

ASIAN DEVELOPMENT BANK

TAR:PRC 37125

TECHNICAL ASSISTANCE

(Financed by the Poverty Reduction Cooperation Fund)

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR

POVERTY IMPACT OF AREA-WIDE ROAD NETWORKS

March 2004

CURRENCY EQUIVALENTS

(as of 22 March 2004)

Currency Unit	–	yuan (CNY)
CNY1.00	=	\$0.1208
\$1.00	=	CNY8.2772

ABBREVIATIONS

ADB	–	Asian Development Bank
ARNM	–	area-wide road network model
EIRR	–	economic internal rate of return
GDP	–	gross domestic product
IS	–	information system
km	–	kilometer
MOC	–	Ministry of Communications
NTHS	–	National Trunk Highway System
PRC	–	People's Republic of China
TA	–	technical assistance
TPU	–	transport planning unit
11FYP	–	Eleventh Five-Year Plan

NOTES

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

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I. INTRODUCTION

1. During the 2003 Country Programming Mission of the Asian Development Bank (ADB), the Government of the People's Republic of China (PRC) requested ADB to provide technical assistance (TA) to study the poverty reduction impact of area-wide road networks to improve the planning, implementation, and operations of road networks. The TA will lead to a more equitable distribution of road investment benefits by linking local roads and the National Trunk Highway System (NTHS). The Fact-Finding Mission visited Beijing in July 2003 and reached an understanding with the Government on the TA objectives, scope, implementation arrangement, cost estimates, financing plan, and terms of reference for consulting services. The TA is included in ADB's 2003 country assistance plan for the PRC.¹ This report is based on the Mission's findings. The TA framework is presented in Appendix 1.

II. ISSUES

2. The PRC economy grew rapidly during the past decade, averaging around 10% per annum, and is expected to continue growing rapidly in the foreseeable future. Despite this good progress, the Government's fight against poverty is far from over. Average gross domestic product (GDP) per capita is about \$1,000. Living standards of millions of people in rural and urban areas, particularly in the western region, must be raised.

3. Economic growth has resulted in increasing traffic volume. The motor vehicle fleet is growing at 15–30% per annum, creating a huge demand for more road space. In 2002 the vehicle fleet totaled over 16 million trucks, cars, and buses; and 47 million other motorized vehicles. The privately owned fleet of motor vehicles increased more than 30 times in 1985–2002, from 300,000 vehicles to 10 million. In 1990–2000 road traffic grew at 9.7% per annum for passenger traffic, and 5.9% per annum for freight. Road traffic accounted for over 55% of the total passenger traffic. Given the PRC's rapid economic growth, low vehicle ownership rates, increased automobile manufacturing capacity, lower car prices as tariff barriers fell after World Trade Organization accession, and increasing access to loans to finance automobile purchases, the vehicle fleet is expected to continue to grow rapidly in the coming years.

4. Rural PRC needs a good road network to grow and prosper. The poor have limited mobility beyond their immediate communities because of geographic isolation and the high cost of motorized transport. As a result, the poor view roads as the key infrastructure needed to accelerate socioeconomic development, improve quality of life, create jobs, bring in stable income, and provide access to social services.

5. The economy's changing structure and increasing diversification have altered transport demand. Demand for road transport has risen faster than that for other transport modes. To meet the growing demand for improved access to markets and services, the Government has made major efforts to increase road capacity. Roads are classified into expressways, and local (classes I–IV) and unclassified roads. The backbone of the network is the NTHS, a 35,000-kilometer (km) system of interprovincial expressways and high-class highways to be constructed by 2010. Village and farm roads, which are normally either class IV or unclassified, are the lowest level of the network. In 2000 the Government adopted the Western Region Development Strategy to enhance economic development where most of the poor reside, and gives high priority to the road sector to promote economic growth and reduce poverty.

6. To remove major transport bottlenecks, the Government implemented a large investment program of the road sector, totaling CNY924 billion during 1996–2000, compared with CNY242 billion during 1991–1995. The road network grew from 1.16 million km in 1995 to 1.76 million km in 2002, and expressways increased from 2,141 km to 25,200 km. The second stage of the road development program (2003–2020) will increase the network to over 3 million km, or 68,000 km annually. Expressways will increase to 70,000 km, or 2,650 km annually. In 2003 the

¹ The TA was first listed in *ADB Business Opportunities* (Internet version) on 25 April 2003.

Government launched 5,300 rural road projects, covering 78,000 km and costing CNY78 billion.²

7. Despite the huge amount of investment, the PRC's road transport network has many weaknesses, which are particularly evident in the poor rural western areas. Roads and traffic management fall under the responsibility of various agencies.³ Information is not coordinated or exchanged. Expressways and class-I highways account for 3% of the total road network, and class-2 highways for 11%. About 70% of the county and township roads are gravel or earth roads; 340 townships and 67,000 villages have no road connection. Public transport services (buses) are unavailable in 1,000 townships and 160,000 villages, most of which are in the western region (footnote 2). Expressways are built on the outskirts of key urban areas but connections to the city center are insufficient. Roads without adequate traffic signals, signs, or markings constitute about 86% of the total network. Domestic market development has been hindered by the lack of transport integration and high logistics costs. For example, transporting grapes from Sichuan Province to Beijing costs more than importing them from Chile.⁴

8. Rapid traffic growth has increased road network congestion and the number of road accidents. In 2002 773,137 road accidents caused 109,381 fatalities, or 1 fatality every 5 minutes—the highest rate in the world. Without appropriate measures, fatalities could reach 200,000 per annum by 2010. Economic losses from accidents are 1–3% of GDP per annum. A disproportionate number of fatalities are the poor, usually pedestrians, nonmotorized transport users, and public bus users.

9. The road sector is the largest sector in ADB's PRC operations, accounting for about 60% of the portfolio. Roads also dominate ADB's future PRC program. To increase the probability that the poor will benefit from ADB-funded road projects, these have been shifted to the poor central and southwest regions.

10. The scope of ADB-financed road projects has been broadened to include improving local roads, thus providing better access to poor communities, as well as financing expressways. ADB's operational approach revolves around two concerns: (i) developing the NTHS to connect the key economic growth centers, and (ii) improving local roads to increase the likelihood that the poor will benefit from the investment. Adopting an area-wide approach to road network planning—one that links NTHS and local roads—can significantly help eliminate poverty and optimize transport system efficiency.⁵

11. Obstacles that hinder deepening Government and ADB-financed road projects' poverty impacts and impede understanding the linkage of better roads to poverty reduction include the following:

- (i) The Government's planning approach and feasibility study methodology are based on a single-project approach. Insufficient attention is paid to linking expressways with local roads to meet the needs of the poor.
- (ii) Different agencies are responsible for expressways and local roads, creating problems in planning and coordination.
- (iii) Scarce resources are being diverted from local roads to expressways.
- (iv) Fiscal resources are lacking for local roads, which, unlike expressways, are not tolled.
- (v) Transport planning is lacking through which expressways and local roads can be integrated with community transport systems.

² Ministry of Communications (MOC). 2003. *Transport Statistics*. Beijing.

³ MOC and its provincial departments are responsible for the nation's expressways and key provincial roads. Local roads and urban roads fall under responsibility of local governments. The Ministry of Public Security and its provincial bureaus are responsible for traffic management and road safety.

⁴ World Bank. 2003. *Trade and Transport: A Chinese Perspective*. China Roads and Highways Conference. Beijing.

⁵ Department for International Development. 2002. *Making Connections: infrastructure for Poverty Reduction*. UK.

- (vi) Databases are absent, as are analysis resources, a monitoring system, and guidelines to address social and stakeholder dimensions and traditional road project factors.

III. THE TECHNICAL ASSISTANCE

A. Purpose and Output

12. The TA aims to improve planning of road network investments and operations in the PRC, which will benefit the poor and increase overall economic benefits from road network investments through better linkage between local roads and NTHS. In view of the tremendous growth expected (para. 6) and current obstacles (para. 11), the TA will help the Government prepare a road network strategy that promotes, in an integrated manner, expressways and local roads to meet communities' needs and support economic growth. The TA will provide road agencies with the cross-disciplinary skills and tools to incorporate poverty- and stakeholder-related issues⁶ in various stages of road project planning, implementation, and operation.

13. The TA will help do the following:

- (i) Develop an integrated and sustainable road network development strategy to better link poor communities. It is expected to help the Government move away from the single-project approach, and prepare priorities for the Eleventh Five-Year Plan (11FYP, 2006–2010), and the 2020 program.
- (ii) Recommend a central government mechanism to fund local road investments, and enhance local financing capacity, to tackle institutional obstacles.
- (iii) Improve the Government's feasibility study methodology⁷ and guidelines to facilitate road network project planning and selection.
- (iv) Develop a computerized information system (IS) to provide uniform social, economic, engineering, transport, and area-specific data to fill the current gap; and an integrated area-wide road network model (ARNM) to evaluate road network investments, using IS data.
- (v) Conduct a pilot project to test the strategy, feasibility study methodology, IS, and ARNM.
- (vi) Create a transport planning unit (TPU)⁸ to improve road investment programs and strengthen interagency cooperation and coordination, improve human resources development, oversee implementation of the pilot project, and conduct monitoring.

B. Methodology and Key Activities

14. The TA will address sector strategy, project support, and monitoring. The sector strategy study will do the following:

- (i) Build on the strength of the ADB-PRC partnership in the road sector; review relevant studies, including ADB-financed TAs;⁹ and assess supply and demand,

⁶ Zaman, M. 2002. *Integrating Social Issues in Road Projects: Example of South Asian Experience*. ADB: Manila.

⁷ The feasibility study forms the basis for project preparation, planning, design, decision making, and securing funds. All proposed projects must be associated with a feasibility study for government assessment before inclusion in the ADB country program. Feasibility study guidelines were last reviewed in 1994, with the help of the World Bank. The guidelines need to be strengthened in light of developments such as socioeconomic impact assessment requirements, vehicle growth, the Government's 2020 strategy, strengthening of local road and expressway integration, toll and financial performance criteria, competition from other transport modes, road safety, maintenance analysis, and the changing nature of transport service providers.

⁸ The TPU will be attached to the Planning Department of the Sichuan Province Communications Department for operational reason. MOC will provide the guidance and resources, and monitor effectiveness.

⁹ Asian Development Bank (ADB). 1992. *Institutional Strengthening for Highway Operation and Management Improvement*. Manila; ADB. 1992. *Jilin Province Highway Network Study*. Manila; ADB. 2000. *Assessing the Impact of Transport and Energy Infrastructure on Poverty Reduction*. Manila; ADB. 2002. *Socioeconomic Assessment of Road Projects*. Manila.

- poverty, institutions, economic framework, finance, toll, maintenance, expressway program, stakeholders, and provision of local roads.
- (ii) Develop an integrated expressway and local road strategy to help the Government prepare its priorities for the 11FYP and 2020 program.
 - (iii) Recommend a joint central government, Ministry of Communications (MOC), and local government funding mechanism to implement local roads as part of the expressway projects, improve funding allocation, improve equity, and tackle institutional problems.

15. The project support study will improve the feasibility study methodology and guidelines to facilitate planning and selection of road network projects, to allow the poor to benefit from improved roads and fulfill the requirements of the new government program (para. 6). The guidelines will include (i) procedures to define and implement expressway projects based on consideration of the overall road network services rather than just the traditional individual NTHS link; and (ii) procedures to define local roads based on (a) required local road standards; (b) means of transport; (c) integration with NTHS and local infrastructure; and (d) community-related factors such as community participation, location of local roads, social services, and productive sectors (e.g., agriculture). The improved feasibility study (footnote 7) is anticipated to contribute significantly to planning of community-oriented projects and to intensify their impact on poverty.

16. The project support study will develop practitioner tools to facilitate strategic planning, preparation of feasibility studies, and management of roads. The study will (i) develop a computerized IS that will provide uniform social, economic, engineering, transport, and area-specific data; (ii) develop an integrated ARNM to evaluate road network investments, using IS data; and (iii) conduct a pilot project to test the strategy, feasibility study methodology, IS, and ARNM. The study's output will fill information and analysis gaps and provide road planners, designers, and decision makers with the skills and ability to deliver better transport services.

17. The monitoring study will (i) develop a monitoring system; and (ii) create a TPU to improve road investment programs, strengthen interagency cooperation and coordination, improve human resources development, oversee implementation of the pilot project, and conduct monitoring.

18. The relevant central government strategy, systems, and plan will be investigated, and three western areas¹⁰ selected for field study to develop proposals: Sichuan Province, Chongqing Municipality, and Guangxi Zhuang Autonomous Region, which include nine existing and planned ADB-financed road projects, representing an ideal case study to gather reliable input for the TA and implement the pilot project. The proposed Central Sichuan Roads Development, Guangxi Roads Development II and Chongqing Roads Development projects will be included in the TA study together with the exiting projects of the study areas.

19. The final report will consolidate the findings of the TA studies and be complemented by guidelines, user manuals, and relevant documents. The TA will finance a national conference to disseminate the knowledge gained under the TA and to provide guidance on priority issues. Senior government officials, ADB staff, stakeholders, and development partners will be invited. Workshops will assess issues and outcome. Staff of the TPU and selected agencies will be trained to fill gaps in their knowledge, facilitate planning and operations of future integrated road network investments, run the pilot project, and enable staff to update the final TA outcome regularly and provide expert advice. An audiovisual package and promotional materials will be prepared to disseminate the knowledge developed under the TA.

¹⁰ The areas include high poverty incidence and cultural minorities; heavy interprovincial traffic; regional trade (e.g., Viet Nam); planned and ongoing projects; operational expressway and local road projects; and intermodal transport (road, port, and rail).

C. Cost and Financing

20. The total cost of the TA is estimated at \$1.4 million equivalent, comprising \$631,700 of foreign exchange cost and \$768,300 equivalent of local currency cost. ADB will provide \$1 million equivalent to cover the entire foreign exchange cost and a portion of the local currency cost amounting to \$368,300 equivalent. The TA will be financed on a grant basis from the Poverty Reduction Cooperation Fund and administered by ADB. Government will finance the remaining \$400,000 equivalent to cover the costs of office accommodation and support services, communications, local transport, office supply, and other facilities and services required to implement the TA. The detailed cost estimate is in Appendix 2.

D. Implementation Arrangements

21. A team of international consulting firms in association with domestic consulting firms will be engaged using the simplified technical proposal procedures based on the quality- and cost-based selection method and in accordance with ADB's *Guidelines on the Use of Consultants*. The TA will require a total of 46 person-months of consulting services (15 international, 31 domestic) to carry out the study as defined in the outline terms of reference. The international and domestic consultants will provide expertise in (i) highway and traffic engineering; (ii) transport planning and economics; (iii) transport policy and organization, (iv) poverty and social analysis; and (v) management information system. The terms of reference are in Appendix 3.

22. MOC will be the TA executing agency, responsible for supervision and monitoring of TA activities, and providing ADB and consultants with what they need. A central steering committee, chaired by the director general of the Comprehensive Planning Department, MOC, has been established, comprising the National Development and Reform Commission and Ministry of Finance. Project committees, chaired by directors of provincial communications departments, and including interagency staff, have been established in the relevant provinces. The consultants will be fielded in May 2004 and work for 12 months. MOC will provide the consultants with the required office accommodation and services in Beijing and relevant provinces. All equipment, systems, and guidelines will be procured under the consultants' contract in accordance with arrangements acceptable to ADB, and ownership will be transferred to the TPU after the TA. Tripartite meetings involving the Government, ADB staff, and consultants will be held in the PRC to advise and guide the consultants and review their reports. The final report will be submitted 6 weeks after ADB and Government comments. After the TA starts, MOC will establish the TPU as part of Sichuan Province Communications Department, which has a good implementation reputation and large number of projects. The TPU will manage the pilot project, which will also start during the TA, and provide an annual monitoring report to ADB for 3 years after TA completion.

IV. THE PRESIDENT'S DECISION

23. The President, acting under the authority delegated by the Board, has approved ADB administering technical assistance not exceeding the equivalent of \$1,000,000 to the Government of the People's Republic of China to be financed on a grant basis by the Poverty Reduction Cooperation Fund for Poverty Impact of Area-Wide Road Networks, and hereby reports this action to the Board.

TECHNICAL ASSISTANCE FRAMEWORK

Design Summary	Performance Indicators/Targets	Monitoring Mechanism	Assumptions And Risks
<p>Goal Greater flow of benefits to the poor and increased overall economic benefits from road network investments in the People's Republic of China through better linkage between local roads and the National Trunk Highway System (NTHS)</p>	<ul style="list-style-type: none"> • Increase in traffic between national highways and local roads • Increase in range of transport services (e.g., number of transport entities, number and frequency of services, range of vehicle types) using local roads • Increase in ex-ante and ex-post economic internal rate of return (EIRRs) of network developments, particularly of local road components • Increase in provincial and local gross domestic product and other economic and poverty statistics where network developments are implemented 	<ul style="list-style-type: none"> • Review of EIRRs in feasibility and various post-evaluation studies • Government statistics and annual reports • Special assessment of poverty incidence • Benefit monitoring reports • Traffic counts and transport surveys 	<ul style="list-style-type: none"> • An improved planning system is adopted and matched by funding increases for local roads. • The pilot project demonstrates that improved planning will result in a more integrated road system that increases the proportion of benefits captured by the poor. • Price and other complementary incentives stimulate economic activity in areas around the local roads in the networks.
<p>Purpose Improved planning of road network investments and operations</p>	<ul style="list-style-type: none"> • Reference in project documents to the technical assistance (TA) outcome, and conformity of project features with the use of its methodology and strategy • Changes in funding arrangements for local roads 	<ul style="list-style-type: none"> • Asian Development Bank (ADB) country program and sector reviews • Project documents 	<ul style="list-style-type: none"> • The Government adopts the policy measures, initiatives, and institutional reforms of the TA. • The pilot project is successfully implemented and its results are incorporated in methods and models. • The steering committee continues to monitor the transport planning unit (TPU) activities following TA completion. • Donor's and external funding agencies accept the TA outcome.
<p>Outputs Sector Strategy Study</p> <p>Strategy A road network strategy that promotes, in an integrated manner, expressways and local roads to improve accessibility to meet the needs of communities, and support economic growth. The strategy is expected to help the Government move away from the single-project approach and prepare priorities for the Eleventh Five-Year Plan (2006–2010), and 2020 program</p>	<ul style="list-style-type: none"> • A road network strategy document of acceptable quality produced, and accepted by Government • A road network strategy used in pilot project • A road network strategy included in the draft final report and assessed at the national conference 	<ul style="list-style-type: none"> • Consultants' reports and ADB TA reviews • Stakeholders survey 	<ul style="list-style-type: none"> • The Government is supportive, particularly by regularly and expeditiously reviewing the consultants' proposals. • The consultants' reports are of acceptable quality.

Design Summary	Performance Indicators/Targets	Monitoring Mechanism	Assumptions And Risks
<p>Funding Mechanism</p> <ul style="list-style-type: none"> • A central government mechanism to fund Local Road investments as part of the NTHS program • Arrangements to enhance local financing capacity 	<ul style="list-style-type: none"> • A report detailing appropriate mechanisms and arrangements acceptable to various government levels • A funding mechanism included in the draft final report and assessed at the national conference 	<p>Consultants' reports and ADB TA reviews</p>	<p>The Government is supportive, particularly by regularly and expeditiously reviewing the consultants' proposals.</p>
<p>Project Support Study Feasibility Study Methodology Improved government feasibility study methodology and guidelines to facilitate planning and selection of network road projects</p> <p>Information System and Model</p> <ul style="list-style-type: none"> • A computerized information system (IS) that will provide uniform social, economic, engineering, transport, and area-specific data • An integrated area-wide road network model (ARNM) to evaluate road network investments, including post-investment operations of the road networks, using IS data • Manuals for IS and ARNM <p>Pilot Project A pilot project to test the strategy, feasibility study methodology, IS, and ARNM</p>	<ul style="list-style-type: none"> • Methodology prepared to an acceptable standard and presented in a report and supported by guidelines on its use • Methodology included in the draft final report and assessed at the national conference • Availability of a useable, appropriate information system and model, complete with manuals • Relevant documentation included in the draft final report and assessed at the national conference • A pilot project prepared to an adequate standard, and location and implementation arrangements agreed on • A pilot project during the TA 	<p>Consultants' reports and ADB TA reviews</p> <p>Consultants' reports and ADB TA reviews</p> <p>Consultants' reports and ADB TA reviews</p>	<p>The Government regularly and expeditiously reviews the consultants' proposals.</p> <p>Relevant government agencies are fully cooperative.</p> <p>The Government continues to support the pilot project.</p>
<p>Monitoring Study System A monitoring system set up</p> <p>Transport Planning Unit A TPU serves as an expert body to improve road investment programs and strengthen interagency cooperation and coordination, oversee pilot project implementation, improve staff skills, and conduct monitoring</p>	<ul style="list-style-type: none"> • TPU established by May 2004 • Monitoring system prepared and implemented during the TA • TPU staff assigned on time • Pilot project started during the TA • Regular and timely monitoring reports submitted, during the TA and for 3 years after completion 	<p>Progress reports and review missions</p>	<ul style="list-style-type: none"> • Trained staff continue their assignment with the TPU. • IS and ARNM are installed and in operation. • The Government endorses the monitoring system.

Design Summary	Performance Indicators/Targets	Monitoring Mechanism	Assumptions And Risks
<p>Activities</p> <ul style="list-style-type: none"> • Review and field studies to develop proposals, then preparation of reports, systems, and manuals • Conduct of national conference, and workshops • Conduct of the pilot project during the TA • Human resources development of the TPU and selected agency staff during the TA 	<ul style="list-style-type: none"> • Reports, systems, and manuals prepared on time • National conference to be held following distribution of the draft final report • Pilot project conducted on time • Human resources development completed 40 weeks after TA commencement 		
<p>Inputs</p> <ul style="list-style-type: none"> • Consulting Services Recruitment of good-quality consultants—15 person-months of international and 31 person-months of domestic consultation services • Good-quality ADB supervision • TA financing of \$1 million on grant basis by the Poverty Reduction Cooperation Fund, and \$400,000 from the Government 	<ul style="list-style-type: none"> • Timely recruitment of consultants • Consulting services completed by the end of May 2005 • Timely review, appropriate guidance to consultants, and liaison with Government • TA approved by ADB • TA letter signed by ADB and the Government 		

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
A. Asian Development Bank Financing^a			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	298.5	0.0	298.5
ii. Domestic Consultants	0.0	198.4	198.4
b. International and Local Travel	47.0	11.5	58.5
c. Reports and Communications ^b	16.8	30.0	46.8
2. Equipment ^c	67.4	17.6	85.0
3. Conference, Workshops, and Training ^d	80.0	38.0	118.0
4. Surveys, Miscellaneous Administration, and Support Costs	7.5	53.0	60.5
5. Representative for Contract Negotiations ^e	5.5	0.0	5.5
6. Contingencies	109.0	19.8	128.8
Subtotal (A)	631.7	368.3	1,000.0
B. Government Financing			
1. Office Accommodation and Services	0.0	250.0	250.0
2. Remuneration and Per Diem of Counterpart Staff	0.0	100.0	100.0
3. Others	0.0	50.0	50.0
Subtotal (B)	0.0	400.0	400.0
Total	631.7	768.3	1,400.0

^a Financed by the Poverty Reduction Cooperation Fund.

^b Including production of audiovisual demonstration package, guidelines, manuals, and promotion materials.

^c Computer hardware and software, photocopier, facsimile machine, and other equipment to be procured under the consultants' contract and whose ownership will be transferred to the Government, including area-wide road network model and information system.

^d Includes cost of the national conference, workshops and in-country and overseas training.

^e Includes cost of travel to Manila and per diem for government observers attending consultants' contract negotiations at the Asian Development Bank (ADB) headquarters.

Source: ADB estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The technical assistance (TA) will require a total of 46 person-months of consulting services, including 15 person-months of international and 31 person-months of domestic consultants, to carry out the study and provide expertise in (i) highway and traffic engineering; (ii) transport planning and economics; (iii) transport policy and organization; (iv) poverty and social analysis; and (v) management information system. The domestic consultants will be recruited to assist the team of international consultants, and will have extensive knowledge in the relevant areas. The international consultants' scope of work will include, but not necessarily be limited to, the following:

A. Highway and Traffic Engineering Specialist

2. The highway and traffic engineering specialist will act as the team leader, and have the main responsibility for coordinating the TA activities, and accomplishing the TA outputs with the support of other international and domestic consultants. The consultant will have demonstrated skills to manage an interdisciplinary team, and a wide range of experience in developing a transport system in a complex environment, with full understanding of the institutional, socioeconomic, policy, and technology of modern transport.

3. The consultant will also do the following:

- (i) Review, and recommend improvements to, road infrastructure,¹ and transport services, including intermodal links, supply-demand, maintenance, expressway program, stakeholders, provision of local roads, vehicle ownership, access to services, affordability, competition, safety,² and constraints.
- (ii) Outline the recent and likely future expenditures on road construction and operations, and assess whether such expenditure will be adequate to maintain effective road infrastructure, including sources of revenue to fund the Eleventh Five-Year Plan (11FYP, 2006–2010) and the 2020 program. Examine the national trunk highway system (NTHS) strategy, determine the adequacy of local road plans, and identify constraints.
- (iii) Prepare a road network strategy that promotes, in an integrated manner, expressways and local roads to improve accessibility to meet communities' needs and support economic growth to help the Government move away from the single-project approach and prepare priorities for the 11FYP and 2020 program. Recommend a funding mechanism and joint local government and MOC projects to overcome institutional obstacles.
- (iv) Review the role of the feasibility study³ in decision making for highway investments at the various levels of government in the People's Republic of China (PRC). Assess the major parameters and methods for use in the highway

¹ The TA will assess the national strategy, systems and central government plan, and use the study area of Chongqing Municipality, Guangxi Zhuang Autonomous Region, and Sichuan Province for field investigation and pilot project implementation. The proposed Central Sichuan Roads Development, Guangxi Roads Development II, and Chongqing Roads Development projects will be included in the TA study together with the exiting projects of the study area.

² Assess the impact of the 2003 road safety and traffic law; impact of the new port law on intermodal operations; previous Asian Development Bank (ADB)-financed TAs e.g., Asian Development Bank (ADB). 1992. *Institutional Strengthening for Highway Operation and Management Improvement*. Manila: ADB. 1992. *Jilin Province Highway Network Study*. Manila: ADB. 1998. *Regional Road Sector Study*. Manila: ADB. 2000. *Assessing the Impact of Transport and Energy Infrastructure on Poverty Reduction*. Manila: ADB. 2002. *Socioeconomic Assessment of Road Projects*. Manila, and relevant literature.

³ World Bank. 1994. *Study of Prioritization of Highway Investments*. Washington DC; and Rust PPK Pty. Ltd. 1994. *Feasibility Study Methodology*. Washington DC.

- feasibility study, and appropriateness of data. Review regulations issued by Ministry of Communications on preparing feasibility study reports.
- (v) Review the engineering component of the feasibility study methodology, which deals primarily with limited parameters. Recommend improvement measures, including linking of expressways with local roads to meet the needs of the poor, traffic forecasts and modeling, geometric design of each class of road, construction practice, asset management, road safety audit, and traffic enforcement.
 - (vi) Develop procedures to define and implement expressway projects based on consideration of the overall road network services, and procedures to define local roads, based on (a) required standards, (b) means of transport, (c) integration with NTHS and local infrastructure, and (d) community-related issues such as road location and social services.
 - (vii) Develop a comprehensive and effective feasibility study methodology and guidelines to improve planning and selection of road network projects, based on the integration of the engineering component with the economic, environmental, poverty, and stakeholder issues, to develop expressway and local road projects.
 - (viii) Provide input to the development of IS, ARNM, guidelines, and manuals to help staff with planning, design, maintenance, budgeting, supervision, operations, and performance monitoring. Conduct a human resources development program.
 - (ix) Conduct a pilot project in the study area to demonstrate that improved planning will result in a more integrated road system that increases the proportion of benefits captured by the poor; and to test the strategy, feasibility study methodology, IS, and ARNM. Incorporate planned, under-construction, and operational expressway and local road projects, including interprovincial, intercountry, and intramodal cases. Assess the appropriateness of the integrated expressway and local road system for ADB and external financier investments.
 - (x) Provide input to create the TPU to improve road investment programs and strengthen interagency cooperation and coordination, oversee implementation of the pilot project, and conduct monitoring.

B. Transport Planning and Economic Specialist

4. The specialist will do the following:

- (i) Assess economic trends in production; industrial structure; rural and urban areas; and income, including national and international trade, growth of markets, and likely change in commodity flows. Review expenditures on road infrastructure development, and government poverty reduction and economic policies.
- (ii) Assess the status of transport modes for freight and passengers, outline expected developments, and identify facilities for an efficient and integrated expressway and local road network.
- (iii) Review transport demand level, cost of competing modes of transport, transport users and service providers, type and quality of road infrastructure, policies, government budget and subsidy, vehicle ownership, maintenance, and licensing and registration regime.
- (iv) Examine the structure of financing and management of the tollway system. Assess the potential impact of the national expressway model (i.e., the 659-kilometer Beijing-Shenyang network and unified toll system and potential government regulation) on road planning, development, linking of expressways and local roads, road users, and the poor.

- (v) Examine the socioeconomic assessment methods for ADB-financed road projects and identify areas that need refining. Assess how allocation of scarce expenditures to expressways may be diverting funds from local roads, which, unlike expressways, are not tolled; and how expressways and local roads can be integrated into community transport systems.
- (vi) Define the benefit of area-wide road networks, planning procedures, function of each road class, demand and supply, cost, accessibility, accidents, and impacts. Review traffic forecast and modeling practices for expressways and local roads, and the relationship between tolls, poverty, and road use.
- (vii) Recommend a poverty-focused model for transport planning within the wider context of improved livelihoods, access to resources, social services, and jobs, including an economic evaluation model for use in the feasibility study to optimize road investments.
- (viii) Design and propose data sets for planning, implementation, operation, and monitoring of integrated expressways and local road networks, with attention to (a) procedures to define and implement expressway projects, based on consideration of overall road network services rather than just the traditional individual NTHS link, to meet the requirements of the 11FYP and 2020 program of the new government; and (b) procedures to define local roads based on required standards, means of transport, integration with NTHS and local infrastructure, income-generating activities, community participation, location of local roads, social services, and agricultural and industrial production. Propose measurable variable and performance indicators utilizing previous studies.
- (ix) Provide input to develop the integrated road network strategy, road funding mechanism, feasibility study methodology and guidelines, and IS and ARNM development. Prepare training material, and advise on pilot project implementation and TPU creation.

C. Transport Policy and Organization Specialist

5. The specialist will do the following:

- (i) Prepare recommendations on road sector policies, institutions, and financing, and assess the structure and capability of road agencies in relation to road planning, design, construction, and management. Identify a series of capacity-building activities, including training that could enhance sector management.
- (ii) Review the road classification system; assess the function of each road class and the relationship between these functions; and recommend ways to optimize the network, particularly for the poor. Assess the benefits of linking expressways to local roads, and provide advice on barriers and required actions.
- (iii) Assess government funding procedures and institutional obstacles, and prepare mechanisms to promote the joint construction of expressways and local roads to enhance interagency planning and coordination.
- (iv) Identify the status of non-motorized transport services. Study public and private road-based passenger and goods transport; and growth of vehicle fleet in terms of ownership rates, increased automobile manufacturing capacity, lower car prices as tariff barriers fell after World Trade Organization accession, and increasing access to loans to finance automobile purchases.
- (v) Recommend ways to support good governance in the road sector, and a corporate structure to achieve sound and sustainable commercialization of expressway-operating entities, and assess the impact on local road development.

- (vi) Recommend an overall policy framework, and identify the role of an area-wide road network in improving private vehicle, public bus, and truck operations, and access of poor communities to benefits of road investments. Develop an action plan and evaluation criteria to help the Government maximize benefits of road development and transport operations.
- (vii) Help develop an area-wide road network strategy to serve as a best-practice model for national road investment, and consider linkages with ADB-financed projects, and current government strategies.
- (viii) Provide input to develop the feasibility study methodology and guidelines, covering all aspects of road planning, design, operations, competition in provision of passenger and goods transport, safety, administration, cost, monitoring and socioeconomic issues; and to design IS and ARNM, including interagency protocols. Provide training to enhance local capacity, and advice on pilot project implementation and TPU creation.

D. Poverty and Social Analysis Specialist

6. The specialist will do the following:

- (i) Based on the review of research, policy documents, toolkits, and other literature, diagnose the poverty situation and how development of the road network, including related facilities and services, has helped reduce poverty.
- (ii) Provide a detailed analysis of the constraints on the PRC's road network development in maximizing poverty reduction impacts from an equity and efficiency point of view, and assess the socioeconomic benefits of integrated area-wide road network development at household, community, and meso and macro levels, keeping in mind of the potential impacts of recent agricultural⁴ and other policy reforms, as well as increased rural-urban migration. Such an analysis may include impacts on household incomes and alternative livelihoods, empowerment of women and men in the communities, time saved for traveling, better access to market, services, lower transport costs, etc. Develop a quantitative and qualitative methodology to measure and monitor the poverty reduction impact of the integrated road network strategy. Assess the potential negative socioeconomic impact of the integrated area-wide road network development, particularly increased road accidents, and suggest detailed prevention, mitigation, and monitoring measures.
- (iii) Review the feasibility study methodologies from a poverty and social analysis point of view and improve methodologies in planning, prioritizing, designing, implementing, and monitoring and evaluating the area-wide road network projects.
- (iv) Provide inputs to develop the integrated road network strategy, feasibility study methodology, IS, and ARNM. Provide advice on implementing the pilot project and structure and role of the TPU, including reporting and information dissemination systems, and suggest adjustment of the poverty and social methodologies as necessary.

E. Management Information System Specialist

7. The specialist will do the following:

⁴ For example, 2003 Government regulation to increase prices of grain, cooking oil, and other related products; tax abolition law on so called special agriculture produce, i.e. farm produce other than grains, and possible impact on increasing income of farmers and poor community, overseas and local export, and need for better road infrastructure.

- (i) Review the lack of databases, planning and analysis resources, monitoring system, and guidelines. Based on the TA team input, develop a uniform computerized IS, including data collection protocol, graphic facilities, and user manuals. Data should include economic, social, services, road and road transport, population, and characteristics of the area. Incorporate cross-checking, reporting, and information dissemination protocols.
- (ii) Based on socioeconomic, engineering, and other data, develop ARNM, in collaboration with TA team, taking into account population, production, economic activity, income, and travel demand issues. The model should incorporate traffic forecast and management procedures, investment of strategic road projects, strategic transport planning process, link with the master plan, socioeconomic issues, and cost-benefit functions. ARNM should be capable of modeling a range of alternative road improvement projects (new and current). ARNM should be used to fulfill the requirements of the feasibility study, road network strategy, and management of roads, using IS data.

8. Prepare user manuals and guidelines, including design standards, showing road classification, vehicle operating cost, road surface conditions, traffic volume and composition, road safety, social issues, cost, and other related matters. Prepare computerized mapping facilities to assess road network routes, public transport services, and a profile of the study area.

9. Develop the IS and ARNM using well-known and user-friendly software, including menu-driven and graphical input and output. Prepare procedures to ensure that the data bank, schedules, maps, and feasibility study standards can be regularly updated. Prepare training materials to facilitate use of all systems by TPU and other agency staff during the TA. The IS and ARNM should be flexible enough to be used anywhere.

F. Reporting

10. The consulting services will be carried out over 12 months and completed in May 2005. Four tripartite meetings involving the MOC, ADB, and consultants will be held to discuss and review the TA findings, and inception, interim, and draft final reports, including workshop recommendations. The main reports will be submitted to ADB as follows: (i) inception report, 3 weeks after services start; (ii) interim report—24 weeks after services start; (iii) draft final report—40 weeks after services start; and (iv) final report—6 weeks after comments of ADB, MOC, steering committee, and final experts workshop. The final report will incorporate the outcome of the national conference, which will be held after distribution of the draft final report. Two copies of each report in English and Chinese are required for the Ministry of Finance, National Development and Reform Commission, MOC, and Sichuan Province Communications Department. ADB requires three copies of each report in English (except for the final report, for which five copies are required).