal revenue of local governments. Consequently, more local government resources can be allocated to improve social infrastructure, including basic education, health care, employment, and social security programs for the poor in the project areas and the rest of Guizhou Province.

B. Socioeconomic Development and Poverty Reduction in Guizhou Province

2. Guizhou, with a population of 39.6 million in 2006, is the poorest province in the People's Republic of China (PRC). Among PRC's 31 provinces, Guizhou ranked 31st in per capita gross domestic product (GDP), 31st in rural net income, and 27th in urban disposable income since the 1990s. Like the other provinces, Guizhou has also experienced robust socioeconomic development since the 1980s and especially after 2000; and its GDP growth averaged about 11.0% per annum from 2001 to 2006. Guizhou's total GDP rose from CNY113.3 billion in 2001 to CNY228.2 billion in 2006. Its per capita GDP rose from CNY2,895 in 2001 to CNY5,787 in 2006. The project expressway, as a backbone pathway of the southwestern corridor in the PRC and for linking Guizhou with other northern and western provinces, could act as a catalyzer in promoting socioeconomic development in Guizhou.

3. The socioeconomic achievements of Guizhou from 2001 to 2006 are presented in Table A14.1. The highlights are the following: (i) urbanization, in terms of the proportion of urban residents to the total population, increased from 24.0% in 2001 to 27.5% in 2006; (ii) both total and per capita GDP doubled, with annual growth rates of about 11.0%; (iii) robust industrial development caused the secondary industry contribution to total GDP to rise from 38.7% in 2001 to 43.0% in 2006; (iv) more rural laborers were employed in the industry sector and employment in agriculture declined from 75.1% in 2001 to 63.8% in 2006; (v) local financial revenues more than doubled; (vi) rural per capita income increased by CNY573 or 40.6%; and (vii) rural poverty steadily declined from 18.8% in 2001 to 14.9% in 2006.

Table A14.1: Socioeconomic Data of Guizhou Province

Item	Unit	2001	2004	2006	Change Over 2001-2006
Population	million persons	37.99	39.04	39.55	1.57
Urban Population	%	24.0	26.3	27.5	3.5
Per capita GDP	CNY	2,895	4,317	5,787	2,892
Total GDP	CNY billion	113.3	167.8	228.2	114.9
GDP Growth over Previous Years	%	8.8	11.4	11.6	
GDP Composition					
Primary Industry	%	25.3	20.3	17.2	(8.1)
Secondary Industry	%	38.7	40.6	43.0	4.3
Per Capita Rural Income	CNY	1,412	1,722	1,985	573
Total Rural Employment	million persons	18.22	19.03	19.54	1.32
Agriculture Rural Employment	%	75.1	67.7	63.8	(11.3)
Per capita Local Fiscal Revenue	CNY	263	382	581	318
Rural Poverty Incidence (CNY625) ^a	%	—	8.3	7.5	
Rural Poverty Incidence (CNY1,000) ^a	%	18.8	16.7	14.9	(3.9)

() = negative, CNY = yuan, GDP = gross domestic product.

^a Estimates were based on rural income–poverty incidence regression relationship established by ADB. 2007. Technical Assistance to the People's Republic of China for Evaluating Poverty Impacts of Transport Projects. Manila. Poverty incidence (%) = $-0.678 \times \text{Per capita rural income}/100 + 28.363$.

Source: Guizhou Statistics Bureau. 2002. 2005. 2007. *Guizhou Statistical Yearbooks*. Beijing: China Statistics Press.

C. Socioeconomic Development and Poverty Reduction in Zunyi Municipality

4. Zunyi, with a population of 7.32 million in 2006, is the largest municipality in Guizhou province. It ranks second in social and economic development, next to the provincial capital of Guiyang.

5. To disseminate the project benefits and promote local socioeconomic development and poverty reduction, the Project included 13 feeder roads totaling 704 kilometers (km). The feeder roads were completed in 2007. In addition, Zunyi had initiated its own road development program for an integrated highway network. In 2004, it invested CNY37.43 million to construct or improve roads totaling 3,672 km.

6. The Project promoted urban development in Zunyi. The group resettlements were mostly associated with urban or rural residents. The Chumi township in Tongzi county, for instance, integrated the establishment of resettlement areas for affected people with town development zoning and planning.

7. The Project greatly facilitated external investments along the expressway and in the whole of Zunyi. In 2004, Tongzi county and Huichuan district obtained actual external investments of CNY286 million and CNY816 million, respectively.

8. Upon the opening of the expressway, Zunyi unveiled its new development strategy of "Approaching Chongqing", which implied an emerging integration of Zunyi's economic

development with that of Chongqing municipality, which was one of the major driving forces of southwestern PRC. The Zunyi municipal government signed a cooperation agreement with the Chongqing municipal government for mutual interests and complementary industrial development of coal and power supply.

9. The construction and opening of the expressway also facilitated a government-led cropping structure along the expressway. Tongzi county, for instance, established vegetable and livestock production bases in Songkuan, Xinzhan, Chumi, and Loushanguan townships, which have abundant resources for those enterprises.

10. Table A14.2 presents the socioeconomic data of Zunyi from 2001 to 2006 when project implementation was ongoing. The highlights are the following: (i) the proportion of the non-agricultural population to the total population, increased from 14.1% in 2001 to 15.2% in 2006; (ii) per capita GDP increased by CNY2,719 or 72.9% in 6 years; (iii) industrial development boomed as the secondary industry's contribution to total GDP increased to 43.7% in 2006 from 36.5% in 2001; (iv) employment of rural labor in agriculture declined from 72.9% in 2001 to 59.8% in 2006; (v) local financial revenue doubled; (vi) rural per capita income increased by CNY675 or 38.7% in 6 years; and (vii) rural poverty steadily declined from 16.5% in 2001 to 12.0% in 2006.

11. To summarize, industrial development, rural per capita income growth, and rural poverty reduction over the period 2001–2006 were slightly higher in Zunyi than in Guizhou Province. But in other aspects, the two either were similar or only slightly differed.

Table A14.2: Socioeconomic Data of Zunyi Municipality

Item	Unit	2001	2004	2006	Change Over 2001-2006
Population	million persons	7.22	7.23	7.32	0.10
Non Agricultural Population	%	14.1	15.5	15.2	1.1
Per capita GDP	CNY	3,520	4,919	6,239	2,719
GDP composition					
Primary industry	%	32.7	26.5	21.0	(11.7)
Secondary industry	%	36.3	41.8	43.7	7.4
Tertiary industry	%	31.0	31.7	35.3	4.3
Per Capita Rural Income	CNY	1,744	2,120	2,419	675
Total Rural Employment	million persons	3.53	3.68	3.74	0.21
Rural Employment in Agriculture	%	72.9	65.1	59.8	(13.1)
Per Capita Local Fiscal Revenue	CNY	174	245	362	188
Poverty Incidence (CNY625) ^a	%	—	5.1	4.7	
Poverty Incidence (CNY1,000) ^a	%	16.5	14.0	12.0	(4.6)

() = negative, CNY = yuan, GDP= gross domestic product.

^a Estimates were based on rural income–poverty incidence regression relationship established by ADB. 2007. *Technical Assistance to the People's Republic of China for Evaluating Poverty Impacts of Transport Projects*. Manila. Poverty incidence (%) = $-0.678 \times \text{Per capita rural income}/100 + 28.363$.

Source: Guizhou Statistics Bureau. 2002. 2005. 2007. *Guizhou Statistical Yearbooks*. Beijing: China Statistics Press.

D. Socioeconomic Development and Poverty Reduction in Tongzi County

12. About 60% of the project expressway is located in Tongzi, which is a poor county in Zunyi. The expressway construction and opening resulted in substantial socioeconomic changes in the county (Table A14.3) from 2002 to 2006: (i) per capita GDP increased by CNY1,572 or 67.0%; (ii) the contribution of secondary and tertiary industries to total GDP increased by 18.2 percentage points; consequently, a high portion of rural labor shifted from agriculture to the secondary and tertiary industries; (iii) per capita rural income increased by CNY770 or 46.1%; and (iv) rural poverty declined from 17.0% to 11.8%. Tongzi had utilized over CNY1 billion of external investments for a number of industrial programs including calcium carbide factories, compound fertilizer factory, and thermo power plant.

Table A14.3: Socioeconomic Data of Tongzi County

Item	Unit	2001	2004	2006	Change Over 2001-2006
Population	million persons	0.65	0.67	0.67	0.02
Non-Agricultural Population	%	18.6	n.a.	n.a.	
Per Capita GDP	CNY	2,348	3,110	3,920	1,572
GDP Composition					
Primary Industry	%	49.4	42.5	31.1	(18.2)
Secondary Industry	%	23.2	26.6	28.8	5.6
Tertiary Industry	%	27.4	30.9	40.1	12.6
Rural Per Capita Income	CNY	1,669	2,077	2,439	770
Total Rural Employment	million persons	31.22	31.06	33.44	2.22
Rural Employment In Agriculture	%	67.7	62.8	51.9	(15.8)
Per Capita Local Fiscal Revenue	CNY	76	104	172	96
Poverty Incidence (CNY 625) ^a	%	—	4.4	3.9	
Poverty Incidence (CNY1,000) ^a	%	17.0	14.3	11.8	(5.2)

() = negative, CNY = yuan, GDP= gross domestic product, n.a.= not available

Note:

^a Estimates were based on rural income–poverty incidence regression relationship established by ADB. 2007. *Technical Assistance to the People's Republic of China for Evaluating Poverty Impacts of Transport Projects*. Manila. Poverty incidence (%) = $-0.678 \times \text{Per capita rural income}/100 + 28.363$.

Source: Guizhou Statistics Bureau. 2002. 2005. 2007. *Guizhou Statistical Yearbooks*. Guiyang.

13. The expressway project, as a backbone pathway in the southwest corridor in the PRC and as a link between Guizhou and other northern provinces, has greatly promoted the socioeconomic development of Zunyi and directly contributed to the regional development of Guizhou as a whole. Statistics shows that the per capita GDP of Zunyi increased remarkably by 77% from CNY3,520 in 2001 to CNY6,239 in 2006, and the per capita GDP of Guizhou rose from only CNY2,895 in 2001 to CNY5,787 in 2006. The construction and opening of the expressway also promoted socioeconomic development in the counties along the alignment, particularly Tongzi,¹ a poverty county in Guizhou. The per capita GDP of Tongzi increased by 67% from 2001 to 2006. Along with the rapid growth of GDP, the government fiscal revenue also experienced a significant increase, which enabled the governments to mobilize more

¹ About 60% of the expressway is in Tongzi county.

resources to improve public services and social welfare, particularly for the poor. Table A14.4 presents a detailed analysis of the growth of GDP and government fiscal revenue in three impact zones from 2001 to 2004 and 2006.

Table A14.4 Growth of GDP and Fiscal Revenue in the Impact Zones

Region	Year	Per capita GDP (CNY/Person)	Growth (%)	Per capita fiscal revenue (CNY/Person)	Growth (%)
Guizhou Province	2001	2,895		263	
	2004	4,317	49	382	45
	2006	5,787	100	581	121
Zunyi Municipality	2001	3,520		174	
	2004	4,919	40	245	41
	2006	6,239	77	362	108
Tongzi County	2001	2,348		76	
	2004	3,110	32	104	37
	2006	3,920	67	172	126

() = negative, CNY = yuan, GDP= gross domestic product.

Source: Guizhou Statistics Bureau. 2002. 2005. 2007. *Guizhou Statistical Yearbooks*. Beijing: China Statistics Press. Zunyi Statistics Bureau. 2001. 2004. 2006. *Zunyi Statistical Yearbooks*. Zunyi.

14. The operation of the expressway and its feeder roads facilitated a government-led cropping structure along the expressway. Depending on local resource advantages, Tongzi established vegetable, bamboo shoot, and animal production bases in Songkuan, Xinzhan, Chumi, and Loushanguan townships. The expressway has become the main route for transporting agricultural products and production materials such as vegetables, bamboos, animals, chemical fertilizers, feedstuff, etc. The reduced cost and time of transport have helped local farmers profit more from agriculture.

Table A14.5 Industrial Development in the Impact Zones

Region	Year	Industrial Structures (%)		
		Primary industry	Secondary industry	Tertiary industry
Guizhou Province	2001	25.3	38.7	36.0
	2004	20.3	40.6	39.1
	2006	17.2	43.0	39.8
Zunyi Municipality	2001	32.7	36.5	30.8
	2004	26.5	41.8	31.7
	2006	21.0	43.7	35.3
Tongzi County	2001	49.4	23.2	27.4
	2004	42.5	26.6	30.9
	2006	31.1	28.8	40.1

Source: Guizhou Statistics Bureau. 2002. 2005. 2007. *Guizhou Statistical Yearbooks*. Beijing: China Statistics Press. Zunyi Statistics Bureau. 2001. 2004. 2006. *Zunyi Statistical Yearbooks*. Zunyi.

15. The construction and operation of the expressway have greatly facilitated external investments and contributed to local industrial development along the expressway. The report

from GASS in 2004 stated that Tongzi county, Honghuagang district, and Huichuang district in Zunyi attracted external investments of CNY286 million, CNY1.084 billion, and CNY816 million, respectively, in 2004. With the continually increasing investments, more and more enterprises were established; consequently, the secondary and tertiary industries in the project areas experienced rapid development. By the end of 2006, the secondary and tertiary industries in Tongzi and Zunyi contributed, respectively, 68.9% and 79% to the total GDP, much higher than their contribution in 2001. Detailed data is presented in Table A14.5.

16. Meitan county is about 70 km to the west of Zunyi. Its economic status was slightly better than that of Tongzi before 2001. With Meitan as a control area, the two counties are well matched Tongzi performed better in growth of GDP, rural income and local financial revenue, industrial development, and poverty reduction (Table A14.6). From 2001 to 2006, the highlights are as follows: (i) Tongzi experienced a per capita GDP growth of CNY1,572, while Meitan experienced a decrease; (ii) the contribution of industry to GDP in Tongzi increased by 18.2% compared with 5.1% for Meitan; (iii) Tongzi's per capita local financial revenue increased by CNY96 compared with CNY40 for Meitan; (iv) Tongzi's rural per capita income increased by CNY770 compared with CNY625 for Meitan; and (v) poverty incidence in Tongzi was reduced by 5.2 percentage points compared with 4.2 percentage points in Meitan.

Table A14.6: Comparisons between Tongzi County and a Control Area

Item	Unit	Growth and Changes from 2001 to 2006		
		Project Area (Tongzi County)	Control Area (Meitan County)	Difference
Per Capita GDP	CNY	1,572	(418)	1,990
Secondary and Tertiary Industries' Contribution to GDP	%	18.2	5.1	13.1
Rural Employment Distribution In Secondary and Tertiary Industries	%	15.8	13.3	2.5
Per Capita Rural Income	CNY	770	625	145
Per Capita Local Fiscal Revenue	CNY	96	40	56
Poverty Incidence (CNY1,000) ^a	%	(5.2)	(4.2)	(1.0)

() = negative, CNY = yuan, GDP= gross domestic product.

^a Estimates were based on rural income–poverty incidence regression relationship established by ADB. 2007. *Technical Assistance to the People's Republic of China for Evaluating Poverty Impacts of Transport Projects*. Manila. Poverty incidence (%) = $-0.678 \times \text{Per capita rural income}/100 + 28.363$.

Source: Guizhou Statistics Bureau. 2002. 2005. 2007. *Guizhou Statistical Yearbooks*. Beijing: China Statistics Press. Zunyi Statistics Bureau. 2001. 2004. 2006. *Zunyi Statistical Yearbooks*. Zunyi.

E. Poverty Reduction

17. With the rapid socioeconomic growth induced by the expressway in the project influence areas, and the increased fiscal revenue of the local governments, the standard of livelihood and income of local people significantly improved, particularly for the poor. Statistics released by the local government shows that in 6 years, the rural per capita income of farmers increased by 46% in Tongzi county, 39% in Zunyi municipality, and 41% in Guizhou province. Detailed information is in Table A14. 7.

Table A14. 7: Growth of Per Capita Income of Farmers in Impact Zones

Region	Year	Per Capita Rural Income (CNY)	Growth Rate Over 2001 (%)
Guizhou Province	2001	1,412	
	2004	1,722	22
	2006	1,985	41
Zunyi Municipality	2001	1,744	
	2004	2,120	22
	2006	2,419	39
Tongzi County	2001	1,669	
	2004	2,077	24
	2006	2,439	46

CNY = yuan.

Source: Guizhou Statistics Bureau. 2002. 2005. 2007. *Guizhou Statistical Yearbooks*. Beijing: China Statistics Press. Zunyi Statistics Bureau. 2001. 2004. 2006. *Zunyi Statistical Yearbooks*. Zunyi.

18. The incidence of poverty declined significantly in the project impact zones. According to the Zunyi Municipal Poverty Reduction Office, based on the standard of per capita income of less than CNY1,000, poverty declined from 17% in 2001 to 11.8% in 2006 in Tongzi, from 16.5% to 12% in Zunyi, and from 18.8% to 14.9% in Guizhou. Detailed information is presented in Table A14.8.

Table A14.8: Variation of Poverty Incidence in Impact Zones

Region	Year	Rural Poverty Incidence (%)	
		Income less than CNY625/person	Income less than CNY1,000/person
Guizhou Province	2001	—	18.8
	2004	8.3	16.7
	2006	7.5	14.9
Zunyi Municipality	2001	—	16.5
	2004	5.1	14.0
	2006	4.7	12.0
Tongzi County	2001	—	17.0
	2004	4.4	14.3
	2006	3.9	11.8

CNY = yuan.

Sources: Poverty Reduction Offices in Zunyi Municipality and Tongzi County.

19. With more and more enterprises established in the project areas, a large number of job opportunities were generated in 2005, 2006, and 2007. Workers laid off from many state enterprises and local farmers, particularly the poor, found employment. In addition, construction of the expressway directly provided employment opportunities for 2,000 local laborers in the project influence areas. At the peak construction period, about 13,000 laborers worked as unskilled labor or provided services temporarily. With the opening of the expressway, 416 local people were employed for the expressway operation, and 120 local people from affected

villages were employed to undertake expressway cleaning tasks. Of the latter group, 80% were from either project-affected households or the poor.

20. The locally procured construction materials and supplies also provided many employment opportunities in the project areas. According to a report prepared by the Guizhou Academy of Social Science (GASS), seven cement plants in Tongzi were established or reconstructed to meet the demand for cement for the expressway construction. In addition, around 20 stone pits were opened along the alignment to supply the needed stones and gravel. Consequently, the local transportation industry received a boost, and a number of transportation companies were able to provide services for infrastructure and industry development projects in Zunyi and the rest of Guizhou. Due to the procurement of local materials and supplies, a large number of job opportunities were created for local labor, particularly the poor. Furthermore, many laborers obtained regular jobs to service other projects after the completion of the expressway.

21. In addition to the expressway, the Project also upgraded 13 local roads totaling 704 km. All the roads were completed by 2007, and are now in good condition. Zunyi initiated its own road development program for a better expressway-local highway network. In 2004, Zunyi invested CNY37.43 million for new construction or rehabilitation 3,672 km of roads. The upgraded roads reduced travel time and the cost of reaching schools, hospitals, and other social services. They made health care and skills development opportunities easily accessible to the poor, thus improving their chances of finding employment in nearby industries.

F. Monitoring and Evaluation

22. GASS was recruited to monitor socioeconomic impacts resulting from land acquisition and resettlement. In addition to a baseline survey report in 2002, two monitoring and evaluation reports on socioeconomic impact were submitted in 2003 and 2004, respectively. The reports concluded that the construction of the project expressway greatly contributed to regional socioeconomic development and poverty reduction in the project influence areas including immediate, intermediate, and perimeter areas.

G. Conclusions and Recommendations

23. The Project has had significant impacts on regional socioeconomic growth and poverty reduction: (i) more and more enterprises and investments have been attracted to the project impact zones; (ii) employment opportunities for the poor increased during expressway construction and operation; and (iii) upgraded feeder roads link the project areas to the expressway and improve the access of local farmers to wider markets. Overall, the poverty reduction and socioeconomic development impacts of the Project are significant.

EVALUATION OF ETHNIC MINORITY DEVELOPMENT

A. Ethnic Minority Groups in Zunyi

1. Zunyi municipality has 36 ethnic minority (EM) groups. The groups, with a population of 0.89 million in 2006, accounted for 12.2% of the total population of Zunyi in that year. Around 82% of the EM population is distributed in two Gelao autonomous counties¹ and eight minority townships in other counties. In addition, there are four other townships that have sporadic EM residents. The main EM groups are Buoyi, Gelao, Miao, and Tujia.

2. Daozhen Gelao Autonomous County was established in November 2007. It administers 14 townships including one Tujia township. The total population of Daozhen was 0.34 million in 2006, of which 77% were EM. Among the EM population, 58% were Gelao, 32% were Miao, and 10% were Tujia.

3. Wuchuan Gelao and Miao Autonomous County was also established in November 2007. In 2006, Wuchuan had a population of 0.41 million distributed in 15 townships. The 17 EM groups in Wuchuan accounted for 91.5% of the total population; and the Gelao and Miao alone accounted for 85%.

4. The seven minority townships are (i) Mazhong Miao township of Tongzi county, established in 1954; (ii) Pingzheng Gelao township in Zunyi county, established in 1956; (iii) Houshan Miao-Buoyi township, founded in 1956; (iv) Honguang Miao township in Zunyi county, founded in 1984; (v) Shangba Tujia township in Daozhen county, established in 1984; (vi) Huashan Miao township in Yuqing county, founded in 1986; and (vii) Shiping Miao-Gelao township, founded in 1987.

B. Project Support to EM Development

5. Six feeder roads totaling 319 kilometers (km) out of the 13 feeder roads under the Project would provide connections to the two autonomous counties. The six feeder roads are part of one provincial road and one county road. When improvement is complete, the six feeder roads, together with the seven other feeder roads, would provide about 400,000 EM residents convenient access to places outside their county.

C. Development Support to Autonomous Counties and EM Townships

6. From 2001 to 2006, the Zunyi Municipal EM Development Department implemented 560 projects, with an accumulated input of CNY11 million, in the EM counties and townships. The completed projects covered (i) water supply, (ii) access roads and feeder roads, (iii) electricity supply, (iv) television and broadcast media, (v) telecommunication, and (vi) construction of rural houses.

7. In addition to the infrastructure projects (para. 6) implemented under the EM development program, Wuchuan and Daozhen and other EM counties also received intensive support from state poverty reduction programs. Both autonomous counties are designated national-level key working counties for poverty reduction. From 2001 to 2006, they received fiscal transfer payments from central governments of CNY5.33 million and CNY1.65 million,

¹ Daozhen Gelao Autonomous County and Wuchuan Gelao Autonomous County are the only two Gelao autonomous counties in the PRC.

respectively. In the same period, as a result of preferential support from central and local governments, a total of 376 projects using CNY719 million of the national debt fund were implemented in the two EM counties.

8. To further strengthen the development accomplished in the EM counties and townships, the Zunyi municipal government initiated its own partnership program² starting in 2000. About 70 municipal government agencies of Zunyi established partnerships with 12 townships, 8 of which were EM townships, and implemented 132 small-scale infrastructure projects from 2000 to 2006. The 132 infrastructure projects covered (i) water supply; (ii) access roads, (iii) electricity supply, (iv) education, (v) medical care, (vi) telecommunication, (vii) science and technology, and (viii) culture. Total investments from the partnership program amounted to CNY24.2 million.

D. Social and Economic Development in Autonomous Counties and EM Townships

9. Owing to efforts contributed by various government agencies and partners, the two autonomous counties have experienced rapid development in recent years. For Daozhen county, achievements included the following: (i) the average annual gross domestic product (GDP) growth was 13.6% from 2001 to 2006, compared with 12.6% for the whole Zunyi municipality; (ii) local financial revenue increased to CNY47.0 million in 2006 from CNY36.9 million in 2001, with average annual growth of 4.9%; (iii) per capita rural income increased to CNY1,671 from CNY 1,288 in 2001, with average annual growth of 5.6%; (iv) about 81% of the rural residents benefited from the cooperative medical care system; (v) more than 90% of the rural villages were connected with all-weather roads; (vi) more than 80% of the villages gained access to television and broadcast media; and (vii) all townships were covered by mobile phone networks.

10. For Wuchuan county, the changes included the following: (i) the average annual GDP growth was 12.4% from 2001 to 2006; (ii) local financial revenue decreased from CNY42.8 million in 2001 to CNY37.0 million in 2006 mainly due to the closing of a coal mine; (iii) per capita rural income increased from CNY1,318 to CNY1,730; (iv) about 76% of the rural residents benefited from the cooperative medical care system; (v) more than 90% of the rural villages were connected with all-weather roads; (vi) more than 80% of the villages had access to television and broadcast media; and (vii) all townships were covered by mobile phone networks.

11. For the 12 townships covered by the partnership program, achievements included the following: (i) 263 km of roads were upgraded and all villages gained access to roads; (ii) irrigation and drinking water systems were improved for 15,000 people and 2,500 livestock; (iii) four schools were rehabilitated; and (iv) primary school enrollment rose to above 95%. Shicao township, one of the poorest townships in Zunyi, implemented 30 projects with a total investment of CNY1162. million contributed by 19 municipal government agencies. As a result, per capita rural income in Shicao increased to CNY1,088 in 2006 from CNY785 in 2001.

12. Due to the much harsher natural conditions and underdeveloped socioeconomic foundations, the two autonomous counties and the EM townships are considered poor regions in Zunyi municipality. The rural per capita income of Zunyi municipality at CNY2,480 in 2006 was still higher than the CNY1,675 in Wuchuan and CNY1,730 in Daozhen.

² One or several government agencies provided inputs to one township as its development partner.

QUANTITATIVE ASSESSMENT OF OVERALL PROJECT PERFORMANCE

Criteria	Assessment	Rating (0-3)	Weights (%)	Weighted Rating
Relevance	Highly Relevant	3	20	0.6
Effectiveness	Effective	2	30	0.6
Efficiency	Highly Efficient	3	30	0.9
Sustainability	Likely	2	20	0.4
Overall Rating	Successful		100	2.5

Notes on Rating System:

Rating:

3	=	Highly Relevant/Highly Effective/Highly Efficient/Most Likely
2	=	Relevant/Effective/Efficient/Likely
1	=	Partly Relevant/Less Effective/Less Efficient/Less Likely
0	=	Irrelevant/Ineffective/Inefficient/Unlikely

Rating greater than 2.7	=	Highly Successful
Rating between 1.6 and less than 2.7	=	Successful
Rating between 0.8 and less than 1.6	=	Partly Successful
Rating below 0.8	=	Unsuccessful