

**REPORT AND RECOMMENDATION  
OF THE  
PRESIDENT  
TO THE  
BOARD OF DIRECTORS  
ON A  
PROPOSED LOAN  
TO THE  
PEOPLE'S REPUBLIC OF CHINA  
FOR THE  
ZHENGZHOU–XI'AN RAILWAY PROJECT**

**August 2005**

## CURRENCY EQUIVALENTS

(as of 14 August 2005)

Currency Unit	–	yuan (CNY)
CNY1.00	=	\$0.1235
\$1.00	=	CNY8.1002

The exchange rate of the yuan is determined under a floating exchange rate system. In this report, a rate of \$1.00 = CNY8.277, the rate prevailing at the time of fact-finding of the Project, is used.

## ABBREVIATIONS

ADB	–	Asian Development Bank
EA	–	executing agency
EIA	–	environmental impact assessment
EIRR	–	economic internal rate of return
EMP	–	environmental management plan
FIRR	–	financial internal rate of return
FSDI	–	Fourth Survey and Design Institute
ha	–	hectare
HIV/AIDS	–	human immunodeficiency virus/acquired immune deficiency syndrome
HPG	–	Henan provincial government
km	–	kilometer
LIBOR	–	London interbank offered rate
m <sup>2</sup>	–	square meter
MOR	–	Ministry of Railways
PRC	–	People's Republic of China
SDAP	–	social development action plan
SPG	–	Shaanxi provincial government
STI	–	sexually transmitted infection
TA	–	technical assistance
WACC	–	weighted average cost of capital
ZXR	–	Zhengzhou–Xi'an Railway

## NOTES

- (i) The fiscal year (FY) of the Government and its agencies ends on 31 December. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2005 ends on 31 December 2005.
- (ii) In this report, "\$" refers to US dollars.

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## LOAN AND PROJECT SUMMARY

<b>Borrower</b>	People's Republic of China (PRC)
<b>Classification</b>	Targeting Classification: General intervention Sector: Transport and communications Subsector: Railways Theme: Sustainable economic growth Subthemes: Promoting economic efficiency and enabling markets, and fostering physical infrastructure development
<b>Environment Assessment</b>	Category: A. An environmental impact assessment was completed and the summary was circulated to the Board on 29 April 2005.
<b>Project Description</b>	The Project is located in the western part of Henan province and southeastern part of Shaanxi province, a relatively poor area. The Project is designed to promote sustainable economic growth by constructing 459 kilometers (km) of railway line from Zhengzhou in Henan to Xi'an in Shaanxi. The Project will develop an efficient, safe, and environmentally sustainable railway transport system in the region; and facilitate creation of additional employment and income-generating opportunities, thus benefiting poor residents.
<b>Rationale</b>	<p>The Project reflects the ADB railway sector operational strategy for the PRC, which includes reducing railway network constraints and promoting sustainable economic growth in poor areas not served by railways. The Project is in line with the Government's western development strategy to provide less-developed regions with better infrastructure to facilitate economic growth, thereby increasing the opportunity for people to improve their living standards.</p> <p>The interior regions of the PRC have not benefited as much from economic growth and reforms as the east coast; in fact, the gap in economic and social development has increased. Transport constraints and high logistics costs are two factors contributing to regional economic disparities, and two of the constraints preventing the western region from capitalizing on its comparative advantages.</p> <p>The Project is one of the eight passenger-dedicated corridors to be developed by 2020. The proposed alignment for the Zhengzhou–Xi'an railway (ZXR) is 50 km shorter than the existing Longhai railway line. Traversing Henan and Shaanxi, the proposed railway line will connect with Beijing–Guangzhou, Shanghai–Xuzhou, and Beijing–Wuhan main lines on the east and Xi'an–Baoji–Lanzhou, Xi'an–Baoji–Chengdu, Xi'an–Ankang, and Xi'an–Yan'an main lines on the west. This is the main east-west corridor linking Beijing, Shanghai, Lianyungang, and other major cities and ports in the east, to Xi'an, Baoji, Lanzhou, Urumqi, Chengdu, Chongqing, in the west. The Project will also help promote regional cooperation as this is the main east-west corridor linking the PRC to Central Asia and Europe.</p> <p>The Project, a joint-venture railway between the Ministry of Railways</p>

(MOR) and Henan and Shaanxi provincial governments (HPG and SPG), will have substantial managerial and financial autonomy. The Project will contribute to changing railway enterprises from cost centers in a planned economy to profit centers in an increasingly competitive transport market. The components are formulated in line with MOR's 2004 Railway Development Plan.

### Impact and Outcome

The Project will remove a transport constraint to sustainable economic growth. Providing economic railway transportation in the unserved, less-developed, and poor areas will help create conditions necessary for developing local resources and generating employment and income-enhancing opportunities to raise living standards in the project area.

Project preparation involved participatory processes. Extensive consultations were held with all the main stakeholders, including various affected people, potential beneficiaries, village leaders, women's groups, local ethnic bureaus, and local governments in the project area. Household surveys were carried out, and participatory workshops were organized in the project area to understand public opinion about the Project, and to provide inputs for the social and environmental assessments.

The Project comprises the following components: (i) construction of 459 km of double-track electrified standard gauge class I passenger dedicated railway between Zhengzhou and Xi'an; (ii) construction of 9 new railway stations complete with facilities; (iii) safety initiatives, including provision of modern technology and equipment for enhancing safety; (iv) e-governance and operating dispatch information system; (v) provision of training on the use and maintenance of modern equipment; (vi) land acquisition and resettlement; (vii) environmental protection and mitigation of adverse environmental effects; (viii) consulting services for construction supervision, monitoring and evaluation, and marketing and business development; and (ix) strengthening of institutional capabilities. The key inputs needed for project implementation include civil works, equipment, consultants, and staff of MOR and the Project Company.

### Cost Estimates

The total project cost of the Project is estimated at \$4,131.93 million equivalent, comprising \$1,364.61 million in foreign exchange and \$2,767.32 million equivalent in local currency.

### Financing Plan

	(\$ million)		
<b>Source</b>	<b>Foreign Exchange</b>	<b>Local Currency</b>	<b>Total Cost</b>
Asian Development Bank	400.00	0.00	400.00
China Development Bank	0.00	1,667.27	1,667.27
MOR, HPG, SPG	964.61	1,110.05	2,064.66
<b>Total</b>	<b>1,364.61</b>	<b>2,767.32</b>	<b>4,131.93</b>
Percent	33.00	67.00	100.00

HPG = Henan provincial government, MOR = Ministry of Railways, SPG = Shaanxi provincial government.

Source: Asian Development Bank estimates.

### Loan Amount and Terms

A loan of \$400 million from ADB's ordinary capital resources will be provided under ADB's London interbank offered rate (LIBOR)-based

lending facility. The loan will have a 26-year term including a grace period of 6 years, an interest rate determined in accordance with ADB's LIBOR-based lending facility, a commitment charge of 0.75% per annum, and such other terms and conditions set forth in the draft loan agreement.

<b>Period of Utilization</b>	Until 30 June 2012
<b>Estimated Project Completion Date</b>	31 December 2011
<b>Executing Agency</b>	Ministry of Railways
<b>Implementation Arrangements</b>	The Foreign Capital and Technical Import Center, under MOR, will coordinate the project management office's tasks and be responsible for procurement, withdrawals, and reporting vis-à-vis ADB. The Project Company will manage and operate the project railway after completion of the construction; and develop and implement adequate and transparent business development mechanisms, and accounting and reporting systems.
<b>Procurement</b>	MOR will procure ADB-financed components in accordance with ADB <i>Guidelines for Procurement</i> . Other items will be procured in accordance with government procedures acceptable to ADB.
<b>Consulting Services</b>	The ADB loan will finance 20 person-months of international consulting services for (i) strengthening institutional, marketing, and business development functions of the Project Company; and (ii) researching and strengthening the development, operation, and management of passenger-dedicated railway systems in the PRC. The consultants will be recruited in accordance with ADB <i>Guidelines on the Use of Consultants</i> . MOR will engage and finance 28,000 person-months of international and domestic consulting services for project design, construction supervision, construction quality control, environmental supervision, procurement, and monitoring and evaluation of the safeguard aspects of the Project in accordance with government procedures acceptable to ADB.
<b>Project Benefits and Beneficiaries</b>	The Project will (i) provide the shortest land route between Zhengzhou and Xi'an, key centers of Henan and Shaanxi provinces, enabling railway users to benefit from lower transport costs and shorter travel distances and times; (ii) increase the corridor's capacity, benefiting consumers and producers of goods and services through the provision of timely and efficient transport services and lower logistics costs; (iii) generate direct and indirect employment in the project-influenced area, and create jobs and income-earning opportunities (the construction and operation of the railway will employ much local unskilled labor); (iv) provide an area that lacked adequate cost-efficient transportation services with access to broader markets; and (v) stimulate local development through tourism, railway station area development,

and other infrastructure elements to maximize benefits to local areas.

The increased tax revenues generated by the economic development induced by the Project will help finance improved social service facilities and basic infrastructure.

The major project beneficiaries will be (i) passengers, including tourists, who will benefit from affordable, faster, and safer trips; (ii) freight users who will switch from the existing road and benefit from more affordable, faster, and safer trips; (iii) local residents who will benefit from the lower prices of commodities and services transported by the project railway; (iv) local labor involved in construction work and supply of materials during implementation, and in loading/unloading during the operation of the railway; (v) local farmers who will be able to sell their products at market prices without paying a high margin to a transport intermediary; (vi) local manufacturers and traders who can increase production capacity or establish businesses, and will transport their goods and services by the railway; and (vii) local governments, which will benefit from the increased opportunity for local area development and increased revenues.

The Project will benefit about 9.3 million people living in the project area. The poverty and social assessment looked at the 19 counties, of which 17 are rural and 2 urban. Six counties are designated national or provincial poverty counties. The 725 designated poverty villages have a population of about 1.3 million poor. About 90.2% of the beneficiaries live in rural areas, and 15% are poor with an annual net income per capita of less than CNY900. The links between poverty, difficult topography, and poor transport systems are apparent in the project area for the proposed ZXR. Poverty is often caused by geographic remoteness and isolation, limited transport access, high transport costs, and poor access to market information, as well as limited access to health, education, and other social services.

The Project will facilitate the creation of additional employment and income-generating opportunities. About 353,000 person-years of work will be created during construction. This will provide direct employment opportunities to over 70,000 poor people, including women and ethnic minorities. Railway station area development will increase incomes in local communities and help generate local revenues. The Project will facilitate the development of local industry and tourism, which will help generate additional opportunities in the future for local people. Consultations with the local people in the project area indicated their strong support for the Project.

The Project is financially and economically sustainable. The 7.0% financial internal rate of return exceeds the 3.0% weighted average cost of capital. The economic internal rate of return is estimated at 17.4%.

## **Risks and Assumptions**

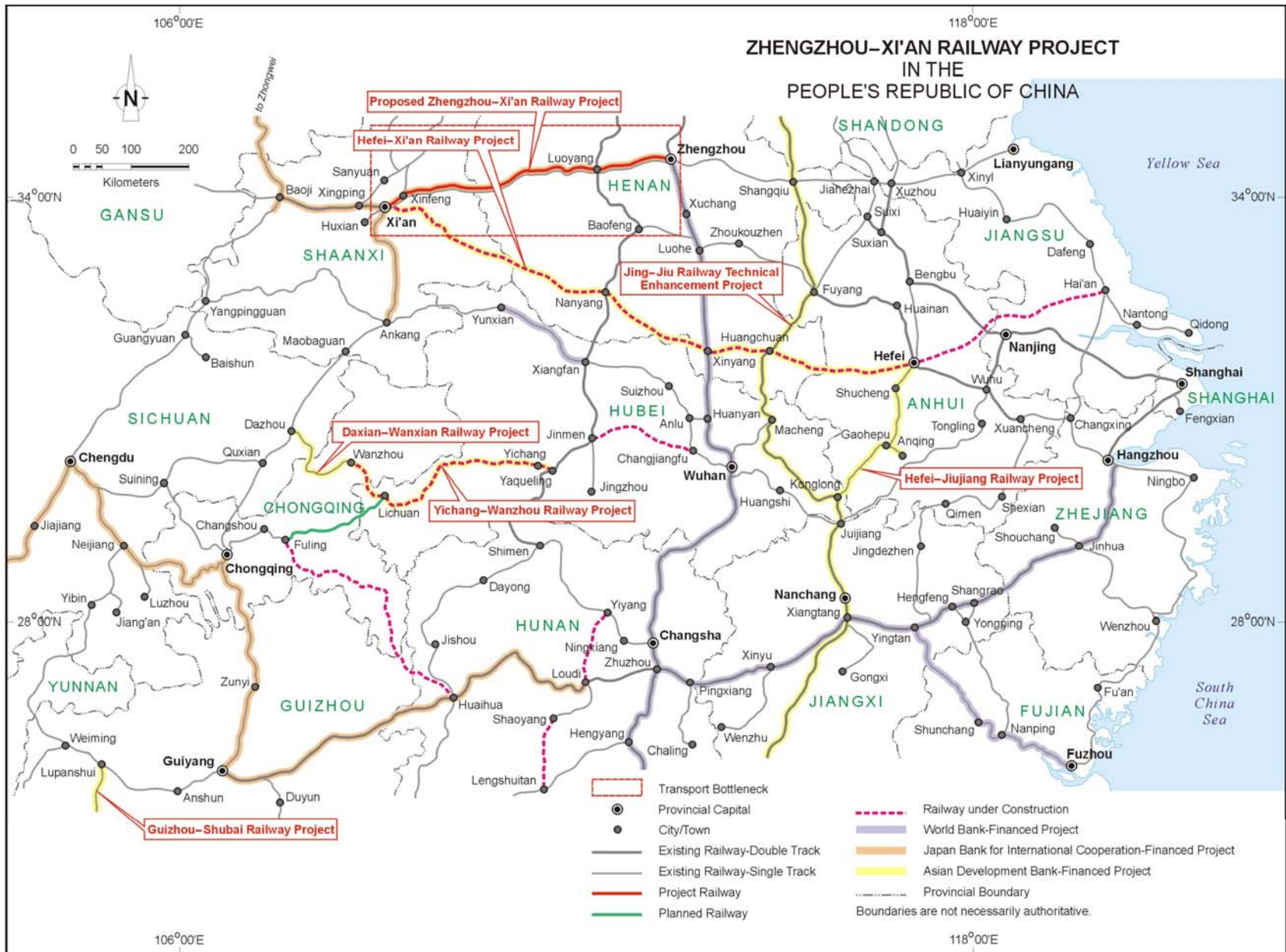
The railway will be constructed in hilly and mountainous terrain, which is a significant technical challenge. The associated physical risks during implementation include delays, cost overruns, worker health and safety, and environmental impacts. These potential risks have been assessed



and appropriate mitigating measures provided.

Resettlement will affect about 37,000 people. The railway alignment was selected to minimize resettlement, where possible. The resettlement plan includes preferential treatment for employment during construction, supply of local materials, allocation of commercial space near railway stations, and job training. Resettlement will be implemented by local governments and closely monitored and supervised. These measures will mitigate the potential social risks associated with resettlement.

Intermodal competition between railways and roads will create market risks for the project railway. However, the existing railway and road is already congested and the capacity constraint is expected to worsen. Surveys of passengers found that the railway would have several advantages over other transport modes: lower fares, shorter travel times, safety, and punctuality. The increasing commercial orientation of the joint-venture railway will help to lessen the risks posed by intermodal competition.





## I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the People's Republic of China (PRC) for the Zhengzhou–Xi'an Railway (ZXR) Project. The design and monitoring framework is in Appendix 1.

## II. RATIONALE: SECTOR PERFORMANCE, PROBLEMS, AND OPPORTUNITIES

### A. Performance Indicators and Analysis

2. From 1978, when economic reforms were introduced, through to 2003, the PRC experienced sustained rapid economic growth. This exceptional economic performance continued in 2004 with economic growth rates of 9.5%. With this impressive growth, demand for transportation grew quickly. During 1978–2004, passenger transport increased by 9% annually and freight transport 7.6%. In 2004, road traffic accounted for 53.7% of total passenger-kilometers (km) followed by railways (35%), civil aviation (10.9%), and coastal and inland waterways (0.4%). The modal split for freight ton-km was 58.4% for coastal and inland waterways, 28.9% for railways, 11.4% for roads, 1.2% for pipelines, and 0.1% for civil aviation.

3. The railway is the primary mode of transport for long distance and bulk transport. At the end of 2004, the PRC's railway system of 74,400 route-kms comprised 61,000 km of national railways and 13,400 km of joint venture and local railways. The Ministry of Railways (MOR) operates the state-owned national railway as an integrated system. The joint venture and local railways, comprising regional lines within provincial boundaries, are constructed under the sponsorship of provincial governments and/or MOR to serve local needs and provide interconnection to the national railway network. Despite its large size, the railway network does not provide adequate coverage for the country's population and land area.<sup>1</sup>

4. PRC railways have the highest freight transport density in the world and second highest passenger transport density after Japan. Locomotive turnover is the highest in the world. Between 1978 and 2004, railway freight increased from 535 billion ton-km to 1,929 billion ton-km, equivalent to an annual growth rate of 5.1%. Passenger traffic grew at 6.6% annually, increasing from 109 billion to 511 billion passenger-km. The average railway journey increased from 134 km in 1978 to 484 km in 2004, compared with the average journey per passenger on roads, which grew from 35 to 54 km over the same period. Despite such growth rates, railway capacity has lagged demand due to system constraints. Given the railway's important role for providing economic transportation, these constraints, if not removed, will continue to be among the major constraints to efficient economic growth. The Government's aggressive plan to improve railways includes network expansion and construction in underserved areas.

### B. Analysis of Key Problems and Opportunities

#### 1. Government Strategy

5. The Government's policy on railway development focuses on (i) removing constraints and expanding the system, (ii) encouraging the construction of joint venture local railways to promote the development of local economies, (iii) improving the efficiency and safety of the existing system by using new technology and modern management tools in planning and operation, (iv) reducing operating subsidies through appropriate pricing and commercialization of services, (v) initiating institutional and structural reforms to increase autonomy and

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<sup>1</sup> The network density per 1,000 square km of land is one third that of India and one tenth that of Japan.

accountability, and (vi) encouraging nongovernment investment in infrastructure and related services (Appendix 2).

6. The Tenth Five-Year Plan (2001–2005) identifies transportation, including railway development, as a priority. The plan envisages (i) constructing 6,000 km of new lines to provide access to unserved areas with the network length reaching a total of 75,000 route-km; (ii) providing 3,000 km of double lines and electrifying 5,000 km of key lines to increase capacity; and (iii) increasing operating speeds on 5,000 km, with the total length of such lines reaching 15,000 km. A total investment of CNY350 billion, including CNY270 billion for capital construction and CNY80 billion for rolling stock is planned. During 2003–2007, the investments for capital construction are expected to reach CNY450 billion (Appendix 3).

7. In 2004, the State Council approved the Railway Development Plan, which seeks to expand the railway network from the present 74,400 km to 85,000 km by 2010, and 100,000 km by 2020; and identifies the need for separate passenger- and freight-dedicated lines on busy trunk routes. The route network length of the passenger-dedicated network will reach 5,000 km by 2010 and 12,000 km by 2020. Increasing train speed to enhance mobility is a major goal: by 2020 train speed will be increased to over 200 km per hour on the trunk network from the present 120 km per hour. Priority will be given to developing railways in unserved areas, and regions that lack transport and remain less developed. The route network length will increase by 16,000 km in the western region of the PRC to reach network length of 40,000 km by 2020.

## **2. Asian Development Bank Strategy and Sector Experience**

8. The Asian Development Bank (ADB) strategy for the railway sector focuses on helping (i) expand the railway system by constructing new lines in unserved, less-developed areas; (ii) modernize and increase capacity to improve efficiency on key routes of the national railway system; (iii) commercialize railway operations to sustain efficient operations; and (iv) increase railway competitiveness in transport sector through restructuring and reform. ADB has focused on the development of railways in poor, less-developed inland provinces to promote sustainable economic growth and reduce poverty.<sup>2</sup> ADB has provided 12 loans totaling about \$2.2 billion to finance the construction of about 1,921 km of eight provincial railways operated by joint ventures with MOR, and 4,138 km of new railway lines under the four national railway projects (Appendix 4). The Project, designed to promote economic growth by providing railway transportation in unserved, less-developed, and poor areas of Henan and Shaanxi provinces, is consistent with the PRC's development priorities and the proposed ADB strategy.

## **3. Policy Dialogue**

9. Policy dialogue has been a feature of ADB assistance to the railway sector and has effectively complemented the lending operations. Since 1989, 10 technical assistance (TA) initiatives totaling \$4.6 million have been provided for institutional development of local railways, tariff and organizational studies for the Jing–Jiu railway, enhancement of commercial and business operations, marketing and business development, human resource development, and improvement of financial management and accounting systems (Appendix 4). ADB policy dialogue with MOR focuses on (i) poverty reduction as the overarching objective of ADB operations, (ii) full compliance with ADB safeguard policies, (iii) sector reforms, (iv) marketing and business development, (v) private sector participation and nongovernmental financing, and (vi) regional cooperation. The Railway Development Plan defines the major goals for the PRC

<sup>2</sup> ADB. 2000. *Technical Assistance for Assessing the Impact of Transport and Energy Infrastructure on Poverty Reduction*. Manila. The findings conclude that completed railway projects supported general economic growth in the region, as well as led to small areas of high economic growth in towns served by railway stations.

railways to 2020, and is in broad agreement with the ADB strategic agenda. MOR's proposed reform agenda for this plan seeks to (i) study and learn from the best international practices gained worldwide, (ii) separate core operations from noncore transportation businesses, (iii) rationalize and reduce staff, (iv) reform the railway investment and financing system, and (v) establish specialized transportation companies.

10. MOR has adopted a structured approach to railway reform. In 1999, using a new management concept—the asset operating liability system, MOR entered into management contracts with railway administrations to improve profitability (as a pilot project). The contracts helped improve operational and financial performance; subsequently this approach was extended to all 15 railway administrations. Separation of core and noncore businesses is a key element of MOR's restructuring program. The total number of employees in the core transportation business was reduced from 1.89 million in 1997 to 1.55 million in 2004. In the noncore transportation business, five large companies employing 616,500 staff have been divested. To provide jobs for redundant staff, by the end of 2004 MOR had set up 5,800 diversified businesses (independent of the core transportation business), employing more than 416,000 staff to supply equipment, goods, and services to the railway industry. In 1998, MOR initiated a cost-sharing scheme for health insurance and pensions for railway employees. In 2004, MOR completed the transfer of 826 educational institutes and 208 hospitals to local governments. One hundred branch lines comprising 7,800 km were separated to improve productivity and reduce operating losses (The reform agenda matrix is in Appendix 5, Supplementary Appendix A includes a chronology of railway reforms).

#### a. Poverty Reduction

11. The strategic purpose of ADB involvement in the railway sector is to create conditions for sustainable economic growth to help improve living standards. The Project, located in an unserved area, has the potential for economic growth once improved, cost-effective transport access is provided. Identifying ways to enhance the poverty reduction impact has been an integral part of project planning and design. Specific features include (i) providing employment during construction and operation of the ZXR on a preferential basis to poor workers including women;<sup>3</sup> (ii) utilizing locally produced materials that meet the requirements of quality and economy (e.g., sand, stone, cement); (iii) adding provisions for railway station area development; (iv) providing station access roads and construction access roads; and (v) supporting poverty reduction programs of local governments.<sup>4</sup> The Project will finance construction access roads to be handed over to the local government at the end of the construction. The local governments also have a 5-year plan to improve the road network and transport services in the project area concurrently with the Project. These roads will reach all of the province-designated poverty villages. The Project and the local road development will increase the welfare gains for the poor including women and help spread project benefits to the poverty villages.

<sup>3</sup> In the Guizhou–Shuibai Railway Project, the proportion of the poor in unskilled labor was 41% on average and 64% during peak construction. ADB. 1998. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Guizhou–Shuibai Railway Project*. Manila.

<sup>4</sup> Some completed projects reported that about 40% of the poor at appraisal were raised above the poverty line upon project completion. The Hefei–Jiujiang Railway Project showed 41% of the poor were raised above the poverty line. ADB. 1993. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Hefei–Jiujiang Railway Project*. Manila.

## **b. Sector Reforms**

12. ADB is supporting institutional reform of the railway sector to separate the Government and enterprise functions, giving full play to market forces and increasing the competitiveness of the railways. ADB has actively pursued separation of core transport business from the noncore transport business, segmentation of passenger and freight services, and strengthening of the recently corporatized specialized transportation companies. Setting up of passenger-dedicated corridors with a separate institutional structure is a key ADB intervention. As part of ADB policy dialogue with MOR, three large companies handling containers, special goods, and express parcel have been set up.<sup>5</sup> Rationalization of staff and reduction of transportation and nontransportation staff is also being pursued. On 18 March 2005, MOR undertook a major restructuring exercise and abolished 41 subrailway administration bureaus, thereby reducing one tier of railway management. The number of railway administrations has increased from 15 to 18. This will reduce staff, rationalize operations, improve productivity, and enhance efficiency. ADB will continue supporting operational reforms, including emphasizing railway safety and the introduction of safe and reliable technology, upgrading speeds, and introducing dedicated passenger and freight lines, modern dispatch control system, and high quality information systems on the PRC railway network. The PRC's accession to the World Trade Organization has intensified competition among different modes of transport and the structure of transport demand is likely to change.<sup>6</sup> ADB is providing an advisory TA for policy reform support.<sup>7</sup> During project processing, coordination was maintained with the World Bank and a common approach to reforms and assistance developed. This will be continued during project implementation.

## **c. Marketing and Business Development**

13. As the PRC progresses to a market-driven economy, railways will need to compete on the basis of price and service quality for demand-based transportation services. New marketing and business development initiatives are needed for freight and passenger services to be competitive. In past projects, ADB has supported project-specific studies to create marketing and business development opportunities, including skills and knowledge for market-oriented operation and awareness of profitable operations. The Project will continue these initiatives through a capacity development program for the Project Company.

## **d. Private Sector Participation**

14. ADB policy dialogue encourages private sector participation in the railway sector for the provision of services, construction, tourism, container, and luggage-related businesses. The setting up of a corporate entity to construct, operate, and manage the Project is a significant step. Discussion is under way to explore the possibility of future listing of the proposed company on the stock market.<sup>8</sup> A leading group has been established and is looking at the possibility of diversified financing sources, including from the private sector. Establishing large container terminals at Zhengzhou and Xi'an will facilitate participation of shipping lines and freight

<sup>5</sup> These companies are China Railway Container Transport Company, China Railway Express Parcel Company, and China Railway Special Goods Company. The startup process is ongoing. ADB and MOR have agreed on the separation of container businesses as part of the ADB-financed Yichang–Wanzhou Railway Project. ADB. 2003. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Yichang–Wanzhou Railway Project*. Manila.

<sup>6</sup> Since opening up the freight transport market to foreign companies under World Trade Organization commitments, two joint venture companies with foreign participation have entered the market.

<sup>7</sup> ADB. 2004. *Technical Assistance to the People's Republic of China for World Trade Organization Policy Reform Support to the Ministry of Railways*. Manila. The TA is ongoing.

<sup>8</sup> Guangzhou-Shenzhen joint venture railway company is listed on Hong Kong and New York Stock Exchange.

forwarders in the business of rail transported containers. Under the Project, MOR will encourage the development of station facilities, local tourism, and real estate. Activities, such as consulting services for construction supervision, testing, construction contracts, track maintenance, commercial activities, loading and unloading, and other logistical facilities, will be outsourced to enhance opportunities for private sector participation.

#### 4. Lessons Learned

15. Experience from completed and ongoing ADB-financed railway projects in the PRC shows strong commitment and generally satisfactory capabilities of executing agencies for project implementation (Appendix 6). The speed of implementation has generally exceeded expectations at appraisal, and agencies have generally complied with loan covenants. Resettlement and environmental management were carried out satisfactorily. Audit covenants were complied with in a timely manner, and the audited financial statements were generally acceptable. Of the 12 ADB-supported railway projects, 5 are complete,<sup>9</sup> 3 have started commercial operations,<sup>10</sup> and 4 are under implementation.<sup>11</sup>

16. The key lessons from the completed railway projects highlight the need to (i) ensure that the executing agency established for project processing, implementation and operation has adequate capacity; (ii) prepare realistic traffic forecasts; (iii) review constraints to traffic on a network basis, and the impact on project viability of the existing and/or planned railway lines and other transportation modes that may compete with the project facilities; and (iv) finance railway projects with appropriately determined debt-equity ratios.

17. Previous railway projects have contributed to socioeconomic development in the projects' influence areas. The main impacts are (i) new railway lines in less-developed regions stimulated economic development resulting in higher growth rates of gross domestic product

<sup>9</sup> ADB. 1989. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Shanxi–Xiaoliu Railway Project*. Manila (Loan 948-PRC for \$39.7 million, approved on 31 January 1989); ADB. 1991. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Yaogu–Maoming Railway Project*. Manila (Loan 1087-PRC for \$67.5 million, approved on 20 June 1991); ADB. 1992. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Guang–Mei–Shan Railway Project*. Manila (Loan 1167-PRC for \$200 million, approved on 25 June 1992); ADB. 1993. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Hefei Jiujiang Railway Project*. Manila (Loan 1221-PRC for \$110 million, approved on 30 March 1993); and ADB. 1994. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Jing–Jiu Railway Technical Enhancement Project*. Manila (Loan 1305-PRC for \$200 million, approved on 14 July 1994).

<sup>10</sup> ADB. 1996. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Daxian–Wanxian Railway Project*. Manila (Loan 1439-PRC for \$100 million, approved on 4 June 1996); ADB. 1997. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Shenmu–Yan'an Railway Project*. Manila (Loan 1553-PRC for \$200 million, approved on 29 September 1997); ADB. 1998. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Guizhou–Shuibai Railway Project*. Manila (Loan 1626-PRC for \$140 million, approved on 18 August 1998).

<sup>11</sup> ADB. 2000. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Hefei–Xi'an Railway Project*. Manila (Loan 1748-PRC for \$300 million, approved on 17 August 2000); ADB. 2001. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Ganzhou–Longyan Railway Project*. Manila (Loan 1850-PRC for \$200 million, approved on 18 October 2001); ADB. 2003. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Yichang–Wanzhou Railway Project*. Manila (Loan 2051-PRC for \$500 million, approved on 15 December 2003); ADB. 2004. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Dali–Lijiang Railway Project*. Manila (Loan 2116-PRC for \$180 million, approved on 2 December 2004).



and rural incomes compared with the without- project scenario;<sup>12</sup> (ii) construction activities generated demand for unskilled labor and employment of poor workers, including women, who would have otherwise remained unemployed or underemployed;<sup>13</sup> (iii) service roads built for construction activities opened up and benefited rural communities in inaccessible areas; (iv) domestic resource mobilization improved, providing additional resources for social programs<sup>14</sup> and generating employment; (v) supply and transportation of local materials generated employment; (vi) improved and lower cost transport resulted in lower prices of agricultural inputs (such as fertilizers), which stimulated cash-crop farming and provided more income to farmers; increased mobility of rural residents; and allowed access to more markets, employment opportunities, and social services beyond the immediate communities; (vii) counties provided with new railway access recorded higher gross domestic product growth rates than in other counties; (viii) the investment environment was enhanced; resulting in rapid development of secondary and tertiary industries that generated employment;<sup>15</sup> (ix) the consequent shift in the structure of employment from low productivity agriculture to higher productivity agroprocessing and light industry increased employment opportunities for women whose incomes and social status then improved;<sup>16</sup> (x) tourism developed because of more affordable and convenient railway travel; and (xi) environmental protection and mitigation measures were taken under the projects as agreed at appraisal; and environmental impacts of induced developments were addressed in accordance with the environmental impact assessments (EIAs) for the projects. The railway projects have contributed to a transformation of the local economies: per capita rural incomes increased substantially, living standards improved, and poverty reduced. The lessons learned and experience gained are incorporated in the current project design.

## 5. Rationale

18. The project rationale reflects (i) network development; (ii) capacity enhancement; (iii) support for the PRC Railway Development Plan and the western region development strategy; and (iv) promotion of pro-poor economic growth along the rail line and in the region, thereby reducing poverty. The project area is largely mountainous with abundant natural reserves of coal, zinc, and other nonferrous materials; and a large manufacturing industry and tourist sites. In spite of abundant natural resources, many are poor and the economic growth necessary to reduce rural poverty has failed to develop because of inadequate transport services and high costs. Local governments and people living in the project area see the railway as a key investment for addressing this problem.

19. The Project is the first of eight passenger-dedicated corridors to be developed by 2020. The proposed alignment for the ZXR is 50 km shorter than the existing Longhai railway line,

<sup>12</sup> In the project area of the Jing–Jiu Railway (footnote 9), the gross domestic product of 10 counties in Jiangxi province increased from CNY4.9 billion in 1993 to CNY15.4 billion in 1998, an annual increase of 25.5% compared with 10.2% for the province as a whole. Rural income per capita in Xinfeng county increased from CNY802 in 1993 to CNY2,222 in 1998, an annual increase of 18.5% compared with 10.3% during 1985–1992 (before the Project).

<sup>13</sup> During the first 2 years of construction of the Guizhou–Shuibai Railway (footnote 10), a total of about 7.5 million person-days of employment was generated, of which 4.1 million person-days or about 55% were provided to local poor people thereby raising them above the poverty line.

<sup>14</sup> The financial revenue of 10 poverty counties in Jiangxi province that are traversed by the Jing–Jiu Railway (footnote 9) increased from CNY0.5 billion in 1993 to CNY1.4 billion in 1998, an annual increase of 22.7% compared with 12.3% during 1985–1992, before construction of the Jing–Jiu Railway.

<sup>15</sup> The Jing–Jiu Railway facilitated the setting up of many resource- and agriculture-based industries in Xingfeng county of Jiangxi province—from 3 in 1992 to 39 in 1998, after project completion. The number of businesses grew from 8,005 in 1992 to 19,287 in 1998, and the number of persons employed in these increased from 18,484 in 1992 to 52,153 in 1998; an annual increase of 23%. In the same county, the number of people living below the poverty line was reduced from 30,400 in 1993 to 11,580 in 1998, a decline of 62%.

<sup>16</sup> Beneficial income and social impacts, particularly on women, were noted in the influence areas of the Yaogu–Maoming Railway (footnote 9) and Guang–Mei–Shan Railway (footnote 9).

which has the highest transport density in PRC railways and is fully saturated. Traversing Henan and Shaanxi, the proposed railway line will connect with the Beijing–Guangzhou, Shanghai–Xuzhou, and Beijing–Wuhan main lines on the east and Xi’an–Baoji–Lanzhou, Xi’an–Baoji–Chengdu, Xi’an–Ankang, and Xi’an–Yan’an<sup>17</sup> main lines on the west. The proposed line extends eastward to Shangqiu and Xuzhou, connecting with Jing–Jiu<sup>18</sup> and Jing–Hu routes; and westward to Baoji and Lanzhou, connecting with the Jing–Lan routes and Lan–Xin line. This is the main east-west corridor linking Beijing, Shanghai, Lianyungang, and other major cities and ports in the east, to Xi’an, Baoji, Lanzhou, Urumqi, Chengdu, and Chongqing, in the west; the current capacity on the existing Longhai line is fully used. Presently both freight and passenger are transported on the same line. This practice limits speeds and restricts traffic flow. When completed, the Project will release capacity on the existing Longhai line, and support growth of freight and container traffic. The Project will also help promote regional cooperation, as this is the main east-west corridor linking the PRC to Central Asia and Europe.

20. The Project and associated developments are expected to stimulate tourism and related industries, and industrial and natural resources development; increase mobility and flow of information exchanges; generate employment; increase living standards; and help reduce poverty. The Project is a part of the Government's program to integrate development of transportation facilities, upgrade highways, and construct links and access roads to the hinterland. Other infrastructure, such as water supply and investment to improve education and health care facilities are also planned. The railway will play an important role in facilitating and integrating this poor and underdeveloped region.

21. The Project will be a joint venture railway owned and operated by MOR and the Henan and Shaanxi provincial governments (HPG and SPG). Joint venture railways, which account for 8,500 km (2004) of the PRC system, have substantial managerial and financial autonomy, including the freedom to set tariffs, which are several times higher than those of the national network. Freight and passenger traffic on joint venture railways has grown faster than on the national railways. Between 1996 and 2004, passenger traffic grew from 2.2 billion passenger-km to 19.6 billion (32%), and freight from 12.3 billion ton-kilometers to 91.4 billion (28.5%) annually as compared with an annual growth rate of 6.8% for passengers and 4.9% for freight on the national railway network. Joint venture railways are more efficient, employing only 5–8 people per km compared with about 25 people per km for the national railways. The Project Company will employ 7.24 people per km.

22. The Project is a key intervention in the railway sector. It introduces the concept of separate corridors for passenger and freight for high-density routes, with many technical, operational, safety, economic, and financial benefits. Because it is a pilot project, ADB is assisting in developing the institutional, marketing, business development, and technical standards for such initiatives. MOR has agreed that a corporate entity will be set up to construct, operate, and manage the Project, and that it will help enhance financial viability and private sector participation. The tariffs agreed are affordable and financially viable. The Project will bring in new technology and pursue operational reforms, including the introduction of safe and reliable technology, increase of speeds, and introduction of modern dispatch control systems and high quality information systems on the railway network. When complete, the Project will

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<sup>17</sup> ADB. 1997. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Shenmu–Yan'an Railway Project*. Manila (Loan 1553-PRC for \$200 million, approved on 29 September 1997).

<sup>18</sup> ADB. 1994. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People's Republic of China for the Jing–Jiu Railway Technical Enhancement Project*. Manila (Loan 1305-PRC for \$200 million, approved on 14 July 1994).

release capacity on the existing Longhai line, and provide for an efficient, high-quality, safe, reliable, and environment friendly mode of transport in the region.

### III. THE PROPOSED PROJECT

#### A. Impact and Outcome

23. By removing a transport constraint to sustainable economic growth, the Project will help increase standards of living and reduce poverty in the project area. This will be achieved by providing efficient, affordable railway transportation in unserved, less-developed areas to create conditions necessary for developing local resources and generating employment and income-enhancing opportunities.

#### B. Outputs

24. The Project comprises nine components: (i) construction of 459 km of double-track, electrified, standard gauge class I passenger-dedicated railway between Zhengzhou and Xi'an;<sup>19</sup> (ii) construction of 9 new railway stations complete with facilities; (iii) safety initiatives, including provision of modern technology and equipment for enhancing safety; (iv) e-governance and operating dispatch information system; (v) provision of training on the use and maintenance of modern equipment; (vi) land acquisition and resettlement; (vii) environmental protection and mitigation of adverse environmental effects; (viii) consulting services for construction supervision, monitoring and evaluation, and marketing and business development; and (ix) strengthening of institutional capabilities. The key inputs needed for project implementation include civil works, equipment, consultants, and MOR and the Project Company staff.

#### C. Special Features

25. **Subregional Context.** The proposed railway link is the main east-west railway link providing land access to Europe through Kazakhstan. The Project will promote railway and multimodal transport of goods and people in the region and thus support regional cooperation. MOR will construct two extra-large container terminals to promote regional traffic.

26. **Safety.** ADB policy dialogue has emphasized the need for operational reforms for the rail network, including enhancing safety by introducing safe and reliable technology; modernizing maintenance systems; and monitoring safety performance. A project component (\$49.58 million equivalent, of which \$20.5 million will be financed by the ADB loan) will promote and enhance railway safety. It will finance the procurement of operation and maintenance equipment to enhance safety and build capacity, including staff training.

27. **E-Governance and the Operating Dispatch Information System.** Part of ADB policy dialogue emphasized introducing modern management systems and high-quality information systems for the PRC railway network. A project component (\$79 million equivalent, of which \$32.61 million will be financed by the ADB loan) will introduce a modern operating dispatch information system, linking the project train and national train reservation systems, and introducing a simulation system to monitor and analyze train performance.

28. **Logistic Center.** MOR has agreed to construct two extra-large container terminals at Zhengzhou and Xi-an to attract high-value traffic on the railways; promote intermodal traffic; and encourage private sector shippers and freight forwarders to use the facility for export and import

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<sup>19</sup> Supplementary Appendix B describes characteristics of the ZXR.

of cargo to other parts of the PRC, ports in the east, and Central Asia and Europe in the west. These will be financed by MOR and completed by 2009.

29. **Tourism.** Both Henan and Shaanxi are important tourist destinations and the Project will support tourism development. In 5 key tourist station areas along the project railway, Luoyang, Hubin, Tongguan, and Lintong districts, 13.7 million people visited as tourists in 2003 providing revenue of CNY 381 million. The local government support to the communities including the poor to promote tourism business has been successful, including village home stays and handicrafts. The provincial and the local governments agreed to further increase such support by re-allocating some of the increased tax revenue from the Project.

30. **Private Sector.** Activities like consulting services for construction supervision, testing, construction contracts, and track maintenance is expected to be outsourced. The Project will encourage private sector initiatives like onboard train services, including catering, cleaning, and loading and unloading at railway stations. Station space will be developed and rented out by open competition; and private sidings, hotels, restaurants, and other logistic facilities will be encouraged in the vicinity of stations.

31. **Reforms.** ADB has engaged MOR in dialogue aimed at enhancing policy reform during project processing; this will be continued. The separation of passenger and freight businesses is a major step, and this is the first project to develop the institutional and technical standards for such initiatives. Setting up a corporate entity to construct, operate, and manage the Project is also a significant step. Discussion is under way to explore the possibility of future listing of the proposed company on the stock market. A project leading group has been established and is exploring the possibility of diversified financing sources, including from the private sector. The Project proposes specific measures to outsource some activities handled by railways and involve the private sector. MOR will continue the process of separating the national core and noncore activities and rationalizing staff. The Project will introduce new technology, emphasize safety, and build capacity for MOR and the joint venture railways.

32. **Social Development Plan.** The Project will facilitate economic development, which will benefit the largely poor population, particularly women and the vulnerable. The social development action plan (SDAP) will enhance project benefits; and ensure adverse impacts are avoided or mitigated; and economic development benefits the poor, women, ethnic minorities, and the vulnerable in an equitable and sustainable manner.

33. **Stakeholder Consultation and Participation.** Extensive consultations including surveys involved about 10,000 people, such as local villagers, tourists, business persons, transport users, and local governments (Appendix 7). This helped to (i) understand public opinion about the proposed railway; (ii) conduct the environmental, economic, and social assessments; (iii) plan resettlement; and (iv) identify the role of various stakeholders. Leading groups have been formed in the prefectures with participation from the relevant government agencies, including poverty reduction offices; All-China Women's Federation; and health, civil affairs, and ethnic affairs bureaus. The local governments assured that the consultation process will be continued to finalize the design and formulate appropriate land compensation, relocation, and rehabilitation measures.

34. **Railway Station Area Development.** The Project includes 11 railway stations, which will be connected to villages, townships, and counties by roads and other transport networks. The local government assured that the railway stations and surrounding areas will be developed with local communities to promote local businesses, income-generating activities, and other opportunities that can benefit all communities, especially the remote poor and women.

35. **Local Employment for Railway Construction and Maintenance.** About 353,000 person-years of work will be created per year during construction. Of this, about 60% will be for unskilled laborers, of which 50% or more will be targeted to poor, resettlement-affected people; women; ethnic minorities; and other vulnerable people. The use of locally produced materials for railway construction will generate additional employment. The poverty reduction offices and women's federations will tailor their programs to ensure sustained gains from employment and income-generating activities resulting from the railway project, by providing training and capacity building. People who have gained short-term income during construction will be consulted and trained to utilize the short-term income for a sustainable livelihood. This will include sending the poor to advanced vocational schools. The increased tax revenue including that from the civil works contractors will help augment these programs.

36. **Complementary Development Initiatives.** To enhance development impacts in the project area, the Henan and Shaanxi provincial and local governments will provide road access, electricity, and telephone to all the poverty villages along the alignment. Road access will be provided to 187 villages, electricity supply to 24 villages, and telephone connections to 163 villages by 2009. The local governments will also reallocate part of the tax revenue obtained from the civil works contractors to the relevant agencies to undertake development programs in the project area.

#### D. Cost Estimates

37. The total project cost, including physical and price contingencies, is estimated at \$4,131.93 million equivalent, comprising foreign exchange costs of \$1,364.61 million (33%) and local currency costs of \$2,767.32 million equivalent (67%) (Table 1), details are in Appendix 8. The cost estimates are based on quantities derived from preliminary engineering designs and unit rates reflecting market prices for goods and materials, and include the costs of land acquisition and resettlement, and environmental mitigation and monitoring.

**Table 1: Cost Estimates**  
(\$ million)

<b>Item</b>	<b>Foreign Exchange</b>	<b>Local Currency</b>	<b>Total Cost</b>
<b>A. Base Cost</b>			
1. Railway Civil Works and Track Work	725.33	1,601.18	2,326.51
2. Signaling and Communications	190.84	138.71	329.55
3. Electric Power and Traction	76.47	106.32	182.79
4. Buildings and Facilities	19.71	80.54	100.25
5. Safety Component	26.29	23.29	49.58
6. E-Governance and ODIS	41.89	37.09	78.98
7. Land Acquisition and Resettlement	0.00	181.43	181.43
8. Environmental Protection	0.00	31.97	31.97
9. Consulting Services, Administration, and Training	32.28	178.41	210.69
<b>Subtotal (A)</b>	<b>1,112.81</b>	<b>2,378.94</b>	<b>3,491.75</b>
<b>B. Contingencies</b>			
1. Physical Contingencies	144.30	96.20	240.50
2. Price Contingencies	58.50	87.75	146.25
<b>Subtotal (B)</b>	<b>202.80</b>	<b>183.95</b>	<b>386.75</b>
<b>C. Interest during Construction</b>	49.00	204.43	253.43
<b>Total</b>	<b>1,364.61</b>	<b>2,767.32</b>	<b>4,131.93</b>

ODIS = operating dispatch information system.

Source: Asian Development Bank estimates.

## E. Financing Plan

38. The Government has requested a loan of \$400 million from ADB's ordinary capital resources to help finance the Project. The loan will have a 26-year term, including a grace period of 6 years, an interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.75% per annum, conversion options that may be exercised in accordance with ADB's loan regulations and conversion guidelines, and such other terms and conditions set forth in the Loan Agreement. The front-end fee will be waived. The Government has provided ADB with (i) reasons for its decision to borrow under ADB's LIBOR-based lending facility on the basis of these terms and conditions, and (ii) an undertaking that these choices were its own independent decision and not made in reliance on any communication or advice from ADB.

39. MOR will finance the remaining foreign exchange cost. The local currency cost will be financed by MOR, HPG, SPG, and cofinancing through a loan from the China Development Bank, which has appraised the Project and provided a commitment letter to MOR. The China Development Bank loan is repayable over 20 years, including a grace period of 6 years, and at a lending rate currently at 5.5% per annum. HPG and SPG will finance the land acquisition and resettlement costs; this will be their equity contribution. MOR, HPG, and SPG have made budgetary provisions for the counterpart funds. A summary of the financing plan is in Table 2 and the details are in Appendix 8.

**Table 2: Financing Plan**  
(\$ million)

Source	Foreign Exchange	Local Currency	Total Cost	Percent
Asian Development Bank	400.00	0.00	400.00	9.68
China Development Bank	0.00	1,667.27	1,667.27	40.35
MOR, HPG, SPG	964.61	1,110.05	2,064.66	49.97
<b>Total</b>	<b>1,364.61</b>	<b>2,767.32</b>	<b>4,131.93</b>	<b>100.00</b>

HPG = Henan provincial government, MOR = Ministry of Railways, SPG = Shaanxi provincial government.

Source: Asian Development Bank estimates.

## F. Implementation Arrangements

### 1. Project Management

40. MOR will be the Executing Agency responsible for overall project implementation. The Foreign Capital and Technical Import Center, under MOR, will coordinate the project management office's tasks and be responsible for procurement, withdrawals, and reporting vis-à-vis ADB. MOR is in the process of setting up a project company (the Project Company), a limited liability company under the PRC Company Law, which will be the project Implementing Agency. The Project Company will manage and operate the project railway after completion of the construction; and develop and implement adequate and transparent business development mechanisms, and accounting and reporting systems. A project leading group headed by a director general and assisted by an adequate number of suitably qualified professional staff has been established. It is undertaking the preparatory work of setting up the Project Company and is setting up the on-site construction management offices along the project route. The staff are experienced in railway engineering, financial, and administrative matters, and in implementing projects financed by international financial institutions. This leading group will be merged with the Project Company once it is established. To develop the Project Company's project

management, business development, and marketing capacity, further assistance will be provided by the project-financed consulting services. The setting up of the Project Company is a condition for disbursement. The financial assessment questionnaire indicates that the Project will have an adequate financial management system in place (details in Supplementary Appendix C).

## **2. Implementation Period**

41. The Project will be implemented over about 6 years from August 2005 to December 2011. Land acquisition will start in September 2005, and the civil works in October 2005 with completion in about 5 years. The trial operations will start in October 2010 for 1 year before commercial operations begin (Appendix 9).

## **3. Procurement**

42. All ADB financed procurement will follow ADB *Guidelines for Procurement*. ADB will finance procurement of materials and equipment. The civil works will be procured under local competitive bidding procedures. Equipment will be procured under international competitive bidding or international shopping or direct purchase (Appendix 10). Contracts valued in excess of \$1,000,000 for materials and equipments will be procured through international competitive bidding. Any supply contracts not exceeding \$1,000,000 will be procured through international shopping and contracts not exceeding \$100,000 will be procured through direct purchase. MOR will select tendering companies on a competitive basis to handle the international bidding. The relevant sections of ADB's anticorruption policy will be included in all documents and contracts during bidding for, and implementation, of the Project.

## **4. Consulting Services**

43. The Government will engage and finance about 28,000 person-months of qualified international and domestic consultants for (i) detailed project design; (ii) preparation of technical specifications; (iii) construction supervision; (iv) construction quality assurance; (v) environmental supervision and management; (vi) monitoring and evaluation of the resettlement plan; and (vii) socioeconomic impact assessment, evaluation of poverty reduction, and project performance monitoring.

44. The ADB loan will be used to finance 20 person-months of international consulting services to (i) strengthen institutional, marketing, and business development functions of the Project Company; and (ii) research and strengthen the development, operation, and management of the passenger-dedicated railway systems in the PRC. Terms of reference for the international consultants, to be recruited using the quality- and cost-based method and simplified technical proposal, in accordance with ADB *Guidelines on the Use of Consultants*, are given in Appendix 11. The provisions of ADB's anticorruption policy will be included in all invitation documents and contracts for international consultants.

## **5. Disbursement Arrangements**

45. All disbursements under the ADB loan will be carried out in accordance with the ADB *Loan Disbursement Handbook*. Since most of the payments will be made for large contracts will above \$200,000, direct payment and commitment procedures will be used to withdraw the loan funds. The statement of expenditure procedure will be used for reimbursement of eligible expenditures for any individual payment not exceeding \$200,000.

## **6. Accounting, Auditing, and Reporting**

46. The Project Company will maintain separate accounts for the Project and have such accounts and related financial statements audited annually by an external auditor in accordance with auditing standards acceptable to ADB. The Project Company, through MOR, will submit to ADB, within 6 months after the end of each fiscal year, certified copies of such audited project accounts and financial statements and auditor's reports, all in English. The audit of such financial statements will include (i) an assessment of the adequacy of accounting and internal control systems with respect to project expenditures and other financial transactions; (ii) an assessment of compliance with loan covenants and ADB requirements for project management; and (iii) an opinion on the use of the statement of expenditure procedure. The Project Company will also submit its audited financial statements covering income statements, balance sheets, and cash-flow statements during construction and in the first three years of commercial operations of the project railway within 6 months after the end of each fiscal year. To ensure that the effective internal control system and checks and balances mechanism are put in place, The Project Company will establish an internal control unit within the company. The unit will independently test financial transactions to ensure the safe custody of the project-financed assets and report directly to the Project Company's board of directors.

47. The Project Company will make satisfactory arrangements for reporting the progress of project implementation by submitting quarterly progress reports through MOR. Within 3 months of completion, MOR will submit a project completion report to ADB.

## **7. Project Performance Monitoring and Evaluation**

48. MOR agreed to a set of indicators for evaluating project performance in relation to its impacts, outcomes, outputs, and conditions. The indicators, to be reviewed at the start of project implementation, include (i) economic development and socioeconomic indicators, (ii) transport costs and time for passenger services, (iii) transport services and transport charges, (iv) accident rates, (v) financial sustainability, (vi) county/village incomes, (vii) access to social services, and (viii) jobs created in construction and maintenance. At the beginning of project implementation, MOR and the Project Company will establish baseline and target values for the indicators. The indicators will be measured at project inception, completion, and 3 years later; and compared with the baseline. Where relevant, indicators will be disaggregated by gender (Appendix 12). MOR will recruit qualified consultants for monitoring and evaluation to help establish the monitoring and evaluation system, and train the Project Company staff in its use. The main sources of data include (i) secondary data from government sources, (ii) household socioeconomic sample survey, and (iii) participatory rapid appraisal. MOR will submit a report summarizing the key findings of monitoring at inception, completion, and 3 years later to ADB.

## **8. Project Review**

49. In 2008, ADB, MOR, and the Project Company will carry out a midterm review of the Project, covering all institutional, administrative, organizational, technical, environmental, social, poverty reduction, resettlement, economic, financial, and other relevant aspects that may have an impact on the performance of the Project and its continuing viability. The review will examine progress in sector reforms, policy development, resettlement, environment, poverty impact, and compliance with assurances in the loan agreement.



## 9. Anticorruption Measures

50. During project processing, ADB's anticorruption policy was explained to central and local government officials. Attention was drawn to the section on fraud and corruption that was added to ADB *Guidelines on Procurement* and *Guidelines on the Use of Consultants*, particularly the need for bidders, suppliers, contractors, and consultants to observe the highest standards of ethics in the procurement and execution of ADB-financed contracts, and the sanctions if fraud and corruption are discovered.

51. Based on MOR's experience in fighting corruption, the following actions will be taken to prevent corruption: (i) a supervisory body is established for prevention of undue interference in business practices and adequate resources are made available for its effective operation, and (ii) a leading group of officials from the Discipline Unit and Supervision Department of the MOR is located in offices involved in the bidding, construction and other operational activities under the Project. The Borrower shall also cause MOR and the Project Company to initiate liaison meetings with the Prosecutor's Office, on a needed basis, where warnings about or information on corrupt practices can be discussed.

## IV. PROJECT BENEFITS, IMPACTS, AND RISKS

52. The project benefits and impacts were assessed along with potential risks associated with the Project. The combined benefits and impacts will outweigh the costs, and net benefits will accrue to the project area.

### A. Traffic Forecast

53. The traffic forecast was based on forecasts prepared by the Fourth Survey and Design Institute (FSDI), by considering expected economic growth, population increase, tourism development potential, local government development plans, market surveys, and the assessment of TA consultants and the ADB Mission. The passenger volume on the ZXR is forecast to grow from 15,652 million passenger-km in 2011 to 50,372 million passenger-km in 2031, with an average growth rate of 6%. As a result of the released capacity on the Longhai line with project completion, the freight traffic on the ZXR corridor is forecast to increase from about 16,140 million ton-km in 2011 to 49,024 million ton-km in 2031, with an annual growth rate of 5.7% based on similar factors. The projected volumes can be accommodated by the ZXR and justify project construction (Appendix 13).

### B. Economic Benefits

54. The economic internal rate of return (EIRR) was calculated by comparing the with- and without-project situations. The ZXR will reduce the cost of transport to and from the poor north and northwestern part of Henan and Shaanxi. Economic costs include costs for construction, operation, and maintenance, and value of agricultural production from land lost permanently. Economic benefits include (i) operating cost savings for freight and passenger traffic, (ii) time saving in diverted passenger traffic from buses, (iii) net economic value added of generated commodity production, (v) generated passenger benefits, and (vi) tourism benefits. The project EIRR is 17.4%, indicating the Project is economically viable (Appendix 13). Sensitivity analysis confirms the robustness of the Project's economic viability. Changes in the key variables, such as a 20% reduction in benefits, do not significantly impact economic viability. The capital cost would have to increase by 33% over those estimated for the EIRR to fall below the cutoff rate of 12%. The freight and passenger benefits would have to decrease by 30% and 323% respectively. Given experience in the PRC railway sector, variations of such magnitude are

unlikely. Project risks were quantified using the statistical method, i.e., considering the possible value for key variables and the probability with which they may occur. The result shows that the EIRR will exceed 12% with 97% probability. Distribution analysis, undertaken by determining the project effects for various beneficiaries, indicates that a large portion of net benefits will accrue to project users.

### **C. Financial Benefits**

55. Financial projections prepared for the Project Company, in accordance with ADB *Guidelines for the Financial Governance and Management of Investment Projects*, assessed the financial viability and sustainability of the railway (Appendix 14). The projected financial statements indicate that financial revenues will be sufficient to cover operation and maintenance costs, income taxes, and debt service; and provide a reasonable rate of return. The financial evaluation was undertaken in real terms using constant 2005 prices. The project cost estimates and financial projections in nominal terms were converted to real terms by adjusting for the projected effects of foreign and domestic inflation and currency fluctuation. Incremental costs and benefits were derived under with- and without-project scenarios. The financial internal rate of return, computed on an after-tax basis, is 7%. This compares favorably with the weighted average cost of capital, also computed on an after-tax basis, of 3%. The Project is both financially viable and sustainable. Sensitivity and risk analyses indicate that the financial internal rate of return for the Project is robust under most conditions (Appendix 14).

56. Consolidated financial statements for MOR have been prepared based on past audited financial statements; Based on the consultant's estimates, MOR's financial performance is projected to be sound and sustainable over the operating period (Supplementary Appendix D). Financial ratios were discussed and covenanted.

### **D. Environmental Impact and Assessment**

57. The Project is classified as environmental category A. The FSDI, Environmental Engineering Division prepared an EIA, which was approved by the State Environmental Protection Agency on 21 June 2005. MOR endorsed the summary EIA, which was circulated to ADB's Board of Directors and uploaded on the ADB website on 29 April 2005 (Supplementary Appendix E).

58. Potential adverse environmental impacts include (i) noise and vibration impacts on adjacent residents; (ii) soil erosion from cut and fill activities; (iii) disturbance of historical, cultural, and archaeological sites; (iv) impact on surface water quality of adjacent waterways; and (v) public health and safety.

59. The EIA concluded that the adverse environmental impacts can be successfully mitigated through the use of best practices and appropriate technologies. Implementation of the environmental management, mitigation, and monitoring programs included in the EIA will ensure compliance with ADB and Government environmental guidelines and procedures. Internal and external monitoring and audits will be conducted to ensure that standards and regulations are followed. An independent monitoring agency will be hired to carry out external monitoring and evaluation work during implementation.

### **E. Impact on Poverty**

60. The railway passes through two provinces (Henan and Shaanxi); five prefectures (Zhengzhou, Luoyang, Sanmenxia, Weinan, and Xi'an) 19 counties, 6 of which are designated

national or provincial poverty counties; and 725 designated poverty villages with about 1.3 million poor residents. The Project will benefit about 9.3 million people in the project area—about 90.2% are rural (17 counties) and 15.0% are poor with a net income per capita of less than CNY900 in 2004. In the urban area (2 counties), 5.8% are poor with per capita income less than that of minimum living standards. Of the total population, 14.0% are poor. The summary poverty reduction and social strategy is in Appendix 16.

61. Poverty in the area is caused by (i) geographical remoteness and isolation, limited road access, high transport costs, and limited access to market and information; (ii) adverse weather conditions and limited natural resources (e.g., cold weather, water scarcity, and limited arable land); (iii) lack of knowledge and technical skills in cropping and animal husbandry; (iv) limited access to credit and training for off-farm activities; (v) limited off-farm employment opportunities; (vi) poor social infrastructure, and lack of access to good health care facilities; and (vii) high cost of middle and higher education.

62. About 353,000 person-years of work will be created during railway construction, 60% will be unskilled work. Half of the unskilled work will be targeted for the poor, totaling 105,920 person-years at total wages of CNY1,037 million or CNY9,790 per person-year. Priority will be given to women, people affected by resettlement, ethnic minorities, and other vulnerable people. In addition, during construction, 6,249 person-years of local jobs will be created in the provision of construction material with total wages of CNY61.4 million, of which 1,875 person-years will be for the poor, with total wages of CNY18.4 million or annual average wage of CNY9,828 per capita. When the operation of the new railway starts, approximately 2,988 additional jobs will be created with total wages of CNY53.7 million annually or CNY1,344.5 million during the 25-year operation period. The estimated construction tax revenue from the Project to counties in the project area is CNY714 million. Local governments are responsible for provision of social services and poverty reduction funds for county poverty reduction planning. The local governments agreed to allocate part of this added revenue for a range of poverty reduction and social activities, including mitigation of negative impacts of HIV/AIDS (human immunodeficiency virus/acquired immune deficiency syndrome) and STIs (sexually transmitted infections), human trafficking, and environment, with special attention to resettlement-affected groups, women, ethnic groups, and other vulnerable people. This includes a program of income sustainability for the poor after project implementation, especially those hired for project construction.

63. The 11 railway stations, connected to all villages including poverty villages, will create jobs, and help distribute project benefits. The stations will have sufficient space inside and out for local area development; local governments will support the poor and other vulnerable people to sell local produce, handicrafts, and goods. Expecting more efficient freight transport from the existing railway, and business travel on the project railway, many enterprises are planning to expand their outputs and increase labor. As the project area includes internationally and nationally well-known tourist areas, additional revenue and employment are expected from tourism. In 2003, 4 million domestic tourists used the train to visit tourist sites along the project railway alignment. Annually, over 3.55 million additional tourists are expected to use the project railway, which over 25 years means 88.75 million tourists, with total revenue of CNY2,304 million. These direct and indirect impacts will provide conditions for poor families to (i) move away from unsustainable, mountainous farmlands; (ii) have better access to markets, and advanced educational and health facilities, especially for women; and (iii) build a sustainable future in new centers of economic activity.

## F. Resettlement Impact

64. The project railway alignment will cross 170 rural villages and 13 urban neighborhoods in 19 counties and urban districts from Zhengzhou to Xi'an. An estimated 1,782 hectares (ha) of land will be permanently acquired, of which about 63% is currently under cultivation, 8% orchards, 11% housing plots, 2% forest, 4% grassland, and 12% wasteland. Approximately 16,147 people will be affected in terms of loss of land, assuming total loss of cultivated land based on average per capita landholdings. The Project will also temporarily require an estimated 596 ha. About 1,682,392 square meters (m<sup>2</sup>) of structures will be affected, of which 79% are residential structures. Relocation of 29,774 people will be required. The Project will also require relocation of 46,426 m<sup>2</sup> of schools and 302,087 m<sup>2</sup> of factories and other enterprises. A total of 36,736 people will be directly affected. Land acquisition and resettlement impacts are minimized by aligning the railway away from urban areas, village centers, and other facilities, where possible, based on consultations with communities.

65. MOR, in consultation with provincial and local governments, has prepared a resettlement plan (Appendix 15, the full plan is in Supplementary Appendix F) based on the preliminary design study; village surveys of all 170 rural villages, and all 13 village-level urban neighborhoods; 2,354 household surveys; provincial, prefecture, and local government statistics; and consultations with local officials, village leaders, and affected households. Although the total amount of land and people affected is large, these impacts are spread thinly over a long narrow corridor. Income loss from land acquisition is less severe because this corridor is developing rapidly and at least 70% of net income for more than half of rural households comes from nonagricultural employment and small businesses. Special assistance will be provided to vulnerable households that include the poor, widows, disabled, and ethnic minorities.

66. Local government land administration bureaus, in conjunction with railway construction support offices, will be responsible for implementing resettlement; many activities will be carried out by township officials and village committees. The estimated resettlement cost is \$181.4 million, excluding the costs for enterprise relocation and infrastructure. In December 2004, MOR, HPG, and SPG signed agreements whereby local governments will fund 100% of the cost of land acquisition and resettlement; this in turn will be an equity contribution to the Project. The resettlement budget will be adjusted based on the actual measurement of physical losses and market prices. Affected people have been informed and consulted about the likely impacts at various stages. During the preliminary design stage, stakeholders consulted included heads of affected households; village leaders and representatives; local government agencies and departments; and vulnerable groups, including women and ethnic minorities. Resettlement information booklets were distributed to affected villages in April 2005, and MOR, HPG, and SPG endorsed the resettlement plan.

67. MOR and municipal land acquisition and resettlement offices, in collaboration with the county resettlement offices, will be responsible for internal supervision and monitoring. MOR will prepare progress reports and submit them to ADB on a quarterly basis, until resettlement is completed. MOR will then prepare a resettlement completion report for submission to ADB. In addition, an independent monitor will carry out the external monitoring and evaluation, and prepare monitoring reports for submission to MOR and ADB every 6 months until completion of resettlement activities; thereafter, annual evaluation investigations will be conducted for at least 2 years and reported to MOR and ADB.

## G. Ethnic Minorities

68. The project area has 52,527 residents from 11 ethnic minority nationalities, representing 0.65% of the total population of the project area (9.5 million). The main ethnic group (83.7%) is Hui, who are descendants of Muslim traders that settled in Xi'an and Zhengzhou. About 500 may be affected by land acquisition and resettlement. Investigations reveal the Hui villagers were integrated with the Han and shared the same socioeconomic conditions. Other ethnic minorities (such as Man, Mongol, Uygur) are not affected by land acquisition and resettlement, as they are either located in urban areas or remote villages far from the alignment. Specific provisions such as livelihood training, employment on construction, access to rural credit, assistance with house construction, and social security are included in the resettlement plan. Ethnic minorities are also included as a target group in the social development action plan (SDAP) to enhance benefits for poor or vulnerable people in the project area (Appendix 17).

## H. Social and Gender Aspects

69. The Project will generate job opportunities for the poor, ethnic minorities, women, and other vulnerable groups, and will help develop their job skills. Sufficient areas for income-generating activities will be designated in and around the station. Construction and operation-related job opportunities and those generated from the Project will provide potential new sources of income for local residents. An increase in female participation in the labor and tourism market has the potential to increase women's net income and savings, improve overall family welfare, and improve the status of women; older women in particular tend to have less employment opportunities than men. Through several programs along the alignment the All-China Women's Federation will specifically address the needs of women and children. The federation will operate even more actively in the project area so that women are able to take full advantage of additional work and income opportunities facilitated by the Project to build businesses that help sustain their families. The federation also reported that children from households led by poor single woman will be helped to go to school.

70. Women and other vulnerable groups will benefit from the Project, and have equal access to project-generated employment and wages. The railway will generate demand for local labor and increase worker productivity and wages. Under PRC law, women are given equal rights in employment. Expansion of secondary and tertiary industries will help generate additional employment opportunities for both men and women. Afforestation activities will provide additional employment opportunities for women relatively close to their homes. An increase in female participation in the labor and tourism market will increase women's net income and savings potential, improving overall family welfare and the status of women.

71. The construction and operation of the railway could have an impact on HIV/AIDS and STIs due to the large number of workers during construction, expansion of the tourism industry, and insufficient knowledge on these issues. However, the project area has fewer cases of HIV/AIDS infection than southeast Henan.<sup>20</sup> Both Henan and Shaanxi have an active public information program for HIV/AIDS awareness, including distribution of leaflets and posters, and radio and television education programs. In Henan, an HIV/AIDS survey and testing for the entire population were conducted in 2003, and Shaanxi will conduct a survey and testing this year. Even the poor in remote areas have knowledge on prevention methods on HIV/AIDS and

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<sup>20</sup> A government survey of blood sellers, carried out in Henan in the summer of 2004, reported 25,036 cases of HIV/AIDS (*China Daily*, 16 November 2004). Most were infected through illegal or inappropriate blood collection during the mid-1990s (*China Daily*, 29 May 2004). Most of the HIV/AIDS victims in Henan province have been receiving free medical treatment (*China Daily*, 3 March 2004).

STIs. The health departments in these provinces have ongoing awareness and prevention programs, and voluntary counseling and testing for HIV/AIDS and STIs.

72. During the construction, the county governments along the alignment will increase awareness of workers and communities. MOR has experience implementing various awareness and prevention programs during railway construction. Medical clinics are established in the area of construction camps, and HIV/AIDS awareness campaigns and preventive measures for workers and communities are organized during railway construction.

73. MOR has agreed with the SDAP, which will (i) enhance job opportunities for local residents; (ii) provide training and vocational programs for poor, women, ethnic minorities, and the vulnerable; (iii) support HIV/AIDS awareness and prevention programs; (iv) support income recovery programs for people affected by resettlement; (v) provide awareness and prevention programs for safety during construction and operation; and (vi) promote local tourism development. This will be implemented with participation from relevant local government agencies, including poverty reduction offices; All-China Women's Federation; and health, civil affairs, and ethnic affairs bureaus. Leading groups have been formed to continue consultation and coordination among various agencies during implementation.

## I. Risks

74. The Project is formulated to minimize potential risks. Based on experience with previous railway projects, traffic demand is conservatively estimated as is passenger traffic. Sensitivity tests indicate that economic circumstances would have to become substantially adverse for the Project to lose economic viability. A potential risk is delay in implementation, which would delay the realization of benefits. MOR has successfully built railway lines, such as the Hefei–Xi'an and Jing–Jiu railways. Government, MOR, HPG, and SPG support for the Project and its preparation contributes to reducing the potential risk of implementation delays. Environmental risks will be mitigated by the measures in the environmental management plan (EMP) and will be closely monitored during project implementation.

75. Resettlement will affect about 37,000 people as the railway alignment is routed to cause minimal resettlement. The resettlement plan includes preferential treatment for employment during construction, supply of local materials, allocation of commercial space near railway stations, and job training. The resettlement plan and SDAP will be closely monitored to ensure compliance with ADB social safeguard policies.

76. Intermodal competition among railways and roads will create market risks for the project railway. However, the existing railway and road is already congested and capacity constraints are expected to worsen. Passenger surveys indicate that the railway has several advantages: lower fares, shorter travel times, safety, and punctuality. The increasing commercial orientation of the joint-venture railway will help lower risks posed by intermodal competition.

## V. ASSURANCES

### A. Specific Assurances

77. In addition to the standard assurances, the Government has given the following assurances, which are incorporated in the legal documents.

- (i) **Reform measures.** The Government will take necessary measures to continue implementation of the Railway Development Plan (2004) including (a) separation

of the core railway operations from noncore transportation business operations, (b) rationalization of staff, and (c) encouragement of the Project Company to outsource some activities currently handled by railways.

- (ii) **Construction quality.** The Government will cause MOR and the Project Company to ensure that the project railway is constructed in accordance with the Government's national technical standards, and that construction supervision, quality control, and contract management are carried out satisfactorily.
- (iii) **Connecting railway lines.** The Government will cause MOR and the Project Company to ensure that (a) capacity enhancement operations for connecting railway lines are completed by commencement of commercial operations of the project railway; and (b) necessary measures are promptly taken to mitigate any capacity constraint on connecting railway lines, identified during operation of the project railway, to ensure smooth flow of traffic generated by the project railway.
- (iv) **Container traffic.** The Government will cause MOR to construct two extra-large container terminals at Zhengzhou and Xi'an by commencement of commercial operations of the project railway.
- (v) **Supply of rolling stock.** The Government will ensure that MOR and the Project Company provide sufficient rolling stock, at all times, for effective operation of the project railway.
- (vi) **Passenger safety.** The Government will cause MOR and the Project Company to ensure the safety of passengers on the project railway in accordance with relevant Government laws and regulations.
- (vii) **Safety dissemination.** The Government will ensure that the Project Company, in cooperation with the local prefecture, city, and county governments, formulates and implements appropriate public safety campaigns through media, public announcements, households, and schools to familiarize people living along the project railway route with safety issues related to railways.
- (viii) **Station access and link roads.** The Government will cause the local prefecture, city and county governments to (a) construct station access roads in a timely manner prior to commencement of commercial operations of the project railway, and (b) apply ADB safeguard policies in construction of such roads.
- (ix) **Financial ratios and reporting.** The Government will cause the Project Company to maintain, starting after the second year of commencement of the commercial operations of the project railway, (a) an operating ratio of not more than 70%, (b) a debt-service coverage ratio of at least 1.2, and (c) a debt to equity ratio of not more than 65:35 to ensure operating efficiency and financial sustainability.
- (x) **Audited accounts and financial statements.** The Government will cause the Project Company to (a) establish and maintain an internal audit unit, the composition and the terms of reference of which will be acceptable to ADB, and undertake timely audit of project accounts in accordance with generally accepted accounting principles, and (b) submit to ADB audited accounts and financial

statements during construction and in the first 3 years of commercial operations of the project railway within 6 months of the end of each relevant fiscal year.

- (xi) **Tariff.** The Government will ensure that MOR and the Project Company set the passenger tariffs, with respect to the project railway, at rates sufficient to ensure full cost recovery including the management cost of the Project Company and working (operation and maintenance) costs of the project railway, depreciation, debt service, taxes, and a reasonable profit.
- (xii) **Tariff study.** The Government will also ensure that the Project Company, in consultation with MOR, carries out a tariff study 6 months prior to the trial operation of the project railway, and advises ADB of the tariffs applied during such trial operation.
- (xiii) **Anticorruption.** The Government will cause MOR to ensure that (a) a supervisory body is established for prevention of undue interference in business practices, and adequate resources are made available for its effective operation; (b) a leading group of officials from the Discipline Unit and Supervision Department of MOR are located in offices involved in the bidding, construction, and other operational activities under the Project. The Government shall also cause MOR and the Project Company to initiate liaison meetings with the Prosecutor's Office, on a needed basis, where warnings about or information on corrupt practices can be discussed.
- (xiv) **Environment.** The Government will cause MOR, the Project Company, HPG, and SPG to ensure that (a) the Project is designed, constructed, operated, and maintained in accordance with environmental laws and regulations of the Government and the ADB *Environment Policy*,<sup>21</sup> (b) the EMP and the mitigation measures included therein, as specified in the project EIA are properly implemented; (c) any environmental permits, licenses, and clearances are obtained in a timely manner; (d) any adverse impact on the environment that may arise from project implementation activities is promptly mitigated or minimized in accordance with the EMP; and (e) implementation of the EMP, including any safety breaches, violation of environmental standards, and corrective measures taken thereto, is reported semiannually to ADB.
- (xv) **Land acquisition and resettlement.** The Government will cause MOR, the Project Company, HPG, and SPG to ensure that (a) the resettlement plan is carried out promptly and efficiently in accordance with all applicable Government laws and regulations and ADB policy on involuntary resettlement;<sup>22</sup> (b) all affected people are given adequate opportunity to participate in resettlement planning and implementation; (c) those affected are compensated and assisted prior to displacement from their houses, land, and assets, such that they will be at least as well off as they would have been in the absence of the Project; (d) adequate and appropriate support is provided for enterprise relocation, (e) affected people receive priority for employment in project construction, (f) special measures are implemented for ethnic minorities and vulnerable groups, (g) civil works contracts include requirements to comply with the resettlement plan; and (e) implementation of the resettlement plan is monitored internally by the Project

<sup>21</sup> ADB. 2002. *Environment Policy*. Manila.

<sup>22</sup> ADB. 1998. The Bank's Policy on Involuntary Resettlement. In *Handbook on Resettlement*. Appendix 1. Manila.



Company and the respective local governments, and externally by an independent institute; and related reports are submitted to ADB and MOR as stipulated in the resettlement plan. The Government will cause MOR, the Project Company, HPG, and SPG to ensure that (a) funds needed for land acquisition and resettlement, including those for cost overruns, are allocated and disbursed in a timely manner; and (b) ADB is promptly advised of any substantial changes in resettlement impacts and, if necessary, a revised resettlement plan is submitted to ADB for concurrence.

- (xvi) **Poverty reduction.** The Government will ensure that MOR and the Project Company cause the contractors involved in project implementation to maximize employment of local poor persons, including ethnic minorities, who meet the job and efficiency requirements for construction of the project railway. Such workers will be provided with adequate on-the-job training. MOR and the Project Company will (i) implement the Project in accordance with the SDAP; and (ii) monitor the Project's impact on poverty with the assistance of domestic consultants and submit annual monitoring reports to ADB during project implementation.
- (xvii) **Gender and development.** The Government will cause MOR and the Project Company to implement the Project in accordance with the SDAP and take all necessary actions to encourage women living in the project area to participate in project planning and implementation. Civil works contractors will comply with all applicable laws to gender equality. The Government shall ensure that MOR and the Project Company monitor the effects of the Project on women through collection and compilation of gender-disaggregated data, where relevant, including in the including in the resettlement plan, SDAP, and project performance management system.
- (xviii) **Health risks.** The Government will cause MOR and the Project Company to ensure that (a) contractors involved in project implementation disseminate information on the risks of socially transmitted infections, including HIV/AIDS, to the workers they employ under the Project and to local communities, through public awareness campaigns; and (b) adequate health and treatment facilities are available nearby. The Government will cause MOR, the Project Company, HPG, and SPG to ensure that similar information is disseminated, in consultation with the health bureaus in Henan and Shaanxi, to railway operating staff.
- (xix) **Monitoring and evaluation.** The Government will cause MOR and the Project Company to monitor and evaluate project impact through a project performance monitoring system, as agreed to by the Government and ADB, to ensure that project facilities are managed efficiently, benefits are maximized, and social impacts are monitored, including data disaggregated by gender and ethnic group, wherever possible. The Government will also cause MOR and the Project Company to collect the necessary information and data on project performance, as agreed to by the Government and ADB, before project implementation, at completion of the Project, and 3 years thereafter.
- (xx) **Change in ownership.** In the event that MOR or the Project Company plan to (a) make any change in the ownership of the project facilities, or of the Project Company, or (b) make any sale, transfer, or assignment of MOR's or the Project Company's direct or indirect interest in the project railway, or (c) lease out, or

contract out, or otherwise modify the Project Company's responsibilities for construction, operation, and maintenance of the project railway, the Borrower will, at least 6 months prior to implementation of such transaction, consult ADB and obtain ADB consent. The Borrower will ensure that such transaction is implemented in a legal and transparent manner.

**B. Condition for Disbursement**

78. The following will be a condition for disbursement:

- (i) MOR, HPG and SPG shall have incorporated the Project Company, and
- (ii) The Government shall have furnished to ADB documentary evidence satisfactory to ADB that the Project Company has been incorporated by MOR, HPG and SPG.

**VI. RECOMMENDATION**

79. I am satisfied that the proposed loan would comply with the Articles of Agreement of ADB and recommend that the Board approve the loan of \$400,000,000 to the People's Republic of China for the Zhengzhou–Xi'an Railway Project from ADB's ordinary capital resources, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; a term of 26 years, including a grace period of 6 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan Agreement presented to the Board.

Haruhiko Kuroda  
President

26 August 2005

## DESIGN AND MONITORING FRAMEWORK

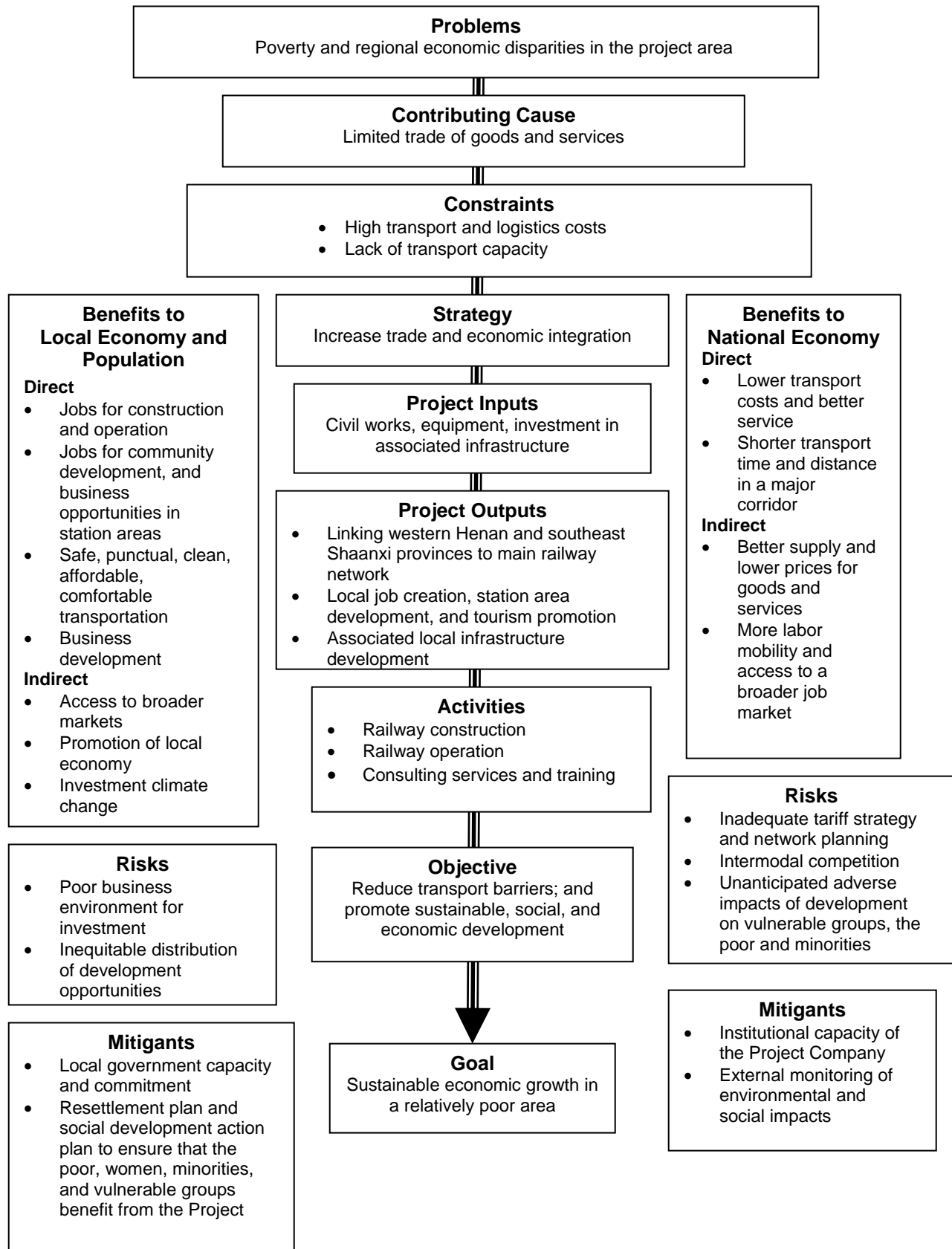
<b>Design Summary</b>	<b>Performance Targets/Indicators</b>	<b>Data Sources/Reporting Mechanisms</b>	<b>Assumptions and Risks</b>
<p><b>Impact</b> Improved transport system in the region that supports socioeconomic development and the western development strategy</p>	<p>Gross domestic product is forecast to increase during 2010–2020 at 6% per annum for Henan and Shaanxi provinces and 7%–8 % per annum for the project area.</p> <p>Per capita rural income in the project area increased from CNY2,575 in 2004 to CNY3,450 in 2010 and CNY5,620 in 2020.</p> <p>Poverty incidence in the project area reduced from 12.1% in 2003 to 6% in 2015 (Shaanxi province) and from 8.1% in 2003 to 4% in 2015 (Henan province).</p> <p>All poverty villages along the alignment provided with road access (187), telephone access (163), and electricity (24) by 2009.</p>	<p>Provincial and county/city statistics offices</p> <p>Project performance management system at inception, completion, and 3 years thereafter with emphasis on socioeconomic improvement impacts</p> <p>Annual reporting by the Project Company</p>	<p><b>Assumptions</b> Government investment projects are implemented as planned.</p> <p>Complementary activities are implemented.</p> <p>The Government is committed to reducing poverty in the western region, based on the Western Development Strategy.</p> <p>Investment of the Ministry of Railway (MOR), Henan provincial government (HPG), Shaanxi provincial government (SPG), and local governments in the railway sector is implemented according to their plans.</p>
<p><b>Outcomes</b></p> <ul style="list-style-type: none"> <li>• An efficient, safe, reliable, and affordable railway transport system is developed in the region.</li> <li>• Local economic development particularly tourism is promoted.</li> </ul>	<p>Economic internal rate of return maintained at about 17.4%</p> <p>Passenger traffic volume increased from 53 pairs of passenger trains in 2004 to 140 pairs in 2020</p> <p>Freight traffic volume increased from 89 million tons in 2004 to 150 million tons in 2020</p> <p>Interregional traffic between the People's Republic of China (PRC) and Central Asia and Europe increased from 59 million tons in 2004 to 400 million tons in 2020.</p> <p>Travel time reduced from (i) Zhengzhou to Xian, from present 8 hours to 3 hours; (ii) Beijing to Xian, from present 15 hours to 8 hours</p> <p>Cost of travel reduced from 28 fen/km to 15 fen/km in 2012</p> <p>Number of road accidents reduced by 10% in 2012</p> <p>Number of tourists visiting the project area increased from 370,000 in 2011 to 800,000 in 2020</p> <p>By 2015, the number of shops, tourist centers, hotels, and businesses established in the vicinity of station areas increased by 50%.</p>	<p>Reevaluation of the economic internal rate of return at midterm review and project completion</p> <p>MOR statistics and operating data before and after the Project</p> <p>Progress reports</p> <p>Project administration missions and project completion report</p> <p>Postevaluation surveys and reports from MOR</p> <p>Accident statistics from Public Security Bureau and hospitals</p> <p>Local government statistics</p>	<p><b>Assumptions</b> The demand forecast materializes; no cost overruns experienced.</p> <p>Assumed economic growth rates materialize.</p> <p>Traffic forecasts for the Zhengzhou–Xian railway (ZXR) are realized.</p> <p>Passengers and freight operators realize the benefit of using the railways.</p> <p>Local governments undertake the planned tourism and the local area development.</p> <p><b>Risk</b> Local governments may not have sufficient budget to implement the tourism and local area development plan.</p>

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p><b>Outputs</b></p> <p>1. Railway infrastructure and associated facilities improved along the Zhengzhou–Xian railway corridor.</p> <p>2. Employment opportunities generated for poor and vulnerable groups to raise incomes and living standards, and reduce poverty</p>	<p>Transport capacity expanded in the Zhengzhou-Xian corridor by 16 billion ton-km for freight and 5 billion passenger-km for passengers, in 2011</p> <p>459 km of railway line and 9 stations are constructed; equipment procured and installed for train operations</p> <p>Implementation of land acquisition and resettlement plan; about 1,782 hectares (ha) of permanent land and 596 ha of temporary land acquired; about 16,000 people are relocated and compensated by August 2008</p> <p>Number of schools, enterprises and infrastructure replaced</p> <p>Environment at the project site is protected and adverse environmental impacts minimized by implementing mitigation measures as included in the environmental impact assessment (EIA) and summary EIA. Mitigation measures included in civil works' contracts</p> <p>Project's adverse impacts on the poor, women, and ethnic minorities is minimized by implementation of the social development action plan</p> <p>Control of HIV/AIDS (human immunodeficiency virus/acquired immune deficiency syndrome) and health risks for construction workers and service providers; indicators include number of clinics, number of patients, number of posters, and number of testing</p> <p>353,000 person-years of construction-related employment are generated, of which the poor, including women, capture 50% of unskilled labor</p>	<p>Project administration missions (PAMs), and project completion report (PCR)</p> <p>PAMs, progress reports, and PCR</p> <p>Regular resettlement monitoring by an independent institute engaged by the Project Company</p> <p>Environmental monitoring reports, PAMs, and PCR.</p> <p>Monitoring reports of the social development action plan, PAMs and PCR</p> <p>Monitoring by the Health Bureau.</p> <p>Progress reports</p> <p>Monitoring by the Project Company and external monitoring agency</p>	<p><b>Risk</b> Construction may be delayed due to its complexity.</p> <p><b>Assumption</b> Completion of equipment procurement and installation at project opening</p> <p><b>Assumption</b> Adequate land for new house sites is available within villages for resettlement.</p> <p><b>Risks</b> Relocation may not be done satisfactorily.</p> <p>Viable alternative employment may not be found for affected people.</p> <p><b>Assumption</b> Mitigation measures are adequate to address environmental impacts.</p> <p><b>Assumption</b> Commitment of MOR/Project Company and contractors to implementation of mitigation measures.</p> <p><b>Assumption</b> Mitigation measures are adequate to address social impacts.</p> <p><b>Risk</b> The capacity of the Health Bureau may not be sufficient to implement mitigation measures.</p> <p><b>Assumptions</b> The poor are qualified to capture these job opportunities.</p>

<b>Design Summary</b>	<b>Performance Targets/Indicators</b>	<b>Data Sources/Reporting Mechanisms</b>	<b>Assumptions and Risks</b>
3. Corporate governance promoted	An effective marketing program is developed to attract passenger and tourists along the ZXR  ZXR operations separated from MOR operations  A debt-to-equity ratio of not more than 65:35, an operating ratio of not more than 70%, a debt-service coverage ratio of not less than 1.2, and a financial rate of return of 7%	PAMs, progress reports, and PCR  PAMs, progress reports, and PCR  Financial statements of the Project Company, midterm review ,and PCR	Provincial government approval will be given in a timely manner.  <b>Risks</b> Adequate funds are not invested in marketing.  MOR may interfere in the the Project Company operations.  <b>Assumptions</b> Revenue forecast materializes as originally envisaged and Project implemented without cost overrun or implementation delays, including approval of project tariff rates.
4. Institutional capacity of the Project Company strengthened	20 person-months of international consulting services will be provided for business development and marketing, and institutional strengthening.	Consultant's reports  Progress reports	Consultant recruitment is timely and performance of the consultants good in providing consulting services to Project Company.
<b>Activities with Milestones</b> 1. Civil Works: Contracts awarded by Oct 2005 and completed by September 2009. 2. Materials and Equipment: Procured by June 2010. 3. Resettlement: Completed by September 2008. 4. Consulting: Consultants recruited by January 2006; work completed by August 2011. 5. Track Laying: Started by September 2007 and completed by March 2010 6. Telecommunications: Telecommunications and signaling completed by August 2010.			<b>Inputs</b> <ul style="list-style-type: none"> <li>• ADB: \$400 million, of which:               <ul style="list-style-type: none"> <li>\$105.85 million for trackwork</li> <li>\$271.78 million for material</li> <li>\$0.8 million for consultants</li> <li>\$21.57 million for contingencies</li> </ul> </li> <li>• MOR, HPG, SPG: \$2.064 billion</li> <li>• China Development Bank: \$1.667 billion</li> </ul>

Source: Asian Development Bank estimates.

### PROBLEM AND CONSTRAINTS ANALYSIS



## RAILWAY SECTOR ANALYSIS

### A. Railway Sector Profile

1. **Key Features.** Despite Government efforts to increase the country's transport capacity, serious constraints and bottlenecks remain, especially in the road and railway sectors. By the end of 2004, the People's Republic of China (PRC) transport system comprised about 74,400 kilometers (km) of railways, 1.86 million km of highways, 123,300 km of inland waterways, and 2.05 million km of civil aviation routes. However, the density of the transport network ranks among the lowest in the world relative to either population or geographic area. From 1978, when economic reforms were first introduced, through to 2004, the PRC experienced sustained rapid economic growth. This resulted in an accordingly rapid increase in demand for transportation. The annual growth of passenger transport was 9% and freight transport 7.6% during 1978–2004. In 2004, road traffic accounted for 53.7% of total passenger-km, followed by railways with 35%, civil aviation with 10.9%, and coastal and inland waterways with 0.4%. The modal split for freight ton-km was 58.4% for coastal and inland waterways, 28.9% for railways, 11.4% for roads, 1.2% for pipelines, and 0.1% for civil aviation.

2. **Recent Developments.** To improve transport inefficiencies and eliminate transport bottlenecks that constrain efficient economic development, the Government increased investment in transport infrastructure in the Ninth Five-Year Plan (1996–2000) and the Tenth Five-Year Plan (2001–2005). Investment in transport infrastructure as a share of gross domestic product more than doubled in the last decade. A World Bank study<sup>1</sup> indicates that total transport investment should be increased to at least 3.8% of gross domestic product to avoid economic costs associated with transport constraints. To meet the increase in transport demand, more infrastructure investments are needed. The Government continues to accord high priority to transport and substantial investments in the road and railway sectors from both domestic and international financing sources, including the private sector, are envisaged in the 11th Five-Year Plan (2006–2010), which is currently under preparation.

3. **Future Development Priorities and Outlook.** The 10th Five-Year Plan (2001–2005) identifies transportation, including railway development, as a priority. The plan envisages (i) constructing 6,000 km of new lines to provide access to unserved areas with the network length reaching a total of 75,000 route-km, (ii) providing 3,000 km of double lines and electrifying 5,000 km of key lines to increase capacity, and (iii) increasing operating speeds on 5,000 km with the total length of such lines reaching 15,000 km. A total investment of CNY350 billion, including CNY270 billion on capital construction and CNY80 billion for rolling stock, is planned for the railway sector. During 2003–2007, the investments for capital construction are expected to reach CNY450 billion.

4. In 2004, the State Council approved the new Railway Development Plan (up to 2020). The plan seeks to expand the railway network from 74,000 km to 85,000 km by 2010, and to 100,000 km by 2020. Increasing train speed is a major goal. Train speed will be raised to over 200 km per hour on the trunk network by 2020. Priority will be given to developing railways in unserved areas and regions that lack transport and have remained less developed. The route network length will be increased by 16,000 km to reach 40,000 km in the western region of the PRC by 2020. The plan also calls for separating passenger and freight traffic in heavily trafficked corridors and 12,000 km of passenger dedicated corridor will be developed by 2020.

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<sup>1</sup> World Bank. 1998. *China: Forward with One Spirit: A Strategy for the Transport Sector*. Report No. 1595-CHA Transport Sector Unit, East Asia and Pacific Regional Office, World Bank. Washington, DC.

5. **Other Development Partner Operations.** In the railway subsector, the Japan Bank for International Cooperation and the World Bank, in addition to the Asian Development Bank (ADB), have been mainly involved in expanding the capacity of national railways. In the past 20 years, the Japan Bank for International Cooperation has provided ¥578 billion for 15 railway projects to expand rail transport capacity, particularly in major coal transport corridors. It has also financed development of new sections of the national railway network in inland provinces. Since 1984, the World Bank has provided 10 loans totaling \$2.4 billion for nine national railway projects and one local railway project.

## B. Asian Development Bank Experience

6. **Assistance in the Sector.** ADB has focused on improving infrastructure in less-developed and poor regions to promote sustainable economic growth and reduce poverty. Since 1989, ADB has provided 12 loans totaling about \$2.2 billion to help finance the construction of 1,921 km of new railway lines under eight local railway projects, and 4,138 km of new railway lines under four national railway projects. These projects have introduced modern technology and improved the efficiency of railway operation through institutional and structural reforms. ADB also provided 10 technical assistance initiatives totaling \$4.6 million to promote the commercial operation of railways, establish corporate governance, achieve cost recovery, and improve railway management.

7. **Evaluation of Assistance.** Experience from completed and ongoing ADB-financed railway projects in the PRC shows strong commitment and generally satisfactory capabilities of the executing agencies for project implementation. The speed of implementation has often exceeded the expectations at the time of appraisal. The executing agencies generally complied with the loan covenants. Resettlement and environmental management were carried out satisfactorily. Audited financial statements were submitted in a timely manner, and the audited financial statements were found generally acceptable. Of ADB's 12 railway projects, 5 are complete, 3 recently started commercial operation, and 4 are under implementation. The key lessons highlight the need to (i) ensure that the executing agency established for project processing and implementation has adequate capacity; (ii) prepare realistic traffic forecasts; (iii) review constraints to traffic on a network basis, and the impact on project viability of the existing and/or planned railway lines and other transportation modes that may compete with the project facilities; and (iv) finance railway projects with appropriately determined debt-equity ratios. The railway projects have contributed to a dramatic transformation of local economies. The per capita rural incomes in project areas increased substantially. Living standards were raised and poverty reduced. The project performance audit report<sup>2</sup> for the ADB-financed Jing-Jiu railway project in the PRC concluded that the project was successful and exceeded its original passenger traffic forecasts.

## C. ADB Strategy

8. **Strategy and Priorities.** ADB strategy for the railway sector has three broad objectives: (i) improve economic efficiency, (ii) promote growth in poor inland provinces to reduce poverty, and (iii) protect the environment and manage natural resources. In pursuit of these three objectives, the strategy supports developing efficient and integrated transport networks to meet the needs of a growing market economy and to contribute to reducing poverty through investment targeting poorer areas coupled with policy and institutional reforms. Because of the

<sup>2</sup> ADB. 2002. *Project Performance Audit Report on the Jing-Jiu Railway Technical Enhancement Project in the People's Republic of China*. Manila.



importance of railway transport for development of the national economy, ADB strategy for the railway sector focuses on (i) expanding the railway system by constructing new lines in unserved areas that are less developed and poor, (ii) modernizing and increasing the capacity to improve transport efficiency on key routes of the national railway system, (iii) commercializing railway operations to sustain efficient operations, and (iv) increasing railway competitiveness in the transport system through restructuring and reform.

9. **Poverty Reduction.** ADB focuses on four issues to enhance the poverty reduction impacts of transport investments: (i) locating ADB-financed projects in less-developed and poor regions where new lines will stimulate economic development, (ii) encouraging maximization of employment of poor people during project construction and operation, (iii) supplying local materials that meet the requirements of quality and economy from poor villages, and (iv) providing station access roads and link roads to widen project benefits to poor interior areas.

10. **Governance and Policy Reform Agenda.** The ADB policy reform agenda in the railway sector is contributing to restructuring the Ministry of Railways (MOR), commercializing operations, supporting management autonomy of railway operations, developing human resources, and improving financial management and accounting systems.

11. **Promoting Private Sector Development.** The PRC's large infrastructure needs require local governments to shift from traditional financing modes to the capital markets. In the railway sector, a wider role for the private sector is envisaged. MOR has taken steps to create the conditions necessary to attract investments in the project facilities and services from nongovernment and private sector sources. Possible areas include construction of industrial sidings, commercial services, tourism, containerization, and parcel-related businesses.

12. **Regional Cooperation.** The PRC is an active participant in three regional cooperation initiatives: (i) through Yunnan province for the Greater Mekong Subregion, (ii) through the Xinjiang Autonomous Region for the Central Asian republics initiative, and (iii) through Inner Mongolia with Mongolia. Improving the cross-border trade regimes is a common feature of these initiatives. Since these programs involve the poorer areas of the PRC, expanding regional markets and options could help reduce poverty. An agreement for facilitating the cross-border movement of goods and people has been developed under the Greater Mekong Subregion initiative. Steps are being taken to develop an institutional framework to facilitate the implementation of regional transport projects, e.g., Uzbekistan–Kyrgyz Republic–PRC railway development and the Pan-Asian railway project (Singapore–Kunming railway link project).

#### **D. Performance Monitoring and Evaluation**

13. **Monitoring Targets, Indicators, Modality, and Processes.** The Government monitors and evaluates sector performance annually; these are reviewed through the process of the country strategy and program. Indicators for evaluating sector performance include (i) economic development and poverty indicators for the western region, (ii) transport density in relation to land area and population, (iii) public and private investment in railways, (iv) transport demand for freight and passengers with modal split data, (v) level of user charges (railway construction surcharges, etc.), and (vi) cross-border traffic volumes with the Central Asian republics, Greater Mekong Subregion, and Mongolia.

**Table A3: Railway Sector Road Map**

Item	Indicators				
	1999	2004	2009		
<b>A. Sector Outcomes</b>					
1. Service for poor areas	Low	Low	Improving		
2. Increasing capacity in key routes	Moderate	Moderate	Improving		
<b>B. Sector Outputs</b>					
1. Expanded railway network (km)	56,007	74,000	80,000		
2. Higher rail density (km/100 km <sup>2</sup> )					
3. Improved railroad conditions					
4. Increased traffic volume					
5. Freight (billion ton-km)	1,292	1,929			
6. Passenger (billion passenger-km)	332	571.2			
7. Share of high-speed network (%)			15.0		
<b>C. Sector Issues and Constraints</b>	<p>Inadequate rail network, particularly in unserved and poor areas            Need to modernize and increase capacity in key routes            Need to commercialize railway operations to sustain efficient operation            Weak corporate governance of local railways            Low level of private sector participation            Need to promote regional cooperation with Greater Mekong Subregion, Central Asian republics, and Mongolia</p>				
<b>D. Actions, Milestones, and Investments</b>			<b>By Agency</b>		
	<b>By Issue</b>	<b>Schedule</b>	<b>ADB</b>	<b>Others/ External</b>	<b>Govt</b>
	Eight South-North and East-West Railways	2005-2020	X	WB	X
	High Speed Passenger Network (12,000 km)	2004-2020	X	WB	X
	High Speed Freight Network (16,000 km)	2003-2020	X	WB	X
	Accelerate Railway Construction in West	2004-2020	X	WB	X
	Investment needs: \$43 billion	2001-2005	X	WB	X
	Reforms and Restructuring	Ongoing	X	WB	X

ADB = Asian Development Bank, Govt = Government of the People's Republic of China, km = kilometer, km<sup>2</sup> = square kilometer, WB = World Bank, X = included in investment program.

Source: Asian Development Bank estimates.

## EXTERNAL ASSISTANCE TO THE RAILWAY SECTOR

		Period	Amount (¥ million)
<b>A. Japan Bank for International Cooperation Loans</b>			
1.	Yangzhou-Shijiusuo Railway Construction	1980–1983	39,710.0
2.	Beijing-Qinhuangdao Railway Construction	1980–1983	87,000.0
3.	Hengyang-Guangzhou Railway Transportation Reinforcement	1980	3,320.0
3A.	Hengyang-Guangzhou Railway Transportation Reinforcement	1984–1987	70,294.0
4.	Zhengzhou-Baoji Railway Electrification	1984–1988	69,191.0
5.	Datong-Qinhuangdao (east section) Railway Construction	1988–1989	18,410.0
6.	Beijing Subway Construction	1988–1989	4,000.0
7.	Shenmu-Shouxian Railway Construction	1991–1993	26,985.0
8.	Baoji-Zhongwei Railway Construction	1991–1993	29,800.0
9.	Hengshui-Shangqiu Railway Construction	1991–1993	23,603.0
10.	Nanning-Kunming Railway Construction	1991–1994	57,696.0
11.	Fujian Province Zhang Quan Railway Construction	1993	6,720.0
12.	Beijing Subway Second Phase Construction	1991–1994	15,678.0
13.	Shouxian-Huanghuagang Railway Construction	1996–1997	60,420.0
14.	Xian-Ankang Railway Construction	1996–1997	35,039.0
15.	Guiyang-Loudi Railway Double Tracking	1996–1997	29,960.0
<b>Total</b>			<b>577,826.0</b>
		Approval Date	Amount (\$ million)
<b>B. World Bank Loans</b>			
1.	Railway I: Construction of a Single Track Between Xinxiang and Heze	27 Jun 1984	220.0
2.	Railway II: Upgrading and Electrification of Zhengzhou-Wuhan Line	14 May 1985	235.0
3.	Railway III: Upgrading and Electrification of the Chongqing-Guiyang Lines	15 Apr 1986	230.0
4.	Railway IV: Double-Tracking of the Yueshan-Xiangfan Section	23 Jun 1988	200.0
5.	Inner Mongolia Local Railway: Construction of Jining to Tongliao Line	12 May 1989	150.0
6.	Railway V: Double-Tracking of the Zhuzhou-Hangzhou Line	24 Sep 1991	330.0
7.	Railway VI: Electrification of Double-Track Beijing-Zhengzhou Line, and Others	25 Mar 1993	420.0
8.	Railway VII: Electrification of Wuhan-Guangzhou Line, and Others	1 Jun 1995	290.0
9.	National Railway I: Langzhou-Baoji Double Tracking and Upgrading Second Line and Electrification	29 Jan 2002	160.0
10.	National Railway II: Upgrading Electrification of the Zhe-Gan Railway Line	24 Jun 2004	200.0
<b>Total</b>			<b>2,435.0</b>
		Approval Date	Amount (\$ million)
<b>C. Asian Development Bank Loans</b>			
1.	948 Shanxi-Xiaoliu Railway	31 Jan 1989	39.7
2.	1087 Yaogu-Maoming Railway	20 Jun 1991	67.5
3.	1167 Guang-Mei-Shan Railway	25 Jun 1992	200.0
4.	1221 Hefei-Jiujiang Railway	30 Mar 1993	110.0
5.	1305 Jing-Jiu Railway Technical Enhancement	14 Jul 1994	200.0
6.	1439 Dazhou-Wanzhou Railway	4 Jun 1996	100.0
7.	1553 Shenmu-Yanan Railway	29 Sep 1997	200.0
8.	1626 Guizhou-Shuibai Railway	18 Aug 1998	140.0
9.	1748 Hefei-Xi'an Railway	17 Aug 2000	300.0
10.	1850 Ganzhou-Longyan Railway	30 Oct 2001	200.0
11.	2051 Yichang-Wanzhou Railway	16 Dec 2003	500.0
12.	2116 Dali-Lijiang Railway	2 Dec 2004	180.0
<b>Total</b>			<b>2,237.2</b>
		Approval Date	Amount (\$'000)
<b>D. Asian Development Bank Technical Assistance</b>			
1.	1117 Institutional Assistance to Provincial Railway Operations	31 Jan 1989	450.0
2.	1523 Institutional Strengthening of Guangdong Sanmao Railway Company	20 Jun 1991	965.0
3.	1524 Regional Railway Sector Study	20 Jun 1991	275.0
4.	1720 Institutional Strengthening of Guang-Mei-Shan Railway Company	25 Jun 1992	250.0
5.	1721 Institutional Strengthening of Guangdong Planning Commission	25 Jun 1992	250.0
6.	1861 Strengthening Business and Commercial Practices of the Hefei-Jiujiang Railway Company and Anhui Province	30 Mar 1993	600.0
7.	2122 Policy Support to the Ministry of Railways	14 Jul 1994	600.0
8.	2578 Institutional Strengthening of Local Railways in Sichuan	4 Jun 1996	400.0
9.	2878 Institutional Strengthening of Local Railways in Shaanxi	29 Sep 1997	400.0
10.	4325 WTO-Policy Reform Support to MOR	2 April 2004	400.0
<b>Total</b>			<b>4,590.0</b>

MOR = Ministry of Railways, WTO = World Trade Organization.

Sources: Asian Development Bank and Ministry of Railways

## REFORM AGENDA MATRIX

Item	2004	2005	2007	2010	2020
<b>Railway's Mission:</b> Support sustainable development as the primary transport mode in the People's Republic of China					
<b>Objectives</b> (i) Develop the railway network (eight vertical and eight horizontal backbones). (ii) Provide users with affordable, safe, fast, reliable, punctual, and comfortable transportation, by means of sector reforms.	Provide users with high-tech services and increase transportation capacity for both freight and passengers to meet unrealized demand, carry out western railway development for poverty reduction, and fulfill the railways' public service obligations.			A highly technological advanced railway system in terms of service quality, hardware, and software will be established.	
<b>Major Indicators</b> Operating length (national lines) in km Network density Route-km per 10,000 m <sup>2</sup> of land Route-km per 10,000 people Employees per route-kilometer	74,000 (60,446) 76.0 0.57 24.5	75,000 (61,000) 78.1 0.58 23.9	77,000 (62,000) 80.2 0.59 23.3	85,000 (65,000) 83.3 0.60 21.9	100,000 (75,000) 93.8 0.66 18.5
<b>Technological Reform</b> (i) Modernize equipment. (ii) Develop high-speed passenger transport services and passenger dedicated lines. (iii) Develop and implement management information system. (iv) Optimize railway assets and increase their turnover.	<ul style="list-style-type: none"> <li>DMIS implemented on some major routes</li> <li>Passenger train speed increased to 200 km/h on some major routes</li> </ul>	<ul style="list-style-type: none"> <li>Express passenger services begin on some major backbones/routes.</li> <li>Better technical design standards will increase operating speed.</li> <li>Passenger ticketing will be fully computerized.</li> </ul>	<ul style="list-style-type: none"> <li>Major rehabilitation works on the east-west and north-south backbones will be carried out.</li> <li>18 large container terminals will be established.</li> </ul>	<ul style="list-style-type: none"> <li>Equipment modernization program will be completed.</li> <li>First high-speed passenger trains will be completed.</li> <li>Traffic control on the major backbones is centralized.</li> </ul>	<ul style="list-style-type: none"> <li>12,000 km of passenger dedicated corridor will be developed.</li> <li>16,000 route-km double-decker container services network will be built to link the container terminals.</li> <li>Automatic train control will lead to better safety.</li> </ul>
<b>Institutional Reform</b> (i) Separate noncore businesses. (ii) Separate government and regulatory function from commercial function. (iii) Separate social infrastructure. (iv) Separate passenger services from freight and infrastructure operation. (v) Restructure branch lines. (vi) Renew management concept.	<ul style="list-style-type: none"> <li>Five major enterprises were separated in September 2000, and three in December 2003.</li> <li>Separation of hospitals and schools completed.</li> </ul>	<ul style="list-style-type: none"> <li>New management concept launched after an assessment of asset operating liability system.</li> </ul>	<ul style="list-style-type: none"> <li>Separation of noncore businesses will be completed by 2007.</li> <li>Outsourcing of track and train maintenance will be considered.</li> </ul>	<ul style="list-style-type: none"> <li>Separation of social infrastructure will be substantially completed by 2010.</li> </ul>	<ul style="list-style-type: none"> <li>Productivity equivalent to that of railways in developed countries will be attained by reducing personnel and streamlining business practices.</li> </ul>
<b>Social Security Reform</b> (i) Reform the pension system. (ii) Reform health insurance. (iii) Continue diversified economy program.	Social benefit reform (pension and health care) started in 1998 and is completed. The diversified economy company program is ongoing; 416,000 redundant personnel were transferred to diversified economy companies.				
<b>Structural Reform</b> (i) Corporatization (ii) Diversify financing. (iii) Increase private sector participation. (iv) Reform tariff regime .	<ul style="list-style-type: none"> <li>First initial public offering was in 1995.</li> <li>CNY3 billion bonds were issued as part of a total CNY12 billion railway bonds program.</li> <li>Certain high value-added business segments are corporatized.</li> </ul>	<ul style="list-style-type: none"> <li>The financing capacity of the sector will be increased by using various modalities, including private sector financing.</li> </ul>	<ul style="list-style-type: none"> <li>Corporatization of branch lines will be completed.</li> <li>New line tariff policy will be considered for applications.</li> </ul>	<ul style="list-style-type: none"> <li>Intramodal competition will be introduced and an independent regulatory body established.</li> </ul>	
<b>Regulatory Reform</b>	<ul style="list-style-type: none"> <li>Railway Law (enacted in 1989) was revised in 1999.</li> </ul>	<ul style="list-style-type: none"> <li>Accession to WTO permitted qualified foreign freight operators to obtain a maximum 30-year concession. A full concession for foreign operators is available from 2007 onward.</li> </ul>			

DMIS = dispatch management information system, TMIS = transport management information system, WTO = World Trade Organization.

Sources: Asian Development Bank and Ministry of Railways.

## LESSONS LEARNED FROM ASIAN DEVELOPMENT BANK-FINANCED RAILWAY PROJECTS

Loan, Technical Assistance	Objectives	Major Accomplishments and Lessons Learned
<p>Shanxi–Xiaoliu Railway (Loan 948)</p> <p>Executing Agency (EA): Shanxi–Xiaoliu Railway Company</p>	<p>(i) Promote efficient and economic transport of minerals and agricultural outputs, (ii) facilitate industrial development in the poor project area, and (iii) provide efficient passenger services linking the project area to the national railways.</p>	<p>Loan: The project is classified as unsuccessful due to a shortfall in traffic and resulting low economic internal rate of return, poor institutional setup, and operational constraints on the adjacent locally funded section.<sup>a</sup> The postevaluation highlighted the need to (i) have a fully functional and committed EA responsible for both construction and operation at the project planning stage; (ii) prepare realistic traffic forecasts; and (iii) ensure adequate institutional setup. However, since postevaluation, the operating performance has improved substantially owing to new management and some physical improvements.</p>
<p>Institutional Assistance to Provincial Railway Operations (technical assistance [TA] 1117)</p>	<p>Strengthen the Shanxi – Xi'aohui Railway Company financial management and accounting, tariff setting, and management information systems.</p>	<p>TA: Part 1 of the TA assisted the EA with construction management. Part 2 helped address the areas of concern for improving operation. However, this assistance was not sufficient to overcome problems associated with this project.</p>
<p>Yaogu–Maoming Railway (Loan 1087)</p> <p>EA: Guangdong Sanmao Railway Company</p>	<p>(i) Permit efficient and economic rail transport, (ii) improve connections to the national railway network, and (iii) improve transport links to three special economic zones.</p>	<p>Loan: The project completion report (PCR) concluded that the project was successful.<sup>b</sup> Traffic exceeded forecasts, and commercial operations were successful. There was rapid economic growth and substantial social changes resulted in the project area after project completion. Jobs created in tertiary industry helped women improve their social status. The EA was restructured into a joint-stock company. An important lesson was to ensure appropriate capital adequacy for such projects, as 100% debt financing is not financially sustainable.</p>
<p>Institutional Strengthening of Guangdong Sanmao Railway Company (TA 1523)</p>	<p>Computerize financial and operational systems and study ways to introduce market-based reforms to enhance efficiency.</p>	<p>TA 1523: The TA supported the establishment of a market-oriented and profit-conscious management. The organizational structure was rationalized, corporate profitability objectives established, and associated management policies implemented. Computerization aided management and financial decision making.</p>
<p>Regional Railway Sector Study (TA 1524)</p>	<p>Assist in railway planning focusing on local railways in the south and southeast PRC.</p>	<p>TA 1524: The TA helped identify railway projects for development of unserved areas. Some have been built.</p>
<p>Guang-Mei-Shan Railway (Loan 1167)</p> <p>EA: Guang-Mei-Shan Railway Company</p>	<p>(i) Permit efficient and economic rail transport within the project area and to other regions; and (ii) establish the essential transport infrastructure to develop mining, industry, agriculture, and tourism.</p>	<p>Loan: The PCR rated the project successful.<sup>c</sup> Commercial operation started 1 year ahead of schedule. Traffic and revenues exceeded forecasts. The railway had a substantial socioeconomic impact.<sup>d</sup> Incomes and living standards in the project area were raised and poverty reduced after project completion. Employment creation in the service industry increased opportunities for women. Debt-servicing problems resulting from 100% debt financing were addressed by financial restructuring. Based on the successful financial performance, the Guang-Mei-Shan Railway Company raised \$510 million through an initial public offering on the New York Stock Exchange in 1996.</p>
<p>Institutional Strengthening of Guang-Mei-Shan Railway Company (TA 1720)</p>	<p>(i) Improve management information and financial systems through computerization, and</p>	<p>TA 1720: Finance and marketing functions were strengthened, and computer applications developed to improve management information systems. The TA helped establish the EA as a commercial entity, focusing on corporate and organizational reform, commercial operation,</p>

Loan, Technical Assistance	Objectives	Major Accomplishments and Lessons Learned
Institutional Strengthening of Guangdong Planning Commission (TA 1721) EA: Guangdong Planning Commission	(ii) undertake a study for additional market-based reforms to enhance efficiency and accountability.  Develop and implement a sustainable monitoring system transferable to other projects and provinces.	and effective information flow. Transfer of knowledge to other local railways was promoted.  TA 1721: Socioeconomic evaluation showed that the project facilitated economic development in the project area, including that of tertiary industry, which generated employment and promoted the welfare of rural residents. The income of resettled households was increased and living conditions improved.
Hefei–Jiujiang Railway (Loan 1221) EA: Hefei–Jiujiang Railway Company	(i) Foster economic growth by completing part of the second railway between Beijing and Kowloon, and (ii) provide essential transport infrastructure in less-developed inland provinces.	Loan: The PCR concluded that the project was partly successful, due to lower than expected traffic. <sup>e</sup> Environmental management and resettlement were completed satisfactorily. The lessons learned were: (i) undercapitalization led to high, short-term debt financing; (ii) traffic forecasts need to be prepared considering alternative routes; and (iii) tariffs should consider those on alternative railways. Since 2003, the traffic has increased substantially.
Strengthening Business and Commercial Practices of the Hefei–Jiujiang Railway Company and Anhui Province (TA 1861)	(i) Promote commercial discipline in local railway companies, and (ii) examine the feasibility of local railway companies' diversifying ownership through broader equity participation.	TA 1861: The TA helped the railway company improve commercial orientation and knowledge of market-oriented businesses. The railway company was assisted in forecasting financial performance during 1999–2003. The EA was helped assess year 2000 readiness of the project facilities and take remedial measures.
Jing–Jiu Railway Technical Enhancement (Loan 1305) EA: Ministry of Railways	(i) Enhance operational efficiency of the Jing–Jiu Railway (JJR) by acquiring modern railway technology and developing human resources, and (ii) support MOR in formulating reforms to improve efficiency and commercialize operations.	Loan: The PCR and PPAR concluded that the project was successful. <sup>f</sup> MOR acquired modern technology and implemented organizational and tariff reforms that improved efficiency. The project helped stimulate economic growth in the project area, particularly in the poverty counties in Jiangxi province. Per capita income increased substantially and poverty incidence fell. This project also highlighted the need to forecast freight traffic more accurately than it did.
Policy Support to the Ministry of Railways (TA 2122)	(i) Recommend organizational arrangements for the commercial operation of the JJR, and (ii) formulate a tariff policy considering alternative routes.	TA: The TA study concluded that (i) a separate entity for commercial operation of the JJR is not desirable as it would place the JJR at a competitive disadvantage; and (ii) the operation should be integrated with the national network. The proposal for a higher tariff for the north-south corridor, including the JJR, was put into effect.
Daxian–Wanxian Railway (Loan 1439) EA: Dawan Railway Company	Provide economic transportation for facilitating economic growth in northern Sichuan to reduce poverty.	Loan: Located in a poor area, the project had a delayed start due to the administrative separation of Sichuan province and Chongqing municipality. Physical implementation is complete. Project trial operations completed. Commercial operations started in October 2004.
Institutional Strengthening of Local Railways in Sichuan (TA 2578) EA: Sichuan Provincial Planning Commission	(i) Corporatize the railway bureau; and (ii) promote commercialization, corporate and financial management, market-based tariffs, and human resource development.	TA 2578: The TA identified excessive staffing, undercapitalization, and underutilization of assets as problems of local railways in Sichuan. The organizational commitment to meet customer needs was lacking. An action plan to develop the required business environment is under implementation.

Loan, Technical Assistance	Objectives	Major Accomplishments and Lessons Learned
Shenmu–Yanan Railway (Loan 1553) EA: Shaanxi Xiyian Railway Company Institutional Strengthening of Local Railways in Shaanxi Province (TA 2878) EA: Shaanxi Provincial Planning Commission	Promote economic development and reduce poverty in northern Shaanxi province by providing economic transportation. Convert Shaanxi Local Railway Company (SLRC) into a corporate entity and help Shaanxi Xiyian Railway Company (SXRC) and SLRC develop financially commercial operations.	Loan: The project is located in a poor area of Shaanxi province. Trial operations are completed. Commercial operations have started. TA 2878: The study made recommendations for efficient commercial operation of SXRC and SLRC, including corporatization of SLRC. Other areas covered included management information systems, traffic costing, and tariffs. Implementation of the action plan developed under the TA is in progress.
Guizhou–Shuibai Railway (Loan 1626) EA: Guizhou–Shuibai Railway Company	Promote economic growth and create conditions necessary to reduce endemic poverty,	The project is located in a poor part of Guizhou province. Implementation started in 1998, and construction is complete. Trial operations are complete and commercial operations have started.
Hefei–Xi'an Railway (Loan 1748) EA: MOR	Promote economic growth in poor provinces to raise living standards and reduce poverty.	Many poor counties are located along the project route. Project implementation started in 2000, and construction was completed in 2003. Trial operations on the railway have started.
Ganzhou–Longyan Railway (Loan 1850) EA: MOR	Promote economic growth in poor provinces to raise living standards and reduce poverty.	Project implementation started in 2002, and construction was completed in March 2005. Trial operations on the railway started in April 2005.
Yichang–Wanzhou Railway (Loan 2051) EA: MOR	Promote economic growth in poor provinces to raise living standards and reduce poverty.	Implementation of the project started in 2004, and is progressing satisfactorily.
Dali–Lijiang Railway (Loan 2116) EA: WYRC	Promote sustainable economic growth and reduce poverty in poor northwestern part of Yunnan province.	Project implementation started in 2005, and is progressing satisfactorily.

EA = executing agency, GDP = gross domestic product, JJR = Jing–Jiu Railway (Beijing–Kowloon Railway), MOR = Ministry of Railways, PCR = project completion report, PPAR = project performance audit report, TA = technical assistance.

<sup>a</sup> ADB. 1998. *Project Performance Audit Report on the Shanxi–Xiaoliu Railway Project in the People's Republic of China*. Manila.

<sup>b</sup> ADB. 1994. *Project Completion Report on the Yaogu–Maoming Railway Project in the People's Republic of China*. Manila.

<sup>c</sup> ADB. 1998. *Project Completion Report on the Guang–Mei–Shan Railway Project in the People's Republic of China*. Manila.

<sup>d</sup> ADB. 1992. *Technical Assistance to the People's Republic of China for Institutional Strengthening of Guangdong Planning Commission*. Manila.

<sup>e</sup> ADB. 2000. *Project Completion Report on the Hefei–Jiujiang Railway Project in the People's Republic of China*. Manila.

<sup>f</sup> ADB. 2000. *Project Completion Report on the Jing–Jiu Railway Technical Enhancement Project in the People's Republic of China*. Manila; ADB. *Project Performance Audit Report on the Jing–Jiu Railway Technical Enhancement in the People's Republic of China*. Manila.

Source: Asian Development Bank assessment.

## CONSULTATIONS WITH STAKEHOLDERS

Date	Region	Agency	Participants	Persons	Main Topic
Dec 2001–Jul 2002	Project region	First and Fourth Survey and Design Institutes	Local government officials, leaders of railway department	80	Opinions of local government and railway authorities about ZXR
Mar–Jul 2003	Project region	First, Second, and Fourth Survey and Design Institutes	Local government officials, leaders of railway department, potential passengers	300	Opinions of local government and railway authorities about ZXR
Sep–Nov 2003	Project region	First, Second, and Fourth Survey and Design Institutes	Local government officials, leaders of railway department, potential passengers	300	Opinions of local government, railway authorities and potential passengers about ZXR
Nov 2003–Jan 2004	Project region	First, Second, and Fourth Survey and Design Institutes	Local government officials, leaders of railway department, potential passengers	300	Collect opinions of local government, railway authorities, and potential passengers about ZXR
Feb 2004	Shaan County, Lingbao-2 villages	Second Survey and Design Institute	Village leaders, representatives of the village	20	Basic situation in village, opinion about future demolition, attitude toward ZXR
Mar 2004	Luoyang Longmen township	Fourth Survey and Design Institute	Township leaders, village leader, representatives of the village	20	Local demolition policy, resettlement framework, channels for public participation, attitude toward ZXR
Mar 2004	Hua County, Baqiao - 2 Villages	First Survey and Design Institute	Village leaders, representatives of the village	20	Local demolition policy, resettlement framework, channels for public participation, attitude toward ZXR
Feb–Mar 2004	Project region	First Design Institute	Farmers	7	Basic household situation, opinion about future demolition, attitude toward ZXR
Feb–Mar 2004	Project region	First, Second and Fourth Survey and Design Institutes	Households that may experience impact	Survey 1092 households	Basic household situation, opinion about future demolition, attitude toward ZXR
Dec 2004	Project region	TA and local consultants	Local government officials	221	Basic situation of local society and economics, attitude toward ZXR
Dec 2004	Project region	TA and local consultants	Tourists at main tourist sites	17	Attitudes toward ZXR
Dec 2004	Project region	TA and local consultants	Passengers at train, long-distance bus station, airport	Survey of 1600 passengers	Points of origin and destination, aim of travel, reasons for choosing mode of transport, frequency of travel, reasons for paying, occupation, income
Dec 2004	Project region	TA and local consultants	Drivers at long-distance bus stations, drivers of trucks and buses at highway tolls	Survey of 1000 drivers	Model of the vehicle, owner of the vehicle, number of years in use, origin and destination, operating fee, goods transported, number of tons, frequency of trips
Dec 2004	Project region	TA and local consultants	Villages along the line that will sustain potential resettlement impact	Survey of 1198 HHs	Basic household situation, opinions about future demolition, attitudes toward ZXR
Dec 2004	Project region	TA and local consultants	Households that are not on alignment but which may experience impact	Survey of 721 HHs	Basic household situation, opinions about future demolition, attitudes toward ZXR
Dec 2004	Project region	TA and local consultants	Large enterprises along the line	Survey of 163 enterprises	Type and quantity of the production, raw material consumption, number of employees, total wages
Dec 2004	Project region	TA and local consultants	Environmental impacts	Survey of 487 people	Current environmental issues, likely environmental issues as a result of the ZXR, attitudes toward ZXR
Mar 2005	Project region	MOR, TA and local consultants, Fourth Survey and Design Institutes, tendering companies. and ADB Mission	Local government officials, potential passengers, villagers	310	Project impacts on local economy, poverty, social issues, environment and resettlement

HH = households, MOR= Ministry of Railways, TA = technical assistance, ZXR = Zhengzhou–Xi'an Railway.

Source: Compiled by the project preparatory technical assistance consultants, 2005.



**COST ESTIMATES AND FINANCING PLAN**  
(\$ million)

Item	Cost Estimates			Financing Plan	
	Foreign Exchange	Local Currency	Total Cost	ADB	MOR, HPG, SPG, CDB
<b>A. Base Cost<sup>a</sup></b>					
1. Civil Works	604.54	1,410.60	2,015.14	0.00	2,015.14
2. Railway Track Work <sup>b</sup>	120.79	134.47	255.26	105.85	149.41
3. Buildings and Facilities	3.48	66.16	69.64	0.00	69.64
4. Signaling and Communications	190.84	138.71	329.55	156.17	173.38
5. Electric Power and Traction	76.47	106.32	182.79	49.89	132.90
6. Safety Component	26.29	23.29	49.58	20.47	29.11
7. E-Governance and MIS	41.89	37.09	78.98	32.61	46.37
8. Land Acquisition and Resettlement	0.00	181.43	181.43	0.00	181.43
9. Other Equipment and Facilities	16.23	14.38	30.61	12.64	17.97
10. Administration, Consulting Services, and Miscellaneous	32.28	178.41	210.69	0.80	209.89
11. Environmental Protection, Mitigation, and Monitoring	0.00	31.97	31.97	0.00	31.97
12. Temporary Facilities and Transitional Works	0.00	56.11	56.11	0.00	56.11
<b>Subtotal (A)</b>	<b>1,112.81</b>	<b>2,378.94</b>	<b>3,491.75</b>	<b>378.43</b>	<b>3,113.32</b>
<b>B. Contingencies</b>					
1. Physical Contingency <sup>c</sup>	144.30	96.20	240.50	0.00	240.50
2. Price Contingency <sup>d</sup>	58.50	87.75	146.25	21.57	124.68
<b>Subtotal (B)</b>	<b>202.80</b>	<b>183.95</b>	<b>386.75</b>	<b>21.57</b>	<b>365.18</b>
<b>C. Interest<sup>e</sup> during Construction</b>	49.00	204.43	253.43	0.00	253.43
<b>Total</b>	<b>1,364.61</b>	<b>2,767.32</b>	<b>4,131.93</b>	<b>400.00</b>	<b>3,731.93</b>

ADB = Asian Development Bank, CDB = China Development Bank, HPG= Henan provincial government, MOR = Ministry of Railways, SPG = Shaanxi provincial government.

<sup>a</sup> At 2005 prices. Import taxes and duties are waived.

<sup>b</sup> Including rails, sleepers, ballast, bridge beams, track laying, and bridge construction.

<sup>c</sup> At 8% of civil works cost, including land acquisition.

<sup>d</sup> At 3% per annum for local currency costs and 2% per annum for foreign exchange cost during 2006–2011.

<sup>e</sup> This is based on the prevailing United States dollar 5-year swap rate plus a spread for the ADB loan and the prevailing interest rate for the China Development Bank.

Source: Asian Development Bank estimates.

### IMPLEMENTATION SCHEDULE

Item	2004			2005			2006			2007			2008			2009			2010			2011																											
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J
1 Detailed Design, Engineering, and Documentation	■																																																
2 Prequalification and Tendering				■																																													
3 Land Acquisition and Resettlement				■																																													
4 Civil Works and Buildings				■																																													
5 Track Laying													■																																				
6 Telecommunications and Signalling													■																																				
7 Trial Operations																															■																		

Source: Asian Development Bank estimates.

**CONTRACT PACKAGES**  
(\$ million)

<b>Description</b>	<b>Amount (\$ million)</b>	<b>Procurement Mode</b>
<b>A. Track Work</b> (10 packages)		
Railway Materials (including rails, sleepers, turnouts, fastenings)	<b>105.85</b>	ICB
<b>B. Equipment</b> (various packages)		
1. Electric Power and Traction	49.89	ICB/IS/DP
2. Signaling and Communications	156.17	ICB/IS/DP
3. E-Governance and Operating Dispatch Information System	32.61	ICB/IS/DP
4. Safety Component	20.47	ICB/IS/DP
5. Other Equipment and Facilities	12.64	ICB/IS/DP
<b>Subtotal (B)</b>	<b>271.78</b>	
<b>C. Consulting Services</b>	<b>0.80</b>	
<b>D. Contingencies</b>	<b>21.57</b>	
<b>Total</b>	<b>400.00</b>	

ICB = international competitive bidding, IS = international shopping, DP= direct purchase.

Note: Contracts valued in excess of \$1,000,000 for materials and equipments will be procured through ICB. Any supply contracts not exceeding \$1,000,000 will be procured through IS. Any supply contracts not exceeding \$100,000 will be procured through DP.

Source: Asian Development Bank estimates.

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

### A. Introduction

1. The Zhengzhou–Xi'an Railway (ZXR) Project is the first of the eight dedicated passenger lines in the People's Republic of China (PRC). The objective of the Project, which connects Zhengzhou in Henan province with Xi'an in Shaanxi province, is to promote sustainable economic growth by enhancing transportation capability in an unserved area, thereby creating employment and income-enhancing opportunities, raising incomes, and reducing poverty. To achieve this objective, a corporate entity is being set up to construct, operate, and manage the Project; and assist in facilitating economic developments, such as tourism, as well as value-added and labor-intensive industries in the project area. The consulting services are to assist in (i) strengthening institutional, marketing, and business development functions of the Project Company; and (ii) researching and strengthening the development, operation, and management of dedicated passenger railway systems in the PRC.

### B. Scope

2. For the first component, the consultants will (i) help with institutional strengthening of the Project Company for its successful operation in a market environment; (ii) determine the level of tourism, industry and market development expertise of the Project Company; (iii) research programs and incentives available for attracting tourist and related industry at the county, prefecture, and province levels; (iv) meet with a selection of potential shippers located or planning to locate along the route of the ZXR; (v) meet with business people of Zhengzhou, Luoyang, Sanmexia, and Xi'an to determine current operations and future inland transport requirements including for export to Central Asia and Europe; (vi) develop plans for improving railway services, for passengers (including tourists) and freight (particularly container services); (vii) propose measures to develop industrial sidings; and (viii) improve marketing of railway services to targeted customers both passenger and freight.

3. For the second component, the consultants will (i) research and strengthen the development, operation, and management of the passenger-dedicated railway systems in the PRC, and (ii) recommend actions and changes including institutional efforts to make these passenger dedicated railways more market oriented and competitive. The international consultants will be recruited in accordance with Asian Development Bank (ADB) *Guidelines on the Use of Consultants*.

### C. Expertise and Cost Estimates

4. About 20 person-months of international consulting services will be engaged using the simplified technical proposal procedures based on quality- and cost-based selection in accordance with ADB *Guidelines on the Use of Consultants*. The provisions of the ADB anticorruption policy will be included in all invitation documents and contracts for international consultants. The international consultants will have expertise in business development and marketing, international trade, and railway operation. The loan will finance the services of the international consultants.

5. MOR and the Project Company will (i) assign appropriate counterpart staff to liaise with and facilitate the work of consulting services; (ii) provide suitable office accommodation and communications facilities commensurate with requirements; (iii) assist the consultants in scheduling field visits and discussions with field agencies in connection with the study; and (iv) provide all facilities, documentation, and assistance as may be reasonably requested by the consultants to complete the work.

## PROJECT PERFORMANCE MANAGEMENT SYSTEM

Item	Monitoring Tool	Major Indicators to be Monitored (baseline and target figures to be incorporated into PAM)	Monitoring Agency	Accountable Agency	Reporting Frequency Submission Due Date
<b>Sustainability</b>	<b>Socioeconomic Monitoring Report</b>	Population, poverty incidence, literacy rate Infant mortality, maternal mortality, school enrollment Number of hospitals/clinics, number of schools Update of poverty reduction program of each county	Project Company	MOR, Project Company	Annually  (up to 3 years after physical completion)
		GDP, GDP per capita, retail prices of a selection of commodities Station area land prices, local government revenue Local price escalation, net income per capita Fixed asset investment for roads Number of registered enterprises Number of township enterprises, Number of markets			
		Progress of development of local road network Road density by approximate distance from a station Number of villages without roads, safe water, electricity, telephone line Number of HIV/AIDS (human immunodeficiency virus/acquired immune deficiency syndrome) cases in the project area.			
<b>Viability</b>	<b>Operation Report</b>	Traffic volume, Train speed Number of personnel Revenues, expenses Average travel speed	Project Company	MOR, Project Company	Annually (up to 3 years after final acceptance)
	<b>APA AFS</b>	Audited project accounts Audited financial statements of the Project Company External auditor's checklist	CNAO	MOR, Project Company	AFS = Same as operation report APA = Same as quarterly progress report
	<b>Notice</b>	Notice to proceed, notice of resettlement completion, notice of provisional and final acceptance of the facilities	Project Company	MOR, Project Company	Within a reasonable time
<b>Sustainability</b>	<b>Environmental Monitoring and Evaluation Report</b>	(i) Water quality: suspended solids, BOD, oil and grease for earthwork/ erosion control, sewage, and pollution from construction equipment and locomotives (PM during construction; PM, SO <sub>2</sub> , and NO <sub>x</sub> during operations); (ii) clearing of vegetation and revegetation, especially any old-growth trees; (iii) regional air quality (PM, SO <sub>2</sub> , NO <sub>x</sub> ); (iii) secondary development projects	To be nominated	MOR, Project Company	Semiannually until 2 years after provisional acceptance

Item	Monitoring Tool	Major Indicators to be Monitored (baseline and target figures to be incorporated into PAM)	Monitoring Agency	Accountable Agency	Reporting Frequency Submission Due Date
Sustainability	Land Acquisition and Resettlement Progress Report (External)	Sample household incomes (restoration) Sample village incomes Opinion surveys Rehabilitation measures Training progress Complaints, grievance, and responses Ethnic minority, vulnerable groups, gender	To be determined	MOR, Project Company	Semiannual reporting during implementation and annual evaluation reports thereafter for at least 2 years.
Sustainability	Land Acquisition and Resettlement Monitoring Report (Internal)	Implementation schedule Number of households signed land acquisition agreement Compensation payments Removal of houses, construction of new houses Transfer of land Rehabilitation measures Complaints, grievance, and responses Resettlement disbursements	RCSO with assistance of FSDI	MOR, Project Company and local government	Quarterly until completion of resettlement within 3 months from the end of each quarter One completion report when implementation is complete
Technical Feasibility	Quarterly Progress Report	Implementation schedule Contract award Disbursements Physical progress by contract Update of project cost estimate Number of poor disaggregated by gender for unskilled local labor Workers safety / accidents at construction sites	Project Company	MOR, Project Company	Quarterly until the quarter in which physical completion takes place, or the loan account with ADB is closed, whichever is later. Within 3 months from the end of each quarter
All	Midterm Review	Evaluation of various aspects of project implementation including technical, environmental, resettlement, social, institutional, economic and financial, and sector performance	Project Company	MOR (FCTIC) and Project Company	In third year from the signing of the Loan Agreement
All	PCR	Evaluation of various aspects of project implementation including technical, environmental, resettlement, social, institutional, economic and financial, and sector performance	Project Company	MOR (FCTIC) and Project Company	Within 3 months after physical completion

ADB = Asian Development Bank, AFS = audited financial statement, APA = audited project accounts, BOD = biochemical oxygen demand, CNAO = China National Audit Office, EPB = environmental protection bureau, FCTIC = Foreign Capital and Technical Import Center, FSDI = Fourth Survey and Design Institute, GDP = gross domestic product, MOR = Ministry of Railways, NO<sub>x</sub> = nitrogen oxides, PAM = project administration memorandum, PCR = project completion review, PM = particulate matter, RCSO = Railway Construction Support Office, SO<sub>2</sub> = sulfur dioxide.

Source: Asian Development Bank estimates.

## TRAFFIC FORECAST AND ECONOMIC ANALYSIS

### A. Traffic Forecast

1. The Zhengzhou–Xi’an Railway (ZXR) is an integral part of the national dedicated passenger railway network envisioned in the People’s Republic of China (PRC). The national network will encompass 5,000 route-kilometers (km) by 2010 and 12,000 route-km by 2020 along four east-west and four north-south directions, incorporating cutting-edge technologies in signaling, telecommunications, automatic train control systems, and safety equipment. ZXR is also an integral part of the key railway corridor connecting western and central PRC with eastern and coastal regions of the country. The configuration and operational strategy of the ZXR Project shows that appropriately this is a corridor development project. The activities under the Project will enhance the capacity for railway transportation for both passenger trains and freight trains along the ZXR corridor, which comprises the existing mixed service Zhengzhou–Xi’an section (Zhengxi) of the Longhai railway and the new passenger-dedicated ZXR line.

2. Freight traffic for the Longhai railway line was forecast by commodity (i.e., coal, petroleum products, iron and steel, fertilizers, intermodal containers, and other commodities) in two categories differentiated by their economic impact: (i) traffic diverted from other modes, mainly from other national railway routes and roads, based on an assessment of the relative service and cost competitiveness of the Zhengxi; and (ii) generated traffic that would only move because of the additional freight-carrying capacity created on Zhengxi by shifting existing passenger trains to ZXR. The traffic forecast was based on a three-tier analysis: (i) national transport demand based on historical trends; (iii) national railway traffic demand based on commodity-specific analysis for major commodities currently using and expected to use the existing Zhengxi section of the Longhai railway; and (iv) Zhengxi section traffic projections based on the railway investment strategy (RIS-III) model of the Ministry of Railways (MOR).<sup>1</sup> Traffic projections considered expected economic growth, population increase, tourism development potential, local government development plans, market surveys, and assessments of technical assistance (TA) consultants and the Asian Development Bank (ADB) mission. The freight volume on the Zhengxi section is forecast to increase from about 16.14 billion ton-km in 2011 to 49.02 billion ton-km in 2031, with average annual growth rate of 5.7%. Passenger traffic was forecast based on similar factors, with a particular focus on tourism development potential.<sup>2</sup> Passenger traffic is forecast to grow from 15.65 billion passenger-km in 2011 to 50.37 billion passenger-km in 2031, with an average annual growth rate of 6.0% (Table A13.1).

3. Transportation improvements will facilitate the development of natural resources and associated industries. Local governments are seeking private sector companies to invest in their areas, particularly in manufacturing and tourism. Freight and passenger traffic forecasts are considered reasonable given that (i) the Zhengxi section of the Longhai railway is currently highly congested with a traffic density of 120.27 million traffic units (ton-km+passenger-km) per km, four times the average national railway’s density of 30.18 million traffic units per km, which in itself is the highest traffic density in the PRC; (ii) railways in the PRC have experienced high annual traffic growth with recent rates higher than the assumed growth rates for freight and passenger traffic; (iii) the Project is a critical link connecting western PRC with the east, as well as serving as a gateway to the PRC-Eurasian rail network for intermodal transport;<sup>3</sup> and (iv)

<sup>1</sup> This model, developed with assistance of the World Bank, is a sophisticated tool to analyze forecast modal split and network flows in the PRC based on a variety of factors, including capacity, socioeconomic variables, and costs.

<sup>2</sup> The ZXR passes through areas recognized as the “Cradle of Ancient China,” and includes temples, grottos, tombs, and other relics from the ancient dynasties dating back 3,000 years.

<sup>3</sup> An International Union of Railways (UIC)-sponsored protocol was executed by 26 nations in Washington on 8 April 2005 to establish seamless rail transport service between the PRC and Europe with onward trans-Atlantic marine service to the eastern United States.

freeing up transport capacity on the Zhengxi section will result in substantially more traffic for both passenger and freight transport.

## B. Economic Evaluation

4. **Cost.** The economic evaluation is based on a comparison of with- and without-project scenarios, using constant 2005 economic prices. The project benefits and cost were revalued in economic prices by separating the cost items into tradable materials and equipment, nontradable materials, labor, and land. The prices were expressed in CNY using the domestic price numeraire with a shadow exchange rate factor of 1.01 for foreign exchange effects. A shadow price was used to put an economic value on the wages paid to unskilled labor, but not on wages for skilled labor since no clear surplus of skilled workers exists. A shadow wage rate factor of 0.67 was used to convert the financial wage rate to an economic opportunity cost of labor.

5. **Benefits.** The economic benefits consist of (i) passenger and freight transport cost savings to passengers and freight shippers, respectively, for diverted freight and passenger traffic; (ii) generated passenger transport benefits estimated by the difference in economic cost of railway and bus transport; (iii) time savings in diverted passenger and freight traffic based on the value of time estimated from the net income of local residents and average value of freight; (iv) net economic value calculated on the basis of the economic value per additional ton of each commodity of generated traffic as a result of the construction of the ZXR; (v) net economic value of generated tourist days by estimating the number of tourists and average expenditure, and considering the cost of providing the tourist services; and (vi) avoided road construction and maintenance costs, accident costs, and shipper savings due to increased railway competition. The salvage value was calculated based on the economic life of each project component.

6. **Alternative Analysis.** Alternative transport modes and designs, particularly roads, were assessed to determine the least-cost option to provide sufficient capacity to cater to the expected demand. Building an electrified double-track railway in this corridor was considered viable to meet the anticipated traffic demand at this stage, given the railway network development, type of cargo and passengers, and energy efficiency. Seven alternative alignments were subsequently evaluated during the feasibility study for the following stations and sections: Zhengzhou terminal approach, Luoyang south station, line around Youguguan in Sanmenxia, Sanmenxia station location, Caijiapo landslide alternatives, Fushui–Weinan south route, and Xi'an terminal approach. Criteria adopted included railway length, cost estimates, length and difficulty of the construction of bridges and tunnels, construction period, local government development plans, and environmental and social impacts, including resettlement.

7. **Conclusion.** The economic internal rate of return (EIRR) for the Project is 17.4% (Table A13.3). Benefits from the freight traffic, including generated commodity production, are the major economic benefit (84%), followed by equal weights of 8% each for passenger benefits and other benefits. Sensitivity analysis tested 10 scenarios to assess the robustness of the results of the economic analysis (Table A13.4). The capital cost would have to be more than 33% higher than estimated for the EIRR to fall below the cutoff rate of 12%. Considering the experience of ADB-financed projects in the railway sector, this switching value is unlikely to occur. ADB-financed railway projects in the PRC have not encountered major cost overruns, and the contract prices tend to be lower than estimated because the contracting process is becoming increasingly competitive. The freight and passenger benefits would have to decrease more than 30% and 323%, respectively to make the Project economically nonviable. A reduction in the generated production by 415% and a 1-year delay in completion do not affect economic viability. Combinations of adverse effects of benefits and costs were also tested. The result showed that the Project would maintain its economic viability under plausible scenarios of variability.



8. The economic analysis was extended to quantify project risk and distribute project net benefits among stakeholders. The risk analysis, based on the statistical method, considers the possible value for key variables, including capital costs, operation and maintenance costs, passenger traffic, freight traffic, and net economic value of generated production; and the probability with which they may occur. The result shows that the EIRR would exceed 12% with 97% probability. Distribution analysis distributed project net benefits by determining the project effects for project beneficiaries, such as project users, labor, and government (Table A13.2). A large proportion (CNY34 billion) of net benefits will accrue to the project users.

**Table A13.1: Traffic Forecast**

Item	2011	2016	2021	2026	2031
<b>Freight Traffic</b>					
Tons (million)	50.19	74.92	97.62	118.93	152.44
Ton-kilometer (billion)	16.14	24.09	31.40	38.25	49.02
By commodity (billion ton-km)					
Coal	4.16	6.21	8.09	9.86	12.64
Petroleum Products	1.41	2.10	2.74	3.34	4.27
Iron and Steel	2.12	3.16	4.12	5.01	6.43
Fertilizers	0.93	1.38	1.80	2.20	2.81
Intermodal Containers	1.29	2.58	4.50	7.33	12.58
Others	6.24	8.66	10.15	10.51	10.29
<b>Passenger Traffic</b>					
Number (million)	31.12	41.77	56.92	78.35	100.15
Passenger-kilometer (billion)	15.65	25.80	35.02	41.74	50.37

Sources: Asian Development Bank estimates and technical assistance consultants.

**Table A13.2: Distribution of Project Benefits**  
(present values at 12%, CNY million)

Description	Financial Present Value	Economic Present Value	Difference	Project Users	Labor	Government
<b>Benefits:</b>						
Passenger Revenue	54,828.6	0.0	(54,828.6)	(54,828.6)		
Freight Revenue	12,541.5	0.0	(12,541.5)	(12,541.5)		
Passenger Transport Cost Savings		7,246.0	7,246.0	7,246.0		
Freight Transport Cost Savings		29,201.3	29,201.3	29,201.3		
Time Savings, Passengers		657.9	657.9	657.9		
Time Savings, Freight Shippers		132.8	132.8	132.8		
Generated Freight Traffic Benefits		55,714.1	55,714.1	55,714.1		
Other Benefits		9,392.5	9,392.5	7,332.5	30.4	2,029.6
<b>Total Benefits</b>	<b>67,370.1</b>	<b>102,344.6</b>	<b>34,974.5</b>	<b>32,914.5</b>	<b>30.4</b>	<b>2,029.6</b>
<b>Costs:</b>						
Capital	30,914.2	29,405.2	(1,509.0)			(1,509.0)
Maintenance	36,264.7	34,494.5	(1,770.2)	(1,062.1)	(442.6)	(265.5)
Labor	8,701.8	8,285.6	(425.2)		(425.2)	
Taxes	13,780.6		(13,780.6)			(13,780.6)
<b>Total Costs</b>	<b>89,661.3</b>	<b>72,185.3</b>	<b>(17,485.0)</b>	<b>(1,062.1)</b>	<b>(867.8)</b>	<b>(15,555.1)</b>
<b>Net Benefits</b>	<b>(22,291.2)</b>	<b>30,159.3</b>	<b>52,459.5</b>	<b>33,976.6</b>	<b>898.2</b>	<b>17,584.7</b>

CNY = yuan.

Sources: Asian Development Bank estimates and technical assistance consultants.

**Table A13.3: Economic Internal Rate of Return**  
(constant 2005 economic prices, domestic price numeraire, CNY million)

Year	Costs			Benefits			Total	Net Benefits
	Capital	Operation and Maintenance	Total	Passenger Traffic	Freight Traffic	Other Benefits		
2005	(2,889)		(2,889)					(2,889)
2006	(3,832)		(3,832)					(3,832)
2007	(6,779)		(6,779)					(6,779)
2008	(7,369)		(7,369)					(7,369)
2009	(6,779)		(6,779)					(6,779)
2010	(1,828)		(1,828)					(1,828)
2011		(3,332)	(3,332)	634	5,859	1,567	8,060	4,728
2012		(3,220)	(3,220)	695	6,530	874	8,099	4,878
2013		(3,429)	(3,429)	761	7,243	919	8,923	5,493
2014		(3,699)	(3,699)	834	8,001	966	9,801	6,102
2015		(3,974)	(3,974)	914	8,808	1,015	10,737	6,762
2016		(4,228)	(4,228)	1,002	9,668	1,066	11,736	7,508
2017		(4,466)	(4,466)	1,099	10,584	1,119	12,802	8,336
2018		(4,779)	(4,779)	1,204	11,563	1,175	13,943	9,164
2019		(4,777)	(4,777)	1,273	12,376	1,205	14,854	10,078
2020	(2,016)	(5,058)	(7,073)	1,347	13,237	1,263	15,847	8,774
2021		(5,247)	(5,247)	1,424	14,162	1,324	16,911	11,664
2022		(5,441)	(5,441)	1,506	15,145	1,388	18,040	12,599
2023		(5,635)	(5,635)	1,593	16,192	1,455	19,240	13,605
2024		(5,831)	(5,831)	1,685	17,309	1,525	20,519	14,688
2025	(2,359)	(6,154)	(8,514)	1,782	18,504	1,599	21,884	13,371
2026		(6,175)	(6,175)	1,884	19,783	1,676	23,343	17,168
2027		(6,314)	(6,314)	1,993	21,154	1,757	24,904	18,590
2028		(6,605)	(6,605)	2,107	22,626	1,841	26,575	19,970
2029		(6,836)	(6,836)	2,229	24,805	1,984	29,017	22,181
2030	(4,618)	(7,437)	(12,055)	2,357	27,172	2,080	31,609	19,554
2031	16,389	(6,980)	9,409	2,493	29,747	2,180	34,420	43,829

Economic Internal Rate of Return = 17.4%  
Economic Net Present Value at 12% = 5,239

CNY = yuan.

Source: Asian Development Bank estimates and technical assistance consultants.

**Table A13.4: Sensitivity Analysis**

Scenario	Change (%)	EIRR	Economic	Switching Value <sup>a</sup>
			NPV (CNY million)	
Base Case		17.4%	15,239	
Costs	10	15.9%	10,648	33
Generated Freight Benefits	(80)	16.4%	12,302	415
Total Freight Benefits	(10)	16.1%	10,157	30
Passenger Transport Benefits	(50)	16.8%	12,877	323
Delay Implementation by 1 Year	-	15.8%	9,540	NPV declines by 37%
Reduce SERF by 20%	(20)	16.2%	9,968	58

CNY = yuan, EIRR = economic internal rate of return, NPV = net present value at 12%, SERF = shadow exchange rate factor.

<sup>a</sup> Switching value indicates percentage change in a variable required for the NPV to become zero.

Sources: Asian Development Bank estimates and technical assistance consultants.

## FINANCIAL PERFORMANCE AND ANALYSIS

### A. General

1. The projected financial statements of the proposed Zhengzhou–Xian Railway (ZXR) Project were prepared in current terms for 2006–2031. Construction will be completed in August 2011; the trial operation will follow; and the first full year of full operation will be 2012. The foreign and local inflation rates are assumed at 2% and 3% during the projection period. The cost estimates are presented in current terms taking into account the potential impacts of domestic and international inflation.

### B. Financial Projections

2. Operating revenues from tariffs are projected based on forecast of future traffic and a base average tariff rate of CNY0.27 per passenger per kilometer.<sup>1</sup> A set of tariffs was devised, based on full cost recovery plus an adequate return on equity, to achieve close to optimum financial and economic performance of A and B classes of trains operating for the transit, interline, and local traffic with due consideration of affordability<sup>2</sup> (Table A14.1). The tariff charges are assumed to increase in current terms once every 5 years to keep up with about two thirds of inflation (10% increase in 5 years). No real increase in tariffs will occur over the Project's life span. Other revenues, including loading and unloading, warehouse storage, parcel service in the train stations, amounts to 4.5% of passenger revenue.

**Table A14.1 Proposed Tariff for ZXR (Unit: CNY/pkm)**

Train Type	Transit Traffic	Interline Traffic	Local Traffic
Class A	0.38	0.33	0.20
Class B	0.30	0.25	0.15

CNY = yuan, pkm = passenger-kilometer, ZXR = Zhengzhou-Xi'an Railway.  
Sources: Asian Development Bank estimates.

3. Annual incremental operating costs are estimated based on 2005 prices as follows: (i) fixed cost CNY4.1 million per train-kilometer (km); fixed cost is assumed to rise at a growth rate of 3% in real terms; (ii) passenger variable cost of CNY0.06 per passenger-km, and increase in line with passenger traffic flows; (iii) estimated cost of dry lease of rolling stock is CNY8.6 per train-km<sup>3</sup>; and (iv) other nonoperating expenses are assumed at CNY0.025 per passenger-km. All incremental operating costs are projected to increase annually in line with domestic inflation rates. In addition, periodic track-laying maintenance will be required after 10 years of operation at a cost of CNY4.6 million per track-km in 2005 prices, electric power and traction will be replaced after 15 years of operation at a cost of CNY1,553 million in 2005 prices, and signal and communication will be purchased after 20 years of operation at a cost of CNY2,727 million in 2005 prices.

<sup>1</sup> Comparable with the existing bus fare of CNY0.28/pkm.

<sup>2</sup> The low fare structure for local service will also substantially benefit the people living in the project area.

<sup>3</sup> Rolling stock costs are estimated by the Ministry of Railways at CNY8 billion for equipment intended for use in the national dedicated passenger network. This equipment consists of a fleet of electrical multiple units (EMUs), which will not be specifically assigned to the ZXR. MOR will separately finance the procurement of EMUs and charge a fee based on train-kilometer (km) to ZXR and other passenger railways. The per-km rate will be based on dry-lease terms and will include depreciation charges (5% per year) and 6% return on investment

4. The accounts receivable turnover period is assumed at 0.5 month of the annual revenue and 2 months of the total working expenses for accounts payable. The Project Company will employ 3,509 employees (7.24 per km) compared with 25 per km for the Ministry of Railways (MOR). The average annual average wages and other costs are CNY 30,000.

5. Depreciation is calculated on a straight line depreciation method with an average life of about 65 years for the main railway structure, 10 years for the track-laying component, 15 years for electric power and traction, and 20 years for signal and communications. The weighted average depreciation value is 2.2% per year. Applicable business taxes at a grossed up rate of 3.24% are charged on revenue. Corporate income tax at 33% is paid on income after deducting business taxes, depreciation and interest charges, operating expenses, and any prior year losses carried forward.

6. The Project will be funded 50% by equity or grants and 50% by long-term loans. The China Development Bank (CDB) loan will be repayable over 20 years, including a 6-year grace period. The ADB loan will have a 26-year maturity, including a 6-year grace period, and be a US dollar LIBOR-based loan with a 0.75% commitment fee.

7. Projected financial statements are presented in Table A14.2. The projected financial statements indicate that the forecast revenue under the base assumptions are sufficient to cover annual recurrent costs, depreciation, debt repayments on the ADB and CDB loans, and generate reasonable profits from the railway operation upon the first full year of operation.

### **C. Financial Analysis**

8. The major assumptions used for calculation of a financial internal rate of return (FIRR) are (i) all calculations are based on 2005 prices, covering 2006–2031; (ii) capital costs include all incremental capital expenditures related to construction and equipment for the railway, but exclude price contingencies and interest during construction; (iii) operation costs include all annual incremental expenses incurred in operating the project railway, but exclude depreciation and debt repayment provisions; (iv) operating revenues from tariff used in financial projections are adjusted to 2005 prices; (v) the residual value equal to undepreciated value of capital investment is included as a benefit of the FIRR calculation.

9. The estimated weighted average cost of capital (WACC), after-tax, in real terms was calculated using estimated capital mix and cost of funds. Costs have been considered as follows: (i) the applicable 10-year LIBOR (London interbank offered rate) fixed swap rate plus a provision for ADB's spread of 0.6% is used for ADB debt, (ii) the estimated interest costs of 5.51% per annum is used for the domestic loan funds; and (iii) the cost of equity was assumed to be 8%. The cost of debt is also adjusted to reflect the impact of income tax of 33%. The nominal cost of debt is converted to the real cost of debt by applying domestic and international average inflation rate for local currency and foreign exchange denominated debt respectively.

10 The FIRR for the Project, computed on an after-tax basis, is 7%, which compares favorably with the WACC, computed at an after-tax basis of 3% (Table A14.3). The Project is considered both financially viable and sustainable. Sensitivity tests indicate conditions causing the Project's viability to fall below the WACC are unlikely to occur. The sensitivity of the Project's financial indicators to cost and revenue variations is shown in Table A14.4.

**Table A14.2: Projected Financial Statement of the Project Company**  
(CNY million, in current prices)

Item	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Operational Statistics</b>										
Traffic Volume										
A Class train PKM	5,858.2	7,756.6	9,744.0	11,857.1	14,129.0	16,591.7	19,276.9	22,217.3	23,777.6	25,345.8
B Class train PKM	9,794.0	9,541.1	9,372.3	9,268.9	9,218.0	9,209.8	9,237.2	9,294.6	8,861.3	8,460.6
Line Distance (km)	459.0	459.0	459.0	459.0	459.0	459.0	459.0	459.0	459.0	459.0
Operating Revenue:										
Passenger	1,046.7	4,727.6	5,316.5	5,960.6	6,667.1	8,218.7	9,163.1	10,204.2	10,642.5	11,092.6
Other	11.8	212.7	239.2	268.2	300.0	369.8	412.3	459.2	478.9	499.2
<b>Total</b>	<b>1,058.5</b>	<b>4,940.3</b>	<b>5,555.7</b>	<b>6,228.8</b>	<b>6,967.1</b>	<b>8,588.5</b>	<b>9,575.4</b>	<b>10,663.4</b>	<b>11,121.4</b>	<b>11,591.8</b>
<b>Less: Business and other Tax</b>	<b>34.3</b>	<b>160.1</b>	<b>180.0</b>	<b>201.8</b>	<b>225.7</b>	<b>278.3</b>	<b>310.2</b>	<b>345.5</b>	<b>360.3</b>	<b>375.6</b>
<b>Income Statement</b>										
<b>Net Operating Revenue</b>	<b>1,024.2</b>	<b>4,780.2</b>	<b>5,375.7</b>	<b>6,027.0</b>	<b>6,741.4</b>	<b>8,310.2</b>	<b>9,265.2</b>	<b>10,317.9</b>	<b>10,761.1</b>	<b>11,216.2</b>
Working Expenses										
Passenger Variable	334.3	1,473.2	1,621.3	1,782.8	1,959.0	2,151.6	2,365.8	2,592.9	2,687.7	2,785.3
Fixed	28.7	121.7	129.0	136.7	144.9	153.6	162.8	172.6	183.0	194.0
Other	97.8	432.4	477.9	528.1	583.7	645.0	712.9	787.8	816.0	845.2
<b>Total</b>	<b>460.8</b>	<b>2,027.3</b>	<b>2,228.2</b>	<b>2,447.6</b>	<b>2,687.6</b>	<b>2,950.2</b>	<b>3,241.5</b>	<b>3,553.3</b>	<b>3,686.7</b>	<b>3,824.5</b>
Depreciation	0.0	760.0	760.0	760.0	760.0	760.0	760.0	760.0	760.0	760.0
Operating Cost	460.9	2,787.3	2,988.2	3,207.6	3,447.6	3,710.2	4,001.5	4,313.3	4,446.7	4,584.5
Operating Profit Before Interest and Taxes	563.3	1,992.9	2,387.5	2,819.4	3,293.8	4,600.0	5,263.7	6,004.6	6,314.4	6,631.7
Interest Expenses	0.0	935.6	893.0	848.1	800.7	750.7	698.0	642.4	583.7	521.8
Operating Profit Before Taxes	563.3	1,057.3	1,494.5	1,971.3	2,493.1	3,849.3	4,565.7	5,362.2	5,730.7	6,109.9
Income Tax	185.9	348.9	493.2	650.5	822.7	1,270.3	1,506.7	1,769.5	1,891.1	2,016.3
Net Profit after Tax	377.4	708.4	1,001.3	1,320.7	1,670.4	2,579.0	3,059.1	3,592.7	3,839.6	4,093.7
<b>Ratios:</b>										
<b>Working Ratio (%)</b>	<b>n/a</b>	<b>42.4</b>	<b>41.4</b>	<b>40.6</b>	<b>39.9</b>	<b>35.5</b>	<b>35.0</b>	<b>34.4</b>	<b>34.3</b>	<b>34.1</b>
<b>Operating Ratio (%)</b>	<b>n/a</b>	<b>59.2</b>	<b>56.1</b>	<b>53.5</b>	<b>51.1</b>	<b>43.6</b>	<b>42.0</b>	<b>41.8</b>	<b>41.3</b>	<b>40.9</b>

ADB = Asian Development Bank; CDB = China Development Bank; km= kilometer; PKM = passenger-kilometer

Source: Asian Development Bank estimates.

Item	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
<b>Balance Sheet</b>													
<b>Current Assets</b>													
Cash in Bank	0.00	0.00	0.00	0.00	0.00	411.5	1,207.8	2,158.5	3,384.4	4,913.4	7,269.2	10,082.7	
Accounts Receivable/Prepaid Expense	0.0	0.0	0.0	0.0	0.0	42.7	199.2	224.0	251.1	280.9	346.3	386.1	
<b>Total Current Assets</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>454.2</b>	<b>1,407.0</b>	<b>2,382.5</b>	<b>3,635.5</b>	<b>5,194.3</b>	<b>7,615.5</b>	<b>10,468.8</b>	
<b>Fixed Assets</b>													
Fixed Assets in Operation	0.0	0.0	0.0	0.0	0.0	0.0	34,200.1	34,200.1	34,200.1	34,200.1	34,200.1	34,200.1	
Less: Accumulated Depreciation	0.0	0.0	0.0	0.0	0.0	0.0	760.0	1,520.0	2,280.0	3,040.0	3,800.0	4,560.0	
<b>Net Fixed Assets</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>33,440.1</b>	<b>32,680.1</b>	<b>31,920.1</b>	<b>31,160.1</b>	<b>30,400.1</b>	<b>29,640.1</b>	
Work-in-Progress	3,352.6	7,800.0	15,668.4	24,221.0	32,089.4	34,200.1	0.0	0.0	0.0	0.0	0.0	0.0	
Deferred Assets							0.0	0.0	0.0	0.0	0.0	0.0	
<b>Total Assets</b>	<b>3,352.6</b>	<b>7,800.0</b>	<b>15,668.4</b>	<b>24,221.0</b>	<b>32,089.4</b>	<b>34,654.3</b>	<b>34,847.1</b>	<b>35,062.6</b>	<b>35,555.6</b>	<b>36,354.4</b>	<b>38,015.6</b>	<b>40,108.9</b>	
<b>Current Liabilities</b>													
Accounts Payable	0.00	0.00	0.00	0.00	0.00	76.8	337.9	371.4	407.9	447.9	491.7	540.2	
<b>Total Current Liabilities</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>76.8</b>	<b>337.9</b>	<b>371.4</b>	<b>407.9</b>	<b>447.9</b>	<b>491.7</b>	<b>540.2</b>	
<b>Long-Term Debt</b>													
ADB Loan	324.5	754.9	1,516.4	2,344.1	3,105.6	3,310.9	3,213.9	3,111.7	3,004.1	2,890.8	2,771.5	2,645.9	
Domestic Bank Loan	1,352.4	3,146.4	6,320.4	9,770.4	12,944.4	13,855.2	13,175.5	12,458.4	11,701.8	10,903.5	10,061.2	9,172.5	
<b>Total Long-Term Debt</b>	<b>1,676.9</b>	<b>3,901.3</b>	<b>7,836.8</b>	<b>12,114.5</b>	<b>16,050.0</b>	<b>17,166.1</b>	<b>16,389.4</b>	<b>15,570.1</b>	<b>14,705.9</b>	<b>13,794.3</b>	<b>12,832.7</b>	<b>11,818.4</b>	
<b>Equity</b>													
Paid-in Capital	1,675.7	3,898.7	7,831.6	12,106.5	16,039.4	17,034.0	17,034.0	17,034.0	17,034.0	17,034.0	17,034.0	17,034.0	
Retained Earnings	0.00	0.00	0.00	0.00	0.00	377.4	1,085.8	2,087.1	3,407.8	5,078.2	7,657.2	10,716.3	
<b>Total Equity</b>	<b>1,675.7</b>	<b>3,898.7</b>	<b>7,831.6</b>	<b>12,106.5</b>	<b>16,039.4</b>	<b>17,411.4</b>	<b>18,119.8</b>	<b>19,121.1</b>	<b>20,441.8</b>	<b>22,112.2</b>	<b>24,691.2</b>	<b>27,750.3</b>	
<b>Total Equity and Liabilities</b>	<b>3,352.6</b>	<b>7,800.0</b>	<b>15,668.4</b>	<b>24,221.0</b>	<b>32,089.4</b>	<b>34,654.3</b>	<b>34,847.1</b>	<b>35,062.6</b>	<b>35,555.6</b>	<b>36,354.4</b>	<b>38,015.6</b>	<b>40,108.9</b>	
Debt-Equity Ratio	50.0	50.0	50.0	50.0	50.0	49.6	47.5	44.9	41.8	38.4	34.2	29.9	
<b>Cash Flow Statement</b>													
<b>Sources of Funds</b>													
<b>Funds from Operation</b>													
Net Income	0.0	0.0	0.0	0.0	0.0	411.5	1,573.0	1,770.0	2,090.1	2,440.6	3,317.4	3,827.8	
Add: Depreciation	0.0	0.0	0.0	0.0	0.0	377.4	708.4	1,001.3	1,320.7	1,670.4	2,579.0	3,059.1	
Changes in Working Capital	0.0	0.0	0.0	0.0	0.0	34.1	104.6	8.7	9.4	10.2	-21.6	8.7	
<b>Borrowings</b>	<b>1,676.9</b>	<b>2,224.4</b>	<b>3,935.5</b>	<b>4,277.7</b>	<b>3,935.5</b>	<b>1,116.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
ADB Loan	324.5	430.4	761.5	827.7	761.5	205.3	0.0	0.0	0.0	0.0	0.0	0.0	
CDB Loan	1,352.4	1,794.0	3,174.0	3,450.0	3,174.0	910.8	0.0	0.0	0.0	0.0	0.0	0.0	
<b>Capital Contribution</b>	<b>1,675.7</b>	<b>2,223.0</b>	<b>3,932.9</b>	<b>4,274.9</b>	<b>3,932.9</b>	<b>994.6</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
<b>Total Sources</b>	<b>3,352.6</b>	<b>4,447.4</b>	<b>7,868.4</b>	<b>8,552.6</b>	<b>7,868.4</b>	<b>2,522.2</b>	<b>1,573.0</b>	<b>1,770.0</b>	<b>2,090.1</b>	<b>2,440.6</b>	<b>3,317.4</b>	<b>3,827.8</b>	
<b>Application of Funds</b>													
<b>Capital Expenditure</b>													
Civil Work and Permanent Equipment	3,352.6	4,447.4	7,868.4	8,552.6	7,868.4	2,110.7	0.0	0.0	0.0	0.0	0.0	0.0	
of Which: Capitalized Interest	58.5	147.6	303.6	468.1	616.1	669.2	0.0	0.0	0.0	0.0	0.0	0.0	
Debt Service:	0.0	0.0	0.0	0.0	0.0	0.0	776.7	819.3	864.2	911.6	961.6	1,014.3	
of which Principal:	0.0	0.0	0.0	0.0	0.0	0.0	776.7	819.3	864.2	911.6	961.6	1,014.3	
ADB	0.0	0.0	0.0	0.0	0.0	0.0	97.0	102.2	107.6	113.3	119.3	125.6	
CDB Loan	0.0	0.0	0.0	0.0	0.0	0.0	679.7	717.1	756.6	798.3	842.3	888.7	
Change in Other Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
<b>Total Application of Funds</b>	<b>3,352.6</b>	<b>4,447.4</b>	<b>7,868.4</b>	<b>8,552.6</b>	<b>7,868.4</b>	<b>2,110.7</b>	<b>776.7</b>	<b>819.3</b>	<b>864.2</b>	<b>911.6</b>	<b>961.6</b>	<b>1,014.3</b>	
Net Cash Position	0.0	0.0	0.0	0.0	0.0	411.5	796.3	950.7	1,225.9	1,529.0	2,355.8	2,813.5	
Cash at the Beginning	0.0	0.0	0.0	0.0	0.0	0.0	411.5	1,207.8	2,158.5	3,384.4	4,913.4	7,269.2	
Cash at the End	0.0	0.0	0.0	0.0	0.0	411.5	1,207.8	2,158.5	3,384.4	4,913.4	7,269.2	10,082.7	
<b>Ratio:</b>													
Debt-Service Coverage Ratio								1.4	1.6	1.7	1.9	2.4	2.6

ADB = Asian Development Bank; CDB = China Development Bank; km= kilometer; PKM = passenger-kilometer

Source: Asian Development Bank estimates.

**Table A14.3: Financial Internal Rate of Return**  
(CNY million)

Year	Capital Investment	Operation and Maintenance Cost	Overhaul Expenses	Project Revenues	Business Tax	Corporate Income Tax	Net Cash Flow after Income Tax
2006	(3,027.42)						(3,027.42)
2007	(4,015.96)						(4,015.96)
2008	(7,105.16)						(7,105.16)
2009	(7,723.00)						(7,723.00)
2010	(7,105.16)						(7,105.16)
2011	(1,915.30)	(375.81)		891.92	(28.87)	(109.66)	(1,537.72)
2012		(1,605.08)		3,911.31	(126.75)	(276.23)	1,903.25
2013		(1,712.72)		4,270.42	(138.36)	(379.09)	2,040.25
2014		(1,826.60)		4,648.35	(150.60)	(485.46)	2,185.70
2015		(1,947.23)		5,047.88	(163.53)	(596.09)	2,341.03
2016		(2,075.28)		6,041.40	(195.76)	(893.53)	2,876.82
2017		(2,213.72)		6,539.43	(211.85)	(1,028.98)	3,084.88
2018		(2,356.01)		7,070.36	(229.08)	(1,173.28)	3,311.98
2019		(2,373.25)		7,159.26	(231.94)	(1,217.40)	3,336.67
2020		(2,390.24)	(2,112.80)	7,244.73	(234.75)	(1,260.15)	1,246.79
2021		(2,407.04)		8,089.94	(262.13)	(1,479.45)	3,941.32
2022		(2,423.66)		8,178.62	(264.98)	(1,524.69)	3,965.29
2023		(2,440.14)		8,265.11	(267.79)	(1,568.93)	3,988.25
2024		(2,456.46)		8,349.78	(270.54)	(1,612.33)	4,010.45
2025		(2,472.68)	(1,513.00)	8,432.96	(273.23)	(1,655.02)	2,519.04
2026		(2,488.82)		9,401.04	(304.58)	(1,947.58)	4,660.06
2027		(2,504.87)		9,490.36	(307.49)	(1,979.36)	4,698.64
2028		(2,520.89)		9,516.58	(308.36)	(1,990.80)	4,696.53
2029		(2,545.77)		9,615.03	(311.54)	(2,022.17)	4,735.55
2030		(2,570.93)	(4,840.50)	9,714.69	(314.75)	(2,053.66)	(65.14)
2031	17,162.20	(2,596.43)		10,836.64	(351.09)	(2,358.68)	22,692.64
Financial Internal Rate of Return before Corporate Tax =							9.4%
Financial Internal Rate of Return after Corporate Tax =							7.0%
Weighted Average Cost of Capital =							3.0%

Source: Asian Development Bank estimates.

**Table A14.4: Sensitivity Analysis**

Item	Change in Variable	FIRR (%)
Base Case		7.0
(i) Lower revenues	10%	5.3
(ii) Capital cost overrun	10%	5.8
(iii) Higher operating costs	10%	6.5
(iv) Implementation delay	1 year	6.2
(v) Combination of (i), (ii), and (iii)		5.0
(vi) Combination of (i), (ii), (iii), and (iv)		4.1

FIRR = financial internal rate of return.

Source: Asian Development Bank estimates.

## SUMMARY RESETTLEMENT PLAN

1. The project railway alignment is 459 kilometers (km) long and will cross 170 rural villages and 13 urban village neighborhoods in 19 counties and urban districts from Zhengzhou in Henan province to Xi'an in Shaanxi province. The resettlement plan (RP) addresses permanent and temporary impacts caused by the Project, including the railway alignment, station sites, station access roads, and related construction activities. An estimated 1,782 hectares (ha) of land will be permanently acquired, of which about 63% is currently under cultivation, 8% orchard, 11% housing plots, 2% forest, 4% grassland, and 12% wasteland. The number of affected people in terms of loss of land is equivalent to 16,147, assuming total loss of cultivated land based on average per capita landholdings. The Project will also temporarily require an estimated 596 ha. About 1,682,392 square meters (m<sup>2</sup>) of structures will be affected, of which 79% are residential. Relocation of 29,774 people will be required. The Project will also require 46,426 m<sup>2</sup> of schools and 302,087 m<sup>2</sup> of factories and other enterprises to be relocated. The total number of people directly affected is estimated at 36,736. A summary of the resettlement impacts are shown in Table A15.1. Land acquisition and resettlement impacts were minimized by aligning the railway away from urban areas, village centers, and other facilities, where possible, based on consultations with communities.

2. The Ministry of Railways (MOR) in consultation with provincial and local governments prepared the RP based on the preliminary design study, village surveys of all 170 rural villages and 13 village urban neighborhoods; 2,354 household surveys; provincial, prefecture, and local government statistics; and consultations with local officials, village leaders, and affected households. The resettlement objective is to ensure that compensation and entitlements provided to affected people are adequate to at least maintain their without-project standard of living, with prospects of improvement, in line with the Land Administration Law (1998) and Asian Development Bank (ADB) policy on involuntary resettlement (1995). People losing land, housing, other assets, or other means of production will be compensated at replacement cost and assisted in restoring their incomes and living standards. In 2004, the PRC Constitution was amended to ensure that people are compensated according to law for land expropriated for public projects, and the State Council issued Decree No. 28 on Further Reform to Strictly Implement Land Administration, which requires public consultation with affected people prior to approval of projects, maintenance of the living standard of affected people, strengthened monitoring procedures, public accounting of the receipt and distribution of resettlement funds, and distribution of compensation for land loss principally to affected people.

3. The RP stipulates eligibility/entitlement provisions for affected people.<sup>1</sup> Permanent land losses will be compensated by land reallocation or by cash payments. Each rural village will utilize the land compensation and resettlement subsidy for income restoration. The main strategies for income restoration include land readjustment, improvement of irrigation systems, development of animal husbandry and cash crops, small business development, and migration to urban centers for employment. Compensation for temporary land loss will be paid directly to people affected to offset any income loss; also, the land will be restored to its original state after use. Compensation for rural housing losses will be paid directly to those affected at replacement cost, free of demolition expenses and salvaged materials. The affected rural houses will be rebuilt in scattered locations within the existing village, so minimal site development is required. Better road access and provision of site leveling, water supply, electricity, telephone, and cable will be provided. Crop and tree losses will be directly paid to those affected and used at their discretion. Urban households, factories, schools and other institutions, and enterprises will be paid compensation at market rates for relocation and reconstruction. Urban households can

<sup>1</sup> A detailed entitlement matrix is included in Table 5-5 of the Resettlement Plan (RP).



select new housing, which is widely available. Most factories will only suffer partial impacts and continue operations at the same site. For factories required to relocate, each owner will prepare a relocation plan, which includes restoration of livelihoods and incomes for all workers. Schools and other institutions will be rebuilt based on the plans of local government, to ensure that service levels are maintained or improved.

4. The resettlement impacts for the railway project are spread thinly over a long, narrow corridor. Investigations showed that income loss from land acquisition is less severe because this corridor is developing rapidly and at least 70% of net income for more than half of rural households comes from nonagricultural employment and small businesses. Special assistance will be provided to any seriously affected villages and groups, especially vulnerable households that include the poor, widows, and disabled. Special measures will also be provided for any affected ethnic minority households. Ethnic minorities account for 0.65% of the population of affected villages and village-level urban units on the alignment, most are Hui.

5. Local government land administration bureaus will be responsible for implementing resettlement; many activities will be carried out by township officials and village committees. MOR and the local governments have extensive experience with resettlement. As a standard procedure, local government will provide training to local officials who will be involved in implementation. The training will focus on ADB requirements, as specified in the RP, and new procedures related to State Council Decree No. 28. Affected people have been informed and consulted about project impacts, and resettlement policies and entitlements at various stages. During the preliminary design stage, stakeholders consulted included heads of affected households; village heads and representatives; local government agencies and departments; and vulnerable groups, including women and ethnic minorities. Resettlement information booklets were distributed to affected villages in April 2005. Affected households will also be consulted and can participate in resettlement activities, including the detailed measurement survey, location of underpasses, new housing sites, and grievance redress.

6. The estimated land acquisition and resettlement cost is \$181.4 million, excluding the costs for enterprise relocation and infrastructure to be relocated.<sup>2</sup> In December 2004, MOR and Henan and Shaanxi provincial governments signed agreements whereby the local governments will fund 100% of the cost of land acquisition and resettlement, which in turn will be an equity contribution to the Project. The resettlement budget will be adjusted based on the actual measurement of physical losses and market prices. The RP will be updated by local governments to include (i) final compensation standards and rates that conform to Decree No. 28, (ii) refined impact figures based on detailed design, (iii) rehabilitation plans for any seriously affected villages, and for enterprises to be relocated, (iv) detailed budgets for each province/municipality; and (v) an updated implementation schedule. This updated RP will be disclosed to affected people, and submitted to ADB for approval prior to the commencement of land acquisition and demolition, which is anticipated in September 2005.

7. MOR and municipal land acquisition and resettlement offices, in collaboration with the county resettlement offices, will be responsible for internal supervision and monitoring of compensation payments, house rebuilding/relocation for affected people, land redistribution, and grievance redress. MOR will prepare progress reports and submit them to ADB on a quarterly basis, until resettlement is completed. MOR will then prepare a resettlement completion report for submission to ADB. In addition, MOR will contract an independent monitor

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<sup>2</sup> The latest resettlement cost is estimated at \$240 million including the costs for enterprise and infrastructure relocation and the contingencies; this increase is well within the contingency amount included in the project cost estimates. The resettlement cost will be finalized in the updated RP.

to carry out the external monitoring and evaluation. The tasks include (i) conduct baseline survey; (ii) review and verify the compensation payments, status of land acquisition and compensation payments; (iii) assessment of grievance redress procedures, affected people's reaction/satisfaction, and restoration of livelihoods; and (iv) compile lessons learned for future resettlement planning. The external monitor will prepare monitoring reports for submission to MOR and ADB every 6 months until completion of resettlement activities; thereafter, annual evaluation investigations will be conducted for at least 2 years and reported to MOR and ADB.

**Table A15.1: Summary of Land Acquisition and Resettlement Impacts**

<b>Impact</b>	<b>Henan Province</b>	<b>Shaanxi Province</b>	<b>Total</b>
No. of counties/districts crossed	11	8	17
No. of townships crossed	44	28	72
No. of urban street units crossed	0	13	13
No. of rural villages crossed	71	99	170
<b>A. Land Acquisition (ha)</b>			
1. Irrigated land	375	331	706
2. Dry land	333	90	423
3. Housing plot	78	119	197
4. Orchard	138	0	138
5. Forest	29	0	29
6. Wasteland and other <sup>a</sup>	208	81	289
<b>Total Land Permanently Acquired</b>	<b>1161</b>	<b>621</b>	<b>1782</b>
% Cultivated land	61%	68%	63%
<b>B. Temporary Land Requirement (ha)</b>			<b>596</b>
1. Cultivated Land			211
2. Wasteland			385
<b>C. Building Demolition (m<sup>2</sup>)</b>	<b>932,533</b>	<b>749,859</b>	<b>1,682,392</b>
1. Private households requiring relocation	4,825	3,710	8,535
- demolished floor space (m <sup>2</sup> )	756,457	577,422	1,333,879
2. Enterprises affected			75
- enterprises requiring relocation			30
- demolished floor space (m <sup>2</sup> )	153,944	148,143	302,087
3. Schools and institutions affected			14
- demolished floor space (m <sup>2</sup> )	22,132	24,294	46,426
<b>Population Affected by Land Acquisition</b>	10,134	6,013	16,147
<b>Population Affected by Temporary Land Use</b>			3,015
<b>Population Affected by House Relocation</b>	16,884	12,890	29,864
<b>Workers Affected by Enterprise Relocation</b>			3,000

ha = hectare, m<sup>2</sup> = square meter,

<sup>a</sup> The population shown assumes 100% loss using average per capita landholdings. Actually, the average loss would be about 15%, which means impacts will be spread among many households in the village.

Source: Estimates based on Preliminary Design Study, 2005.

**Table A15.2: Resettlement Supervision Milestones**  
(as of 26 May 2005)

No.	Resettlement Tasks	Target	Responsible Agency	Completion Date	Status
<b>1.</b>	<b>Disclosure</b>				
1.1	Stage 1: Distribution of resettlement information booklets	183 affected villages/streets	MOR/RCSOs/CROs	Apr 2005	Complete
1.2	Stage 2: Disclosure of resettlement information booklets/public notice with approved rates	All affected households and units	MOR/RCSOs/CROs	Jul 2005	
1.3	Notification to AP of removal	1 <sup>st</sup> contract	HL&RB/SL&RB	15 Aug 2005	
1.4	RP circulation to local offices – Stage 1 – Stage 2	2 provinces 19 counties	MOR	10 May 2005 15 Aug 2005	Complete
1.5	RP placed on ADB website		MOR, ADB	30 Jun 2005	
<b>2.</b>	<b>Resettlement Plan and Budget</b>				
2.1	Completion of staking survey	459 km	DIs	31 Mar 2005	Complete
2.2	Approval of RP and budget	\$250 million	MOR/HPG/SPG	31 Jun 2005	
2.3	Resettlement budget by county	19 counties	RCSOs	31 Jul 2005	
2.4	Revised RP submitted to ADB		MOR/HPG/SPG	15 Aug 2005	
<b>3.</b>	<b>Compensation Agreements</b>				
3.1	Provincial agreements with MOR	2 agreements	MOR/HPG/SPG	Dec 2004	Complete
3.2	Village agreements for land transfer	170 villages	RCSOs/County L&RBs	Aug 2007*	
3.3	Household agreements	950 AF	RCSOs /TROs	Sep 2007*	
3.4	Enterprise and institution agreements	50 units	RCSOs	Sep 2007*	
<b>4.</b>	<b>Detailed Measurement Surveys</b>		RCSOs/L&RBs	Sep–Dec. 2005	
<b>5.</b>	<b>Waiver of Land Taxes</b>		MOR, HPG, SPG	30 Jun 2005	
<b>6.</b>	<b>Resettlement Implementation Plans</b>				
6.1	Village rehabilitation plans	10 villages	CROs	31 Jan 2006	
6.2	Enterprise relocation plans	50 enterprises		31 Jan 2006	
6.3	Plan for vulnerable households	TBD	CROs	31 Jan 2006	After DMS
6.4	Technical training plan for AF	xxxx AF		31 Jan 2006	
<b>7.</b>	<b>Implementation Capacity</b>				
7.1	ADB training for resettlement staff of RCSOs in six municipalities	6 x 40 staff	RCSOs/MGOs/ADB	Jul/Aug 2005	
7.2	Training for staff of MGOs, CROs and TROs	Local staff	RCSOs/MGOs	Sep–Dec 2005	
<b>8.</b>	<b>Monitoring and Evaluation</b>				
8.1	Baseline survey	xxxxx AF**	External monitor	Sep 2005	
8.2	Set-up internal supervision	As per RP	MOR/Project Company	Aug 2005	
8.3	Contract external monitor	As per RP	MOR	Sep 2005	
8.4	Internal monitoring reports	Quarterly	MOR/Project Company	Jan 2006***	
8.5	External monitoring	Semi-annual	External monitor	Mar 2006***	
8.6	Evaluation investigations	Annual	External monitor	Jan 2007***	
8.7	Resettlement completion report	Once	MOR/Project Company	2009	
<b>9.</b>	<b>Documentation of Consultation</b>	As per RP	Project Company /CROs		Ongoing
<b>10.</b>	<b>Documentation of Grievances</b>	As required	Project Company /RCSOs/CROs /TROs		To be recorded
<b>11.</b>	<b>Flow of Funds/Compensation</b>	Initial funds	HPG, SPG	Sep 2005	
<b>12.</b>	<b>Commencement of Land Acquisition</b>				
12.1	Clearance of ROW****		Project Company, Contractors	Sep 2005	
12.2	Demolition of houses****		Project Company, Contractors	Oct 2005	
<b>13.</b>	<b>Commencement of Civil Works</b>			Oct 2005	

AF = affected families, AP = affected people, CRO = county resettlement office, DI = design institute, HPG = Henan provincial government, L&RB = Land and Resources Bureau, MGO = municipal government offices, MOR = Ministry of Railways, RCSO = Railway Construction Support Office, RP = resettlement plan, SPG = Shaanxi provincial government, TRO = township resettlement office, and VC = village committee.

\* Commencement date. \*\*10% AFs and 20% seriously AFs. \*\*\* First report due. \*\*\*\*Start date.

Source: Asian Development Bank estimates.

## SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY

### A. Linkages to the Country Poverty Analysis

<b>Is the sector identified as a national priority in country poverty analysis?</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>Is the sector identified as a national priority in country poverty partnership agreement?</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<p><b>Contribution of the sector or subsector to reduce poverty in the People's Republic of China (PRC):</b>          Improved railway transport will provide an enabling condition for poverty reduction through improved access to markets, employment, advanced education and medical facilities, new knowledge and information, families working or studying in other regions, and other social and economic services; and will facilitate economic development and job creation. Improved access to markets opens up opportunities for expansion of locally produced goods and services. Construction and operation of the railway generates additional employment opportunities in local communities, providing an additional source of income for people, including poor households in the project area. Incoming passengers and tourists generate additional demand for locally produced goods and services. In addition, local government construction of access and connector roads for railway construction and development of local roads from the stations to all levels of the road network and poor villages will help to extend the project benefits and opportunities to rural poor communities by improving local infrastructure; reducing transport costs; increasing access to markets, employment, and other economic and social services; and improving conditions for economic growth shared by the poor.</p>			

### B. Poverty Analysis

**Targeting Classification:** General Intervention

#### What type of poverty analysis is needed?

The alignment is more developed than many similarly mountainous parts of the People's Republic of China (PRC). However, many villages located in the mountains have been isolated from these developments, and remain very poor with intransient poverty. The links between poverty, topography, and transport systems are apparent in the project area. The main causes of poverty in the project areas are (i) natural calamity, (ii) lack of infrastructure, (iii) very limited and unsustainable source of livelihood, (vi) uneven economic development, and (v) poor health. The Project will benefit about 9.3 million people. About 90.2% are rural (17 counties) and 15% are poor with a net income per capita of less than CNY900 in 2004. In urban areas (2 counties), 5.8% are poor with a less than per capita income of minimum living standards.<sup>1</sup> This means about 14% of the total population are poor in the project area. The railway passes through 19 counties, 6 are designated as national and provincial poverty counties, and 725 designated poverty villages. Approximately 1.3 million poor individuals are resident in the area, about 0.65% are ethnic minorities.

About 353,000 person-years of work will be created during railway construction, 60% will be unskilled work. Half of the unskilled work will be targeted for the poor, totaling 105,920 person-years at total wages of CNY1,037 million or CNY9,790 per person-year. Priority will be given to women, resettlement-affected people, and other vulnerable people. In addition, during construction, 6,249 person-years of local jobs will be created in the provision of construction materials with total wages of CNY61.4 million, of which 1,875 person-years will be for the poor, with total wages of CNY18.4 million or annual average wage of CNY9,828 per capita. When the operation of the new railway starts, approximately 2,988 additional jobs will be created with total wages of CNY53.7 million annually for CNY1344.5 million during the 25-year operation period. An estimated tax revenue from the Project to counties in the project areas is CNY714 million. This added revenue will be used for a range of poverty reduction and social activities including mitigation of negative impacts on HIV/AIDS (human immunodeficiency virus/acquired immune deficiency syndrome and STIs (sexually transmitted infections), human trafficking, and the environment, with special attention to resettlement-affected groups, women, ethnic groups and other vulnerable people in the project area. The Project's 10 railway stations, which will be connected to all levels of road network accessible by all villages including the poor, will create various jobs, and help distribute the benefits in the project area. Sufficient space will be provided in and around the stations for local area development; the poor, women, ethnic groups and other vulnerable people will be supported by local governments to sell local specialties and other goods and services. All of these direct and indirect impacts of the Project will provide conditions for the country's goal of micro-urbanization for poor families to (i) move away from unsustainable, mountainous farmlands; (ii) have better access to markets, and advanced educational and health facilities especially for pregnant women; and (iii) build a sustainable future in new centers of economic activity, and complement the poverty reduction activities of local governments to achieve the goal, such as assisting the poor with urban migration, relocation, employment, local economic development, farmer-based rural tourism, agricultural product development, and health and physical infrastructure and natural resources improvement. These concerted efforts will promote progress in attaining the Millennium Development Goals, especially goals 1 and 3-7.

### C. Participation Process

#### Is there a stakeholder analysis?

Yes  No

Various public consultation and participation activities for the Project have been conducted and the role of each stakeholder is identified. MOR, Fourth Survey Design Institute, the project preparation technical assistance consultants and ADB mission have had formal and informal consultations with local communities and government agencies through meetings, surveys, household interviews, written communications, workshops, and such, involving about 10,000 people. The local county and township governments and communities will assist MOR in acquiring land, implementing the resettlement plan (RP), and organizing local labor for construction and local development including the station area to ensure the participation and benefit of the poor, women, and other vulnerable people.

<sup>1</sup> 2003 data were used: annual per capita income in Henan, CNY1,145, and in Shaanxi, CNY1,566.

**Is there a participation strategy?** Yes  No

The participation of local people will be central for improving their opportunities to benefit from the Project. Local groups and relevant government agencies will continue to be involved in the consultation and participation process, especially during the implementation of the environmental impact assessment and RP. Railway construction support offices are being set up in each project county, and will have copies of all relevant documents. During construction and operation, they will serve as a key coordinating point to enhance stakeholder participation, including the poor, women, ethnic groups, and other vulnerable people. A leading group will be formed in each prefecture in the project area among the relevant government agencies at different levels including village groups; poverty reduction offices; All-China Women's Federation; and health, civil affairs, and ethnic affairs bureaus to continue the process of consultation and participation and to coordinate activities by various agencies to ensure local benefits. A social development action plan (SDAP) was prepared and will increase participation of local people in project activities and benefits.

**D. Gender Development****Strategy to maximize impacts on women:**

Analyses of gender-disaggregated data and discussions with representatives of the All-China Women's Federation indicate that women will need some assistance to fully benefit from the Project. Data collected indicate the following: (i) women primarily engage in agricultural activities; and (ii) male members from poor households tend to travel further for migrant labor opportunities than nonpoor males, leaving behind a high percentage of households headed by women. The construction of the railway will create opportunities for local area development by (i) facilitating flow of materials and information into the area, and (ii) accelerating development of local industry and tourism. Many of the service sector jobs will favor women employees. The All-China Women's Federation will provide business management and financial assistance to women interested in setting up small businesses to serve construction crews and growing tourist sector

Poverty and social enhancement measures have been built into the project design, and special mitigation (or protection) actions have been included in the RP. For example, members of the community will collectively decide where schools will be relocated. Women, especially female heads of household, will be consulted as schools provide an informal source of day care for their children. Poor women will receive assistance so that their children can remain in school, freeing women's time during the day to work. Widows will be eligible for special assistance during land acquisition and resettlement. Women will be given priority for project-generated employment during construction and operation of the railway. The rise in female participation in the labor force and tourism market will increase women's net income, thus improving overall family welfare, and increasing the status of women.

**Has an output been prepared?** Yes, see SDAP No**E. Social Safeguards and other Social Risks**

Item	Significant/Not Significant/None	Strategy to Address Issues	Plan Required
<b>Resettlement</b>	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	The RP was prepared and information distributed to affected people. An updated RP will be submitted prior to commencement of civil works.	<input checked="" type="checkbox"/> Full <input type="checkbox"/> Short <input type="checkbox"/> None
<b>Affordability</b>	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	The proposed railway will provide fast, dedicated passenger transport at competitive fares to those travelers seeking this type of service. The existing line will continue to offer low fare transportation for passengers and goods. Congestion will be reduced on existing lines, making it more efficient and useful for low income users.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Labor</b>	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	Railway construction and measures to include tourist-related concessions stalls at stations will generate considerable employment for the poor in the project area. During operation, development of the industry and tourism sectors will generate additional employment opportunities for the poor.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Indigenous Peoples</b>	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	Ethnic minorities make up 0.65% of the population in the project area; 83% are Hui. Some will be affected by land acquisition. Other ethnic groups include Uyghur, Mongol, and Man, but they are not adversely affected. Impacts and special measures for the Hui are included in the RP, and enhancement measures are in the SDAP.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Other Risks and/or Vulnerabilities</b>	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	HIV/AIDS and Human Trafficking Awareness and Prevention: The railway will increase the mobility of goods and people along the route, and could increase risks of HIV/AIDS, STI, and human trafficking among local communities, especially women. The local departments of health, civil affairs bureau and other relevant agencies will coordinate with the construction contractors in delivering HIV/AIDS, STI and human trafficking prevention information, voluntary counseling and testing, condoms, HIV testing kits, and STI treatment packages; and strictly follow the relevant PRC laws and regulations on prevention of these issues. The provincial governments have an active HIV/AIDS awareness and prevention program and MOR has experience in this area.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Source: Asian Development Bank estimates.

## SOCIAL DEVELOPMENT ACTION PLAN

Proposed Actions	Targets	Agencies Involved	Timing	Funding Source	Monitoring Indicators
<b>A. Job creation during construction</b> <ul style="list-style-type: none"> <li>Use of local unskilled labor including those from poverty villages in remote areas especially poor, women, ethnic minorities, and vulnerable</li> <li>Priority given by local governments for local sellers in providing services and supplies at the service areas and construction camps</li> </ul>	60% of labor force hired locally (141,200 18-month jobs), including women More than 50% of unskilled labor from poverty households (70,600 18-month jobs) Labor from at least 40 remote poor villages along alignment, including ethnic minorities	Ministry of Railways (MOR), contractors, poverty reduction offices, All-China Women's Federation (ACWF) and other local government agencies	2006–2009	Local governments	No. of local labor (skilled and unskilled) employed by gender No. of workers from poverty households by gender, ethnicity, and location No. of local sellers provisioning the work camps by gender Contract clause
<b>B. Use of local materials for construction</b> <ul style="list-style-type: none"> <li>Purchase of local construction materials meeting necessary quality standards</li> <li>Use of workers from poverty households for sourcing materials especially poor and women</li> <li>Borrow pits and quarries are returned to their natural state or developed as fish ponds or other beneficial use</li> </ul>	6,200 person-years sourced locally in the provision of construction supplies 3,100 person-years or more than 50% of workers sourced from poverty households	MOR, contractors and local governments	2006–2009	Included in contractor's budget for civil works	Amount and source of supplies from local area No. of local workers and workers from poverty households by gender Condition of work sites at conclusion of each contract Contract clause
<b>C. Jobs during operation of railway</b> <ul style="list-style-type: none"> <li>Use of the poor, women, and other vulnerable people during railway operation and the provision of training</li> <li>Design of station to allow for handicraft shops, gift shops, restaurants, books and newspaper shop, etc.</li> <li>Informal businesses meeting passengers' needs</li> <li>Local governments design commercial areas adjoining the stations for businesses and small manufacturing units to develop</li> </ul>	Number of railway workers from poverty households; >25% are women 650 workers trained and employed in railway operations, 160 women hired, 80 women trained, 40 women-owned small business, 50 informal businesses started serving passengers needs	MOR, Project Company, poverty reduction offices, All-China Women's Federation, and other local government agencies	2012 onward	Railway Company for workers All-China Women's Federation for business start-ups, poverty reduction offices, local government	No. of workers hired in total, by gender, and poor No. of workers trained in total, by gender, and poor No. of women owned businesses started
<b>D. Control of HIV/AIDS/STIs and human trafficking</b> <ul style="list-style-type: none"> <li>Health testing, counseling and referrals in construction camps and availability of condoms at work camps or entertainment centers.</li> <li>Awareness and prevention on HIV/AIDS/STIs and human trafficking campaigns through posters and pamphlets at construction sites and service centers, radio and TV and public meetings.</li> </ul>	All workers understand dangers of HIV/STI and human trafficking. Testing and medical referral service available to workers and local residents.	MOR, contractors, County Health Departments, and civil affairs bureaus.	2006–2010	Project and local governments.	No. of health workers Incidence of HIV/AIDS cases No. of patients with STIs Type and number of posters, pamphlets and locations. Types of media program advertised by TV and radio stations. Number of testing

Proposed Actions	Targets	Agencies Involved	Timing	Funding Source	Monitoring Indicators
<b>E. Income recovery for resettlement affected people, especially vulnerable people</b> <ul style="list-style-type: none"> <li>• Identification of vulnerable people</li> <li>• Income restoration measures</li> <li>• Readjustment of land</li> <li>• Training and special assistance</li> </ul>	All affected persons, with special measures for vulnerable people	MOR, local government resettlement offices, and village committees	2005–2010	Project and local government Covered by resettlement plan budget	Income level of affected people, especially vulnerable people, by gender No. of people trained, by gender Amount of land adjusted
<b>F. Construction safety</b> <ul style="list-style-type: none"> <li>• Ensure the safety of contractors and campsites through the safety guidelines developed and incorporated into contracts with all contractors</li> <li>• Periodic inspections by MOR.</li> </ul>	All contractors and construction workers	MOR, contractors	2005 onward	No cost	Signed contracts No. of workers injured No. of accidents No. of inspections
<b>G. Protect communities from construction and operation disturbances and damages</b> <ul style="list-style-type: none"> <li>• Prohibit night time construction and adherence to noise standards</li> <li>• Building of over/underpasses where necessary.</li> <li>• Reconstruction of damaged irrigation and drainage systems if it is the case.</li> <li>• Building of fences along the railway.</li> </ul>	All communities in the project area.	MOR and contractors	2006–2010	Project and local government	Working hours and locations (records)  No. of under- and overpasses Length of irrigation and drainage canals repaired Fences established along the railway
<b>H. Sustainability of maintaining households out of poverty, especially poor, women, and vulnerable</b> <ul style="list-style-type: none"> <li>• Provide assistance in reducing poverty factors</li> <li>• Provide counseling on preparing for transition</li> <li>• Provide training for further employment</li> <li>• Assist in preparing a business plan for starting a business once the construction work is done</li> </ul>	Workers from poverty households remain above the poverty line during the transition from one employment to another, especially women, ethnic minorities, and vulnerable people	Local government agencies concerned with poverty reduction Designate 1–2 people as counselors and program managers in each county	2005 onward	Local governments (using portion of civil works tax revenue)	No. of workers counseled by gender Amount of training offered, by gender and ethnicity No. of poor workers assisted to start a business by gender
<b>I. Tourism development, especially for the poor, women, and other vulnerable people</b> <ul style="list-style-type: none"> <li>• Link local communities with tour operators and companies to develop historical cultural package tours at existing sites or open new ones</li> <li>• Develop local handicrafts for sale by women, and poor households at stations and tourist sites</li> <li>• Provide start-up funding for restaurants and guesthouses near scenic and historical sites</li> <li>• Develop posters on environmental and cultural relics protection</li> <li>• Promote tourism in the region</li> <li>• Involve local poor, women and vulnerable</li> </ul>	Additional tours to the area 50 new tourist-based businesses Cultural and village tours led by two poverty villages Tourism-related employment, especially for the poor, women, and vulnerable people, including ethnic minorities	MOR, contractors, tourism bureaus, poverty reduction offices, and women's federations.	2006 onward	Tour companies, railway, local businesses, local governments	Increase in number of tourists in area Increase in number of tourist facilities and revenue to local government and population No. of the poor, women, and other vulnerable people participated in tourism services and handicrafts No. of posters regarding environmental and cultural relics protection

Source: Asian Development Bank estimates.