EARD Special Studies

Building Railways in the People’s Republic of China: Changing Lives

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Asian Development Bank
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Abbreviations and Acronyms

ADB – Asian Development Bank
GDP – gross national product
km – kilometer
PRC – People’s Republic of China

NOTE

In this report, “$” refers to the US dollar.
Acknowledgement

This report was prepared by Manmohan Parkash, Senior Transport Specialist, Asian Development Bank (ADB). Mr. Parkash has been closely associated with the railway development in the People’s Republic of China. He has helped design numerous high profile railway projects in recent years and has worked with his team of social experts to integrate social aspects in the project design. Such initiatives have led to strong ownership of projects at the local level and helped spread the project benefits to a larger population, including the poor and the vulnerable.

The document is based on a desk review of the project reports, monitoring reports, completion reports, and evaluation reports of completed and ongoing ADB-financed railway projects. The report has benefited from the useful guidance provided by Nigel C. Rayner, Director, Transport Division, East Asia Department; Liu Junfu, Managing Director General, Foreign Capital Technical Import Center (FCTIC), Ministry of Railways (MOR); and ChenXiao Xin, Director, FCTIC, MOR.

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We gratefully acknowledge the numerous other people who assisted in the preparation of this report.
In recent decades, no other nation has come close to the economic success story that is the People’s Republic of China (PRC). It has continuously absorbed large volumes of foreign direct investment, posted high per capita income growth, and altered trading relationships within Asia and with the rest of the world. Much of this success stemmed from bold policy decisions, and a willingness to experiment and to implement gradual reforms.

After introducing market-oriented reforms in 1978, the country was quick to identify the importance of economic growth to alleviate poverty. It recognized that the key to this was infrastructure development to expand market access, encourage private sector development, and promote the participation of its citizens in economic growth.

The 1980s and the 1990s saw huge investments in roads, railways, seaports, and airports; power generation and transmission; and other infrastructure services despite the enormous risks involved. In just 5 years from 2001 to 2005, the PRC increased the total length of its road network from 1.67 million kilometers (km) to 1.9 million km.; constructed over 24,700 km of expressways; increased the capacity of its ports to handle goods from 2.2 billion tons to 4.8 billion tons including 3 billion in seaports; and increased the railway network from about 60,000 to 75,000 km.

Nevertheless, the level of infrastructure development is still insufficient, with a large number of the poor living in the underserved rural areas. To sustain equitable growth and to integrate the poor into the mainstream economy and reduce sector and regional income disparities, public transport, such as railways, is expected to play an important role.

This report reviews the impact of railway development in promoting economic growth and reducing poverty, and share some of the best practices adopted in ADB-financed railway projects. We hope that this report will generate interest among numerous stakeholders and provide a better understanding of the key issues. We also hope that transport planners, policy makers, development partners, and decision makers will find it useful and relevant.
Executive Summary

Economic reforms that began in the People’s Republic of China (PRC) in 1978 have resulted in rapid development, but they have also resulted in widening regional disparities. The 9% annual gross domestic product (GDP) growth is unprecedented, but growth has been spread unevenly with some segments of the population left behind in relative and even absolute terms and with coastal provinces achieving growth rates far higher than those in the central and western provinces. The lack of adequate infrastructure, particularly in year-round transport links with the central and western regions, is the most important reason for this disparity. A key feature of the Government’s Eleventh Five-Year Plan is therefore railway development because rail transport is energy efficient, environmentally friendly, affordable, reliable, and comfortable. Given technological advances, railway construction is no longer difficult in remote and inaccessible areas. It is cheaper and uses less land than roads.

In recognition of the role of railway development in promoting economic growth and reducing poverty, the Asian Development Bank (ADB) has provided 14 loans in the sector since 1989 covering 15 provinces for a total of about $3.0 billion. Of these projects, eight are complete, two are operating commercially and four are under construction. These projects have had positive impacts in terms of increasing personal incomes, creating jobs, industrializing rural areas, generating local government revenue, developing tourism, improving housing, protecting the environment, and increasing the participation of women and ethnic minorities in economic activities. In addition, railway construction units provide local communities with access roads, electrification, water supply systems, and basic infrastructure. Railways support development of economic growth corridors and microurbanization; provide greater mobility and better access to markets; and have enabled local governments to set up industrial zones and product bases to develop their secondary and tertiary industrial sectors. Increased revenues are used to provide better primary education, health services, agricultural development, and physical infrastructure.

ADB has developed a number of key initiatives for managing railway development including setting up effective institutional structures, consulting and involving stakeholders and local government agencies, and developing an effective project performance management system that closely monitors indicators. These measures have been developed over time and refined based on experience with other railway projects.
Railways stimulate balanced economic growth and efficiency. In short, building railways changes lives.
This plan to develop the railways as a matter of policy is greatly significant. Railways provide mass transport for people and goods that are fast, energy efficient, environmentally friendly, affordable, reliable, and comfortable.
Introduction

The People’s Republic of China (PRC) has witnessed sustained growth rates of 8–10% since 1978 (table 1). Aggregate gross domestic product (GDP) growth has averaged 9% per year since then, and foreign investment and international trade have soared. Globally, the PRC ranks fourth in foreign direct investment, and its merchandise exports in dollar terms exceed those of all other countries except Germany and the United States.¹ Per capita household income has increased eightfold, and the number of people living in absolute poverty fell dramatically from 250 million (30.7%) in 1978 to 23.6 million (2.3%) in 2005.² Prudent fiscal management; open-door, market-oriented policies; and infrastructure investments have helped achieve this economic success.

While economic reforms have resulted in rapid development, they have also resulted in widening regional disparities. The 9% annual GDP growth is unprecedented, but growth has been spread unevenly with some segments of the population left behind in relative and even absolute terms and with coastal provinces achieving growth rates far higher than those in the central and western provinces. The coast was rapidly integrated into the world economy starting in 1980³ when the first special economic zones were established in four cities (Shenzen, Zhuhai, Shantou, and Xiamen) in Guangdong and Fujian, the home provinces of many overseas Chinese investors. As a result, in the 1990s, the average annual growth rate of real GDP per capita of the coastal region was about 11% while the western region’s was less than 8%.

Though a number of factors account for this widening disparity in regional development including differences in natural resource endowments and human capital development, lack of adequate infrastructure investment, particularly in year-round transport links with the central and western regions, is the most important one. The March 2000 session of the National People’s Congress thus endorsed the “Go West” policy, a proactive strategy to promote growth and development in western PRC,⁴ a region characterized by poor agricultural land and weak infrastructure. The

<table>
<thead>
<tr>
<th>Period</th>
<th>GDP (%)</th>
<th>GDP per Capita (%)</th>
<th>Primary Sector (%)</th>
<th>Secondary Sector (%)</th>
<th>Tertiary Sector (%)</th>
<th>Transport Sector (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990–1995</td>
<td>12.00</td>
<td>10.67</td>
<td>4.15</td>
<td>17.38</td>
<td>9.95</td>
<td>11.15</td>
</tr>
</tbody>
</table>

GDP = gross domestic product.
Source: China Railway Statistically Yearbook 2005.

* Chongqing, Gansu, Guangxi, Guizhou, Ningxia, Qinghai, Shaanxi, Sichuan, Xinjiang, Yunnan, and Xizang provinces.
Tenth Five-Year Plan (2001–2005) focused on an integrated strategy to develop both physical and social infrastructure and to improve natural resource management in these less-developed provinces. A key feature of the plan was geared to developing transport infrastructure to connect remote, inaccessible hinterlands and to creating conditions to attract private investment and encourage economic growth. More than 200 road projects were thus launched in 2003 to improve transportation in western PRC. Their aim was to connect all counties with highways and to expand the road network. The Tenth Five-Year Plan identified railway development as a priority. By the end of the plan, an investment of CNY308 billion had been made for capital construction, which included (i) constructing 6,458 km of new lines; (ii) providing 3,275 km of double lines; and (iii) electrifying 6,259 km of tracks. Nevertheless, as GDP increased, so did inequality and regional disparities.

Since 2003, the Government’s emphasis has gradually shifted to promoting standards of living and to protecting the environment in addition to expanding the economy. With the mounting development challenges of high energy costs and environmental protection in mind, the Government endorsed the Eleventh Five-Year Plan (2006–2010) which aimed to achieve balanced, equitable, and sustainable development. The plan consists of 22 indicative rather than fixed targets. Only 6 of the 22 concern the economy (GDP, per capita GDP, share of services in the economy and in employment, research and development spending, and urbanization rate) while the remaining 16 relate to population growth, the use of resources, the environment, and standards of living. The plan seeks to achieve “five balances” between (i) rural and urban development, (ii) interior and coastal development, (iii) economic and social development, (iv) people and nature, and (v) domestic and international development. The primary economic target is an average GDP growth rate of 7.5% over the next 5 years compared with the actual average growth rate of 9.5% over the past 5 years. Other goals include reducing energy consumption and pollution. A key feature of the plan is that railway development is a priority. The plan envisages (i) constructing 17,000 km of new lines with the network length reaching over 90,000 route-km; and (ii) increasing the length of the double lines and electrified lines to reach 45% of the network length. The plan seeks to (i) build a dedicated passenger railway network by constructing passenger-dedicated lines, (ii) develop coal transport corridors by increasing the capacity of existing lines, (iii) expand the railway network to 34,000 km in the poor western region, (iv) build international corridors at the borders in the southwest and northwest, and (v) develop a countrywide intermodal container network. The total estimated investments are CNY1.5 trillion or about $190 billion over the next 5 years.
This plan to develop the railways as a matter of policy is greatly significant. Railways provide mass transport for people and goods that is fast, energy efficient, environmentally friendly, affordable, reliable, and comfortable. Given technological advances, railway construction is no longer difficult in remote and inaccessible areas. It is cheaper and uses less land than roads. Railways provide year-round access, and their numerous multimodal possibilities will help develop an integrated land transport network.

The railway system in the PRC is among the largest and most efficient in the world. It ranks first in freight transport density, second in passenger transport density, and fourth in route length worldwide. The country also transports about 25% of the world’s railway passengers and freight despite having only 6% of the world’s working railways. In the last 10 years, the growth rate of freight and passenger rail transport has averaged 6–8% (figure 1). The Asian Development Bank (ADB) has helped develop the PRC railway sector since 1989. ADB strategy has focused on (i) expanding the railway system by constructing new lines in unserved areas that are less-developed and poor; (ii) promoting energy conservation and environmental sustainability and/or promoting regional cooperation; (iii) modernizing equipment, enhancing safety, and increasing the capacity to improve transport efficiency on key routes of the national railway system; (iv) commercializing railway operations to sustain efficient operations; and (v) increasing railway competitiveness in the transport sector through restructuring and reform.

Since 1989, ADB has provided 14 loans totaling $2.9 billion to finance the construction of 1,921 km of eight provincial railways operated by joint ventures with the Ministry of Railways and 5,541 km of new railway lines under six national railway projects spread throughout 15 provinces. Of these, eight are complete, two are operating commercially, and four are still being implemented (table 2).

ADB railway project areas are generally dotted by high mountains and deep valleys as well as deserts, patches of forest, grassland, and vast rivers. Millions of people inhabit these mountainous
### Table 2: ADB-Financed Railway Projects in the People’s Republic of China

<table>
<thead>
<tr>
<th>Loan No.</th>
<th>Project Name</th>
<th>Railroad Length (km)</th>
<th>ADB Financing in ($ million)</th>
<th>Project Period</th>
<th>Provinces/Areas Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1087–PRC</td>
<td>Yaogu–Maoming</td>
<td>232</td>
<td>68</td>
<td>1991–1994</td>
<td>Guangdong, Guangzi, and Guizhou Special economic zones in Hainan Island; Zuhai near Taipei, China and Shenzen near Hong Kong, China</td>
</tr>
<tr>
<td>1439–PRC</td>
<td>Daxian–Wanxian</td>
<td>162</td>
<td>100</td>
<td>1996–2002</td>
<td>Sichuan/Chongqing 5 counties</td>
</tr>
<tr>
<td>1748–PRC</td>
<td>Hefei–Xi’an</td>
<td>1,027</td>
<td>300</td>
<td>2000–2006</td>
<td>Anhui, Henan, Hubei, and Shaanxi 30 counties</td>
</tr>
<tr>
<td>2116–PRC</td>
<td>Dali–Lijiang</td>
<td>167</td>
<td>180</td>
<td>2004–2009</td>
<td>Yunnan 3 counties</td>
</tr>
<tr>
<td>2182–PRC</td>
<td>Zhengzhou–Xi’an</td>
<td>459</td>
<td>400</td>
<td>2005–2011</td>
<td>Henan, Shaanxi 19 counties/districts</td>
</tr>
<tr>
<td>2274–PRC</td>
<td>Taiyuan–Zhongwei</td>
<td>944</td>
<td>300</td>
<td>2006–2012</td>
<td>Shanxi, Shaanxi, Ningxia 20 counties and 2 urban districts</td>
</tr>
</tbody>
</table>

infertile, and unsustainable farmlands and suffer poor living conditions. The areas are inaccessible and have no reliable transportation. ADB has thus focused on (i) locating railway projects where new lines will stimulate economic development, (ii) hiring as many poor people as possible for project construction and operation, (iii) supplying local materials from poor villages that meet the requirements of quality and economy, and (iv) providing station access roads and link roads to bring project benefits to poor interior areas. ADB-financed railway projects have helped transform local economies: per capita rural incomes have increased substantially, living standards have improved, and poverty has been reduced. Based on experience with projects completed and under implementation, this report evaluates the impact of railways on people’s lives.
Railway development jump-starts local economies with the greatest impact on the towns and townships that serve as rural trading centers.
Socioeconomic Benefits

Higher Personal Incomes

A review of three completed railway projects shows that GDP, per capita GDP, rural incomes, and average income per farmer all increased mainly because of improved access to markets, new jobs, reduced costs of travel, and cheaper goods. GDP increased in the first 3–5 years by 10–12% annually and by about 18% annually over 10 years after project construction started (table 3). The GDP increase in the Shenmu–Yanan project area was 30–32% while in the province as a whole it was 21% mainly because of greater access to markets and the development of mining and industrial products.6

In the Jing-Jiu railway project, farmers’ incomes in one county and one municipality increased by about four times (more than the provincial and national average) during construction and continued to do so afterwards (table 4).

A change in the mix of GDP also contributed to higher incomes as the secondary and tertiary industrial sectors contributed much more after the railways were completed.

Table 3: Per Capita Income Growth in Three Railway Project Areas

<table>
<thead>
<tr>
<th>Name of the Project</th>
<th>Period</th>
<th>Gross Domestic Product Annual % Increase</th>
<th>Average Annual Gross Domestic Product Per Capita % Increase</th>
<th>Average Annual Rural Income Per Capita % Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daxian–Wanxian</td>
<td>2000–2003</td>
<td>11.50</td>
<td>11.50</td>
<td>5.30</td>
</tr>
<tr>
<td>Shenmu–Yanan</td>
<td>1999–2006</td>
<td>18.50</td>
<td>15.80</td>
<td>10.00</td>
</tr>
</tbody>
</table>


Table 4: Farmers’ Incomes Before and After the Jing–Jiu Railway Project

<table>
<thead>
<tr>
<th>Year</th>
<th>Xinfeng County</th>
<th>Ganzhou Prefecture</th>
<th>Provincial Average</th>
<th>National Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>612</td>
<td>532</td>
<td>670</td>
<td>686</td>
</tr>
<tr>
<td>1996</td>
<td>1,916</td>
<td>1,915</td>
<td>1,869</td>
<td>1,926</td>
</tr>
<tr>
<td>2001</td>
<td>2,238</td>
<td>2,113</td>
<td>2,231</td>
<td>2,366</td>
</tr>
<tr>
<td>2001/1990</td>
<td>3.7 times</td>
<td>4.0 times</td>
<td>3.3 times</td>
<td>3.5 times</td>
</tr>
</tbody>
</table>

the primary sector is agriculture, forestry, animal husbandry, and fisheries; the secondary sector is mining, quarrying, manufacturing, electricity production and supply, and construction; and the tertiary sector is transport, postal and telecommunications services, wholesale and retail trade and catering services, and all other economic activities not included in the primary and secondary sectors. While all three sectors demonstrated impressive growth in the Shemnu–Yanan and Guizhou–Shubai project areas, the secondary and tertiary sectors contributed more (table 5).

Figures 2–8 provide data for primary, secondary, and tertiary sector growth in the individual counties in both project areas. Yulin and Yanan counties were part of the Shemnu–Yanan

Along the Shemnu–Yanan railway, the incidence of poverty in the five counties and one district served by the line dropped by 40–80%

<table>
<thead>
<tr>
<th>Period Covered</th>
<th>Shenmu–Yanan (Yulin and Yanan counties)</th>
<th>Guizhou–Shubai (Zhongshan, Shuizheng, and Pangxian counties)</th>
<th>National Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Sector Increase</td>
<td>3.8–6.4</td>
<td>4–5</td>
<td>3.46</td>
</tr>
<tr>
<td>Secondary Sector Increase</td>
<td>24.8–31</td>
<td>12–22</td>
<td>9.80</td>
</tr>
<tr>
<td>Tertiary Sector Increase</td>
<td>13.6–22.6</td>
<td>11.3–16.3</td>
<td>8.23</td>
</tr>
</tbody>
</table>

project, and Zhongshan, Shuizheng, and Pangxian counties were part of the Guizhou–Shuibai project. In all five counties, growth in each sector exceeded the national average.

The seven counties along the Jing–Jiu railway likewise noted substantial increases in their GDP, their tertiary sectors, in foreign and domestic investment, and in personal incomes during project construction and after completion (table 6).

Higher personal incomes and increased investments reduce poverty. For example, before the projects started, 46% of the people were living below the poverty line along the Guizhou–Shuibai railway and 22% were living below it along the Shenmu–Yanan line. The number of poor people decreased by 54.2% over 5 years in the three counties traversed by the Guizhou–Shuibai railway.7 Along the Shenmu–Yanan railway, the incidence of poverty in the five counties and one district served by the line dropped by 40–80% (table 7). This achievement is directly related to the jobs created during railway construction and to better transportation.

**Rural Industrialization**

Over half the population of the PRC is engaged in agriculture even though cultivation is possible on only 11% of the land. Since the late 1970s, the country has moved away from agricultural
### Table 6: Economic Indicators in the Jing–Jiu Railway Project

<table>
<thead>
<tr>
<th>Item</th>
<th>Average Annual Increase (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Economy</strong></td>
<td></td>
</tr>
<tr>
<td>GDP for all Prefectures</td>
<td>12.0</td>
</tr>
<tr>
<td>Tertiary Sector for all Prefectures</td>
<td>18.8</td>
</tr>
<tr>
<td>GDP for 7 Counties along JJR</td>
<td>9.7</td>
</tr>
<tr>
<td>Tertiary Sector for 7 Counties</td>
<td>13.6</td>
</tr>
<tr>
<td><strong>B. Government Revenue</strong></td>
<td></td>
</tr>
<tr>
<td>For all Prefectures (million CNY)</td>
<td>8.3</td>
</tr>
<tr>
<td>For 7 Counties along JJR (million CNY)</td>
<td>8.0</td>
</tr>
<tr>
<td><strong>C. External Investment</strong></td>
<td></td>
</tr>
<tr>
<td>Foreign Investment</td>
<td>197.1</td>
</tr>
<tr>
<td>Domestic Investment</td>
<td>57.1</td>
</tr>
<tr>
<td><strong>D. Personal Income</strong></td>
<td></td>
</tr>
<tr>
<td>Annual Urban Wages for all Prefectures</td>
<td>9.2</td>
</tr>
<tr>
<td>Annual Urban Wages for 7 Counties</td>
<td>8.9</td>
</tr>
<tr>
<td>Annual Rural Net Income for all Prefectures</td>
<td>8.5</td>
</tr>
<tr>
<td>Annual Rural Net Income for 7 Counties</td>
<td>8.6</td>
</tr>
</tbody>
</table>

CNY = yuan, GDP = gross domestic product, JJR = Jing-Jin Railway.  

### Table 7: Population Below the Poverty Line Before and After the Shenmu–Yanan Railway Project

<table>
<thead>
<tr>
<th>County</th>
<th>Before the Project (1994–1996)</th>
<th>After the Project 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shenmu</td>
<td>19.6</td>
<td>4.1</td>
</tr>
<tr>
<td>Yuyang District</td>
<td>17.8</td>
<td>3.9</td>
</tr>
<tr>
<td>Hengshan</td>
<td>27.8</td>
<td>8.2</td>
</tr>
<tr>
<td>Mizhi</td>
<td>15.2</td>
<td>8.6</td>
</tr>
<tr>
<td>Suide</td>
<td>13.1</td>
<td>7.7</td>
</tr>
<tr>
<td>Quingjian</td>
<td>24.9</td>
<td>7.2</td>
</tr>
</tbody>
</table>

collectives, which has yielded tremendous gains in household production. Still, agriculture today accounts for only 20% of the nation’s gross national product because of poor physical and social infrastructure and the lack of access to credit, training, and market information. Small farm size has made farming unprofitable. Industrialization is necessary to increase rural incomes through microurbanization.

Railway construction has opened up fresh opportunities for rural industrialization and the rapid expansion of microenterprises. Large railway projects are integrated with local development plans which include opening industrial parks, development zones, special economic zones, and energy basins among others. These projects help expand and establish industries that in turn create jobs. The Hefei–Xi’an railway, for example, spurred the construction of factories making decorative glass, methyl alcohol, acetic acid, polyformaldehyde, and cement in the Shenfu Economic Development Zone. By 2005, gross industrial output had reached CNY1.8 billion and 6,500 local jobs had been created. The Nanyang Hanye steel plant was built along the line so it could rely on rail transport for sending and receiving goods. About 300 local workers were involved in constructing the plant and earned CNY20–25 per day which was twice as much as their previous wages. The plant employed another 350 people in addition to 200–300 casual workers. In Zhengping county, a cement factory was set up with a CNY0.4 billion investment to produce up to 3,000 tons per day. The Zhengping Industrial Park was established in 2003, leading to the establishment of 20 new enterprises in the area. Huiche township is expected to receive 10% of the profits or CNY5 million per year once the project is fully operational.

A brick kiln serving the Daxian–Wanxian railway in Liangpin hired farmers who earned CNY500–600 per month, more than double their previous earnings. Imported corn and bean cake previously brought to Dazhou (in Chongqing) by train then to Liangpin by truck are now transported directly to Liangpin by train. Cheaper and faster transportation helps avoid double handling goods and increases local traders’ profits.

On the Zhengzhou–Xi’an railway line, the Henan Shangdu Urea Company in Yinshi city has a railway capacity constraint pegged at 66%. The company annually transports 240,000 tons of coal from Xinan, a national poverty county. The railway is expected to help double production and employment and to increase quarrying jobs. The Longgang Electrified Locomotive Company in Huayin county transports about 90% of its steel (75% of it by rail) from Shaanxi Province. The company intends to double its production and increase the number of its employees from 150 to 1,000 as soon as railway capacity is expanded. The timber company in Huayin that produces boards for the Japanese market produced 6,500 cubic meters of cut wood in 2003, 98% of which was transported to the port by rail. The timber used to produce the boards was also moved by rail from northwest PRC. That year, the company employed 186 people at a labor cost of CNY800,000. Without transport capacity constraints, the company expects to increase its staff to 500.

New Jobs

A key output of building railways is the variety of jobs created including for rural households, ethnic minorities, women, and the poor. Jobs can be a direct result of railway construction
or they can be indirectly related. In the short term, these employment opportunities lead to increased household and per capita incomes. In the long term, they improve skills and opportunities because new industries are established and bases for industrial development are strengthened.

Direct Employment

Railway construction needs large amounts of labor. Depending on the terrain and the physical attributes of the railway, an average of 400–700 person-years is required to build 1 km of railway. The unskilled component is estimated at 70% of labor inputs, mostly for civil works. For unskilled work, little or no training is required; local people can easily perform it. An analysis of the completion reports of ADB-financed projects indicates that local people have captured 60–75% of unskilled jobs and that 60–70% of that number have been taken by the poor, including ethnic minorities and women. The Shenmu–Yanan railway employed a total of 19,888 local unskilled laborers (mostly living below the poverty line) for a cumulative total of 6 million days. The average daily wage was CNY16–30 which was a decided improvement over their previous daily pay of CNY10. Thirty-five construction units during the 4-year Hefei–Xi’an project worked for a total of 306,130 person-months: 211,399 of those months were provided by local laborers (69% of all workers) and 151,136 were provided by poor people (71.5% of local labor). In the Daxian–Wanxian railway project, 320 trackmen employed regularly earned an average salary of CNY600 per month, more than double their previous wages. In the Zhengzhou–Xi’an project, 60% of jobs are reserved for unskilled workers and more than 50% will be sourced from poor households. Villagers can also organize loading and unloading teams and transportation groups at rail stations. Porters (including women) either earn fixed incomes or are paid CNY500–1,000 based on freight volume.

Some jobs, however, require training and skill. The contractors, local poverty reduction offices, women’s bureau, ethnic affairs bureau, and other local agencies provide basic training for the poor to help them get some skilled jobs. Earlier, jobs requiring experience were usually supplied by contractors, and workers came from outside the project areas.

Indirect Employment

Constructing and operating railways require various goods and services. Goods include materials used to build the railway that local people can both provide and transport. Construction companies acquire sand and stone in three ways: (i) directly from quarries at no extra cost, (ii) by purchasing it from the county with the company providing labor, or (iii) by purchasing it from local governments and paying for local labor. The Daxian–Wanxian railway purchased $3.6 million worth of local materials during construction. The Hefei–Xi’an railway spent CNY2 billion on local materials, and CNY 200 million of that went to wages of workers providing 300,000 person-months of labor. As numerous railway project sites are in hilly areas that large vehicles cannot navigate, construction units hire local laborers and small-vehicle operators. Local truckers hauling building materials for the Daxian–Wanxian railway earned a total of CNY40,000–50,000 over the 4 years of construction.
During construction, a large number of workers come from nearby villages and live near the project site. This fuels small businesses such as shops, hotels, and tea houses that cater to workers’ daily needs. Small markets spring up in and around construction areas and spur economic activity.

An indicative example of the employment impact of a railway project (Ganzhou–Longyan Railway Project) is given in table 8.

### Multiplier Effects on the Economy

A key output of railway projects is their multiplier effect. The structure of the economy changes and growth in the secondary and tertiary sectors far outpaces growth in agriculture, the primary sector. Improved transport encourages setting up factories, industries, and large distribution centers and developing mines and the service sector—all of which provide jobs. Along the Shenmu–Yanan railway, for example, the secondary and tertiary sectors had registered 370 new jobs by the end of 2005. Operating the Zhengzhou–Xi’an line is expected to generate 2,988 more jobs with total wages of CNYS53.78 million annually during the 25-year operating period. Assuming that these employees spend 80% of their wages in the project area, the

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**Table 8: Employment Impact of the Ganzhou–Longyan Railway Project (person-years)**

<table>
<thead>
<tr>
<th>Type of Employment (Unskilled)</th>
<th>Total Employment Created</th>
<th>Employment from Poor Households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Construction</td>
<td>Operation</td>
</tr>
<tr>
<td>Direct</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>76,020</td>
<td>—</td>
</tr>
<tr>
<td>Operation (Ministry of Railways staff)</td>
<td>—</td>
<td>49,380</td>
</tr>
<tr>
<td>Loading/Unloading</td>
<td>—</td>
<td>103,360</td>
</tr>
<tr>
<td>Security guards</td>
<td>—</td>
<td>1,280</td>
</tr>
<tr>
<td>Indirect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Induced jobs (generated traffic)</td>
<td>—</td>
<td>734,020</td>
</tr>
<tr>
<td>Materials sourced locally</td>
<td>20,230</td>
<td>—</td>
</tr>
<tr>
<td>Access and link roads</td>
<td>3,320</td>
<td>—</td>
</tr>
<tr>
<td>Rest of the PRC</td>
<td>10,070</td>
<td>—</td>
</tr>
<tr>
<td>Total</td>
<td>109,640</td>
<td>888,040</td>
</tr>
</tbody>
</table>

railway will inject CNY1.08 billion into the local economy with significant multiplier effects on local industries and services. Since the Guizhou–Shuibai railway became operational, many villagers have left agriculture for better-paying jobs in mining. Cheaper transport helps make local products more competitive and has economic and social benefits as well. Opening up new markets means more resources to improve infrastructure and to improve the provision of basic services such as primary education and health care.

Railway projects that necessitate resettlement compensation allow villagers to develop small manufacturing or service enterprises. They frequently set up markets, hotels, commercial housing, and food-processing facilities around new railway stations. Income from these activities is then spent on increasing production and on public welfare. All villagers own a share of village collective properties (similar to stock ownership) while employed in village establishments. Local people living close to urban centers also use resettlement payments to work as craftsmen or to operate small shops, repair facilities, and handicraft businesses. Liangping served by the Daxian–Wanxian railway gained many small businesses including hotels, small restaurants and cafeterias, tea houses, luggage checkrooms, consignment rooms, and shoe-polishing booths. Vending wagons also sell fruits, beverages, newspapers, books, and clothes in railway stations.

In Yulin and Yanan, the two counties traversed by Shenmu–Ya’nan railway, the secondary sectors witnessed dramatic growth after project completion (figures 9 and 10). Along the Guizhou–Shuibai line, Shuizheng county had a similar growth pattern (figure 11).

Inclusive Social Development

ADB’s poverty reduction strategy states: “The reach and sustainability of social development is improved when all people, especially the poor and excluded, have an opportunity to participate in shaping public policies and programs.” ADB’s infrastructure projects show that ensuring social inclusion and empowering disadvantaged groups improve development effectiveness, relevance, and sustainability.

Empowering Women

In the 1950s, women’s earnings accounted for 20% of family income compared with 40% today. Though equal before the law, men are still more likely to obtain work than women, and they will earn higher salaries. Rural women have less education and fewer job opportunities than men. At their parents’ request, young women frequently drop out of school to work on the farm and at home so that male family members can go to school or find work.

The growth of secondary and tertiary industries along railway lines has created numerous jobs, especially for women. Female participation in labor, tourism, and afforestation has increased women’s net income and savings, improved family welfare, and enhanced women’s status at home. Before the Hefei–Xi’an railway project, most men were migrant workers and women worked on farms—tilling, seeding, carrying fertilizer, harvesting, and raising livestock. During construction, however, women found more lucrative and physically less taxing jobs outside their villages. They worked on construction, supplied local materials, and started small businesses. During the construction of the Shenmu–Yanan railway, 12% of workers hired were women, and on the Guizhou–Shuibai railway, 15% of the local unskilled workers were women. In 1999, CNY2.9 million were spent on development programs for women, which was five times the
Figure 9: Yulin Sectors Before and After the Project (1994–2004)

Before the Project
- Primary: 30%
- Secondary: 40%
- Tertiary: 30%

After the Project
- Primary: 24%
- Secondary: 14%
- Tertiary: 62%

Figure 10: Yanan Sectors Before and After the Project (1994–2004)

Before the Project
- Primary: 19%
- Secondary: 48%
- Tertiary: 33%

After the Project
- Primary: 20%
- Secondary: 12%
- Tertiary: 68%

Figure 11: Shuizheng Sectors Before and After the Project (1998–2003)

Before the Project
- Primary: 18%
- Secondary: 51%
- Tertiary: 31%

After the Project
- Primary: 21%
- Secondary: 34%
- Tertiary: 45%

allocation in 1998. In 2000, female beneficiaries in Yulin city were offered 70,000 training opportunities. With more education and better training, women are finding more skilled jobs. On the Zhengzhou–Xi’an railway, 40 women are employed to design the special pre-stressed concrete beams for the high-speed test track fit for speeds of 350 km/hr.

Women also benefit from jobs that provide food and other necessities, like laundry services, to construction crews. These jobs are generally flexible, allowing them to earn money while caring for children and older relatives at home. In 1998, 33% of jobs outside construction were taken by women on the Guizhou–Shuibai railway. There is also at least one female member in every provincial, prefecture, county, and township resettlement team during railway construction.

The All-China Women’s Federation actively works with railway project implementers and local governments to further enhance development gains in project areas. The federation provides small loans and helps develop enterprises to help women capture employment and business opportunities created by the railways. Founded in 1949, the federation is the PRC’s biggest women’s organization with 60,000 grassroots organizations and more than 980,000 women’s committees at every level of government. The federation also implements labor-intensive poverty reduction projects (mostly courtyard economies and home-based industries) that are suitable for women. It partners with education departments to end illiteracy and works with labor departments to handle migratory work for women. One well-known federation initiative is the Spring Bud Project, which aims to help girls remain in school, learn marketable skills, and thus improve their employment prospects.

**Empowering Ethnic Minorities**

A key benefit from building railways is the economic opportunities created for the numerous ethnic minorities in project areas. They have traditionally been involved in livestock grazing, agriculture, and nomadic activities. The railways have brought tourism, opportunities for establishing small businesses, and work in afforestation. Rapidly growing secondary and tertiary industries have helped raise their incomes and savings and have improved overall family welfare.

According to the *Guizhou–Shuibai Railway Completion Report*, 38% of the population were ethnic minorities (Bai, Buyi, Miao, and Yi), and 34.7% were affected by land acquisition and resettlement. During construction, they took about 75% of unskilled jobs. The average net income of ethnic minority households increased by 76% from 1997 to 2003 from CNY834–1,466, a rate that was faster than that for all other people in the project area. Furthermore, at least one person in each ethnic household attended a training program. In Liupanshui municipality, for example, during civil works construction, more than 200,000 ethnic minority farmers attended training programs in agricultural production technologies. They used to have to travel long distances to find jobs, but the project allowed them to stay in their neighborhoods.
and work. Resettlement compensation helped them build bigger and better housing. On the Guizhou–Shuibai rail line, resettled people have 22.45 square meters of housing per capita compared with 18.3 before. A similar increase in jobs and living standards is also noticeable around the Dali–Lijiang railway. After building new houses, some ethnic minority members started small businesses, and some bought vehicles to transport materials and other goods.

**Local Government Benefits**

**Construction Tax**

A civil works construction tax equal to 3.4% of the contract value is paid by railway projects and has provided a new source of income for local governments. These tax revenues have helped open up areas for investments and have enabled local governments to exercise greater autonomy in making decisions on spending for local infrastructure and social development projects that in turn improve the investment climate. This tax revenue also decreased dependence on higher levels of government for financial support.

**Business and Income Taxes**

These constitute the bulk of local revenue. As industries relocate and secondary and tertiary industries develop, more jobs are created, thus boosting receipts of both business and income taxes. Around the Jing-Jiu railway, for example, the financial revenue of 10 poor counties in Jiangxi Province increased from CNY487 million in 1993 to CNY1.357 billion in 1998 for an annual growth rate of 22.7% compared with 12.3% from 1985 to 1992 before the railway was built. In Xinfeng county, the number of enterprises in industry, mining, and agricultural products with foreign investment increased from 3 in 1992 to 39 in 1998. The growth of individual and private businesses was equally dramatic from 8,005 in 1992 to 19,287 in 1998. These businesses employed 18,484 people in 1992 and 52,153 in 1998, an annual increase of 23%. A bearing factory in Ji’an was established in August 1993 at a cost of CNY2 million partly financed from compensation funds. It employed 80 people in the locality, and the rapid development of provincial coal mines, industries, and infrastructure was a direct outcome of the Shenmu–Yanan railway.

Railway development jump-starts local economies with the greatest impact on the towns and townships that serve as rural trading centers. Of the 133 towns and townships along the Hefei–Xi’an line, 30 with more than 10 km of railway line reported a fiscal increase of over 25%, 30 with 5–10 km of railway line reported an increase of 15–25%, and 50 reported a 5–15% increase. An excellent example is Bauyuan township that rose from 20th to 1st place in terms of fiscal income among 29 townships in Lantian county in 2005. During the 4-year construction of the railway, CNY4 billion were spent in 30 counties for building materials, local wages, daily consumption of migrant workers, costs of construction units (such as house rent, water and electricity, office supplies, and communication), fuel for construction equipment, small and large temporary projects during the preparatory phase, and construction taxes. These expenditures aggressively promoted the development of various industries along the railway. In addition, the rail project triggered a CNY18.5 billion investment in 153 income-generating projects in 2005, and linking the four interior provinces of Anhui, Henan, Hubei, and Shaanxi to coastal regions facilitated a gross industrial output of CNY1.8 billion. Loans of CNY836 million were provided, of which 9.5% was given directly to project areas with each household receiving a loan of about CNY1,500.
Triggered by the construction of the Daxian–Wanxian railway, steel and cement industries in Dazhou city flourished, broadening the local tax base. In Wanzhou city, residents benefited from the construction of an industrial park devoted to salt and gas projects generating CNY5–6 billion in investments. In the Zhengzhou–Xi’an project area, taxes will be collected on jobs paying more than CNY800. The civil works construction tax of 3.4% of the contract value will also be paid. Overall, total tax revenues are expected to reach CNY510 million for counties in Henan Province and CNY203 million for those in Shaanxi. Not only will money enter the local economy, but local governments will also receive a 5% business tax from tourism-related enterprises.30

Rent and Increased Land Values

These are directly related to the improved climate for investment and industry. Increased land values and rent are lucrative sources of income for county and township governments and villages. The Daxian–Wanxian railway project spurred the growth of bakeries, confectionaries, flour mills, and electric pole factories in the town of Fenshui in Wanzhou city. The rapidly growing local economy increased land values amounting to CNY300,000/mu. The expansion of the Maliu railway station required building a separate freight yard for bulk coal exports. The land was leased from villagers, so the local government unit received substantial revenue.31

Improved Infrastructure

Railway construction requires drilling wells, building access roads, and quarrying sand and stone. These activities provide residual benefits to local communities in the form of safe water sources, access roads to remote areas, and agricultural infrastructure like irrigation canals, aqueducts, and fish ponds (in quarries). Once completed, project support infrastructure is handed over at no cost to local governments and villages that use it for a range of activities (table 9). Some buildings are converted into schools, health units, community halls, local government offices, housing, or hotels. Access roads connect urban centers with rural and mountainous areas. Lantian county on the Hefei–Xi’an railway, for example, had 148 mountain villages with a 50% incidence of poverty. By building 96.3 km of sandstone arterial roads and 20 stone-arched bridges, the county solved the problem of road congestion and transportation. Sixty-seven reservoirs and 43.6 km of pipes provide clean running water to local people. Thirteen school buildings were built and 24 km of roads leading to rural houses were cemented. An additional 9 km of rural power lines were upgraded and 5,400 houses were whitewashed. Toilets, kitchen stoves, and pigsties were likewise installed in 2,500 places along the railway.32

Around the Guizhou–Shuibai railway, a total of 220 km of service roads were turned over to local villages to transport agricultural products in exchange for maintaining them.33 The Daxian–Wanxian railway converted 150 km of temporary construction paths into permanent village roads. The project also financed the rebuilding of the Songhe township central school in Panxian county and paid the school CNY350,000 for 300 square meters (m²) of old buildings and other outdated infrastructure including moving allowances. The new 1,900 m² four-story brick-concrete building was completed in 2002 with 17 classrooms, 36 teachers, and 1,038 students, compared with 9 classrooms, 16 teachers, and 5,000 students in the old school.34 Around the Guizhou–Shuibai railway, houses built during civil works were given free to local villages and converted into schools, clinics, and homes for the elderly. Local inhabitants were also provided with electricity and water supply systems radically altering the quality of village life.35

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31 1/15 of a hectare.

32

33

34

35

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Socioeconomic Benefits 19

Once completed, project support infrastructure is handed over at no cost to local governments and villages that use it for a range of activities.
Table 9: Infrastructure Given to Villages

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Roads and Bridges</th>
<th>Water Systems and Rural Electrification</th>
<th>Welfare Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hefei–Juijiang</td>
<td>Road approaches</td>
<td>Water connection</td>
<td>219, 318 m² buildings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Schools and commercial buildings</td>
</tr>
<tr>
<td>Jing–Jiu</td>
<td>1,105 bridges of 170.6 km village access roads</td>
<td>Dam rebuilding</td>
<td>10 schools and colleges</td>
</tr>
<tr>
<td></td>
<td>paved roads</td>
<td>Borrow pits converted into fishponds</td>
<td>1 clinic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mechanical hand pumps</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water connection</td>
<td></td>
</tr>
<tr>
<td>Daxian–Wanxian</td>
<td>288 km of approach roads</td>
<td>Ditches and conduits to drain waste</td>
<td>8,000 m² converted into houses, schools,</td>
</tr>
<tr>
<td></td>
<td>150 km of link roads</td>
<td>water</td>
<td>clinics</td>
</tr>
<tr>
<td>Shenmu–Yanan</td>
<td>589 km of link roads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guizhou–Shuibai</td>
<td>203 km of link roads</td>
<td>67 impounding reservoirs and laying</td>
<td>13 new school buildings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pipes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>water connection to villages</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>upgrading of 9 km of rural power lines</td>
<td></td>
</tr>
<tr>
<td>Hefei–Xi’an</td>
<td>Construction of 96.3 km of rural arterial roads</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 stone-arched bridges</td>
<td>67 impounding reservoirs and laying</td>
<td></td>
</tr>
<tr>
<td></td>
<td>406 km of access roads</td>
<td>pipes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,122 km of link roads amounting to CNY926 million</td>
<td>water connection to villages</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,122 km of link roads amounting to CNY2.268 billion</td>
<td>upgrading of 9 km of rural power lines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>paving of 24 km of village roads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ganzhou–Longyan</td>
<td>26.8 km of station access roads</td>
<td></td>
<td>Schools and commercial buildings</td>
</tr>
<tr>
<td></td>
<td>152.7 km of link roads</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>417 km of road improvements amounting to $145 million</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Improved Medical Care

Medical clinics are set up for construction units and provide care not only to the workers but also to people living nearby. The units work with local health bureaus to organize public information programs for HIV/AIDS awareness including distributing leaflets and posters, broadcasting radio and television programs, and providing voluntary counseling and testing for HIV/AIDS and sexually transmitted diseases. They also organize prevention programs. Preventive measures, combined with the priority hiring of local people, have effectively prevented the spread of infectious diseases. Furthermore, with improved transport provided by railways, local people can travel...
more easily to seek health care, education, and jobs outside their villages. Railways also speed up referrals of serious health cases to urban centers, and with higher personal incomes, local people are increasingly able to afford more advanced medical treatment. These developments increase life expectancy and reduce mortality in many project areas.

**Expanded Tourism**

The PRC has a long history and a fascinating culture. The Government emphasizes both domestic and international tourism, which is closely linked to good transportation and community-based employment for talented storytellers, musicians, furniture makers, interior designers, and artists. Tourism also supplements farm incomes and supports sustainable community development by promoting rural enterprises like hotels, restaurants, cottage industries, and tour guides that could limit rural-to-urban migration. Foreign tourists contribute to greater earnings by increasing the demand for better accommodation, crafts, and services, thus encouraging local businesses to meet high standards.

The Zhengzhou–Xi’an railway in northwest PRC traverses an area that is rich in natural beauty as well as in historical and cultural sites. Xi’an, the starting point, is the capital of Shaanxi province. It has a history of 3,000 years and served as the capital of 11 dynasties from the Western Zhou (1046–771 BC) to the Tang (618–907 AD). Xi’an is also famed for its Qin dynasty (211–206 BC) warriors—over 16,300 m² of life-sized imperial guards made of terracotta arranged in battle formation.36 Louyang county has several sites that mark the arrival of Buddhism and where Laozi wrote the book that became the foundation of Taoism. In 2003, 4 million local tourists visited cultural sites along this railway. With the completion of new passenger-dedicated lines, 13 pairs of tourist trains that can carry 1,100 people are proposed to meet growing demand, and over 3.55 million more tourists are expected to use the railway annually. Over 25 years, this translates into 88.75 million tourists and CNY2.304 billion. The railway also benefits passengers going to hospitals, educational institutions, research centers, and tourist sites.37

The Ganzhou–Longyan railway covers regional tourism sites including the lush Guanzi mountain resort; the well-preserved quarters of the Red Army; and widespread facilities of the Hakka people, many of whom have migrated but return each year to pay tribute to their ancestors. In 1999, 3.4 million tourists visited the area; by 2006, this figure more than doubled, creating over 50,000 tourism-related jobs.38

Tourism also supplements farm incomes and supports sustainable community development by promoting rural enterprises like hotels, restaurants, cottage industries, and tour guides that could limit rural-to-urban migration.
The Dali–Lijiang railway is another major project that will help develop sustainable tourism. The ancient city of Dali is one of the 24 leading historical and cultural cities in the PRC. It is called the “Geneva of the East,” well known for its literary scholars. Dali is also famed as the “City of Flowers” where rare blooms and unique plants thrive in its unique climate which is warm in the winter and cool in the summer. The city is also the communication hub and distribution center for bulk materials in western Yunnan Province. Lijiang is a UNESCO World Heritage Site because of its well-preserved culture. It is one of the few cities in the world with a large population living more than a mile above sea level. Its inhabitants are ethnic minority mountain people including Naxi, Lisu, Pumi, Muosu, Yi, and Tibetans. Lijiang’s numerous unique festivals and its many canals are major tourist attractions. In 2003, 5.5 million domestic and 140,000 international tourists visited Dali, generating CNY2.56 billion in revenue, and 3.1 million domestic and 105,000 international tourists visited Lijiang, generating CNY2.04 billion. The project will not only help transport tourists but will also improve and preserve the environment by diverting traffic from roads.

**Improved Housing**

Most poor people cannot improve their housing. People in railway project areas who must be resettled, on the other hand, receive new housing sites and compensation before their homes are demolished. Compensation is comparatively high and recipients usually build bigger, stronger dwellings in better environments. On the Guizhou–Shuibai railway, project villages decided to give all the compensation paid in cash for cultivated land and resettlement to affected households. New housing plots were provided free of charge and houses were built according to the expectations of the owners. The Hefei–Xi’an railway resettled 4,926 households with about 20,000 people and a total floor space of over 1 million m². The new houses are the best and the most beautiful in the locality. Almost all are of brick-concrete construction with two or more stories. The original brick-tile and earth-wood houses were of lower quality and aesthetic value. Resettled people received preferential treatment in land reallocation, competitive land compensation rates, low interest loans for housing reconstruction, and grants from poverty reduction funds. They were also given preference in hiring for project jobs.

The new houses are the best and most beautiful in the locality.
Establishing an institutional structure at the provincial, prefecture, county, and township levels is a key ADB intervention.
Managing Railway Development

ADB has developed a number of key initiatives for managing railway development, including setting up effective institutional structures, consulting and involving stakeholders and local government agencies, and developing an effective project performance management system that closely monitors indicators. These measures have been developed over time and refined based on experience with other railway projects.

Institutional Structures

Establishing an institutional structure at the provincial, prefecture, county, and township levels is a key ADB intervention. At the provincial level, a leading group or a steering group is established with the governor or vice governor at the head, comprising representatives from the department of planning; from poverty reduction offices; and from the bureaus of law, resources, environmental protection, forestry, women, ethnic minorities, health, public security, tourism, and finance. Similar committees are established with leaders at the prefecture, county, and township levels. At the county level, railway construction support offices are set up before construction starts. They include representatives from the steering groups and coordinate closely with the designers during the planning phase, particularly in identifying the location of stations. During construction, the support offices help coordinate land acquisition and resettlement and training programs for the poor, for women, and for the vulnerable. They also work to mitigate environmental impacts. In short, the support office ensures that local interests are protected during construction.

Stakeholder Consultations and Participation

During project planning and implementation, local governments coordinate with the Ministry of Railways to consult with people affected by the project. This is done through railway construction support offices. The offices hold formal and informal consultations and conduct surveys, household interviews, and workshops with local communities, relevant local government agencies, nongovernment organizations, village leaders, women’s groups, local ethnic bureaus, and potential beneficiaries in the project area and in neighboring counties. Village and household surveys provide a basis for the environmental impact assessment, poverty and social assessment, social development action plan, and resettlement plan; and for determining health risks. They also assess effects on migrant populations and the impacts of tourism. During construction and operation, railway support offices enhance stakeholder participation and disseminate public awareness of the railway through media releases and site visits.
After public consultations, a number of measures are implemented to mitigate the effects of construction on individuals and communities. Construction units and local governments appoint special staff to carry out and monitor the resettlement of those affected by land acquisition. Efforts are made to avoid acquiring farmland and to minimize involuntary resettlement. Local governments assist families whose houses will be demolished by providing relocation sites, compensation, and construction materials. Construction units also level land, pave roads, and install electricity and water supply facilities in the localities in which they work.

Public consultations are done in accordance with ADB’s policy on gender and development and do everything possible to encourage women to participate in project planning and implementation. While the community collectively decides where schools will be relocated, women, especially heads of households, are consulted as schools provide an informal source of day care for their children. Widows are eligible for special assistance during land acquisition and resettlement. Women are also given priority for jobs during the construction and operation of the railway. In accordance with ADB’s social safeguard policies, an ethnic minority development plan is also prepared, if needed, to avoid or mitigate adverse impacts and to ensure that economic development benefits ethnic minorities equitably and sustainably.

The Dali–Lijang Railway project, for example, is an area where ethnic minorities live. The project has employed a proactive participation strategy involving the All-China Women’s Federation, the Provincial Minority Affairs Bureau, and local people. Consultations were held with more than 4,000 stakeholders in the project area including local and provincial officials, farmers, village leaders, traders, service providers, and nongovernment organization representatives to discuss project alternatives, environmental concerns, land acquisition and resettlement issues, concerns of ethnic minorities, and economic development potential in areas to be directly and indirectly affected by the project. In all, 55 village surveys and 680 household surveys gathered public opinion about the railway, and environmental and social assessments and the resettlement plan were prepared. The approach helped uncover and address important social issues, and build local ownership of the project.

**Project Performance Management System**

This system is developed in close consultation with the Ministry of Railways (the executing agency), the implementing agency, and local governments. The ministry is responsible for overall project implementation, for setting up construction management units along the project route, for coordinating project management activities, for supervising the procurement of project-financed goods and services, for coordinating resettlement, for drawing up environmental and social plans, and for periodic reporting to ADB.

A set of indicators for evaluating project performance in relation to project goals, purposes, outputs, and conditions is agreed on during project preparation and appraisal. They are reviewed
At the start of project implementation and include (i) economic development and socioeconomic indicators, (ii) costs and times for passenger and freight services, (iii) services offered and charges, (iv) accident rates, (v) financial sustainability, (vi) county and village incomes, (vii) access to social services, and (viii) jobs created in construction and maintenance.

At the beginning of project implementation, baseline and target values for the indicators are established. These indicators are measured at project inception and completion and are compared with baseline data. The ministry recruits consultants to help establish the monitoring and evaluation system and to train project staff to use it. The main sources of data include secondary data from government sources, household socioeconomic sample surveys, and participatory rapid appraisals. The Ministry of Railways then makes a report to ADB summarizing the before and after findings. ADB conducts an annual review of all railway projects, covering any institutional, administrative, organizational, technical, environmental, social, poverty reduction, resettlement, economic, financial, and other aspects that may impact on the performance of the projects and their continuing viability.
Railways drive socioeconomic development by reducing poverty and improving quality of life.
Conclusions

Railways drive socioeconomic development by reducing poverty and improving quality of life. Affordable transportation and increased connectivity have enabled local governments to set up industrial zones and product bases and to offer preferential policies to accelerate investment and develop technology. Local economies gain through (i) higher GDP and GDP per capita, (ii) increased demand for construction materials that expands the local building material industry, (iii) increased consumption by construction workers that directly benefits local businesses and farmers, (iv) employment for local labor and local transportation, (v) development of the secondary and tertiary industrial sectors, (vi) increase in local government revenues, and (vii) development of tourism. Local development and financing also expand substantially. Counties use increased revenues for primary education, basic health services, agricultural development, enterprise restructuring, and physical infrastructure.

Better access and removal of transport constraints improve the investment environment and strengthen trade within and between inland provinces. Better products are obtainable at lower prices because of increased demand and easier access to markets. Wider markets for horticultural and agricultural produce promote the growth of township and village enterprises. Railways in poor areas help make prices more competitive and increase farmers’ earnings. Many workers are also moving out of agriculture, thanks to better business environments and new technologies. These changes create jobs requiring less physical labor and benefit the poor, women, and ethnic minorities.

Railways stimulate balanced economic growth and efficiency. Transport links to more developed areas and improved transport access to inland provinces lead to direct employment and business opportunities. By creating jobs and income-generating activities for the poor, railways help reduce poverty. Access roads ensure that local farmers can use the railway to transport their products.

In short, building railways changes lives. Working together with stakeholders, ADB looks forward to greater opportunities to achieve equitable, efficient, and sustainable regional transport in Asia and the Pacific.
Endnotes


Building Railways in the People’s Republic of China: Changing Lives

Asian Development Bank (ADB) is assisting the development of railway sector in the People’s Republic of China (PRC) since 1989 by providing lending and non-lending support. ADB has provided 14 loans in the sector covering 15 provinces of the PRC for a total of about $3.0 billion, mostly in the poorer provinces of central and western regions. These projects have had positive impacts on the people and the local economy. Based on a review of the completed and ongoing ADB-financed railway projects, this report documents the positive impacts of railway development in promoting economic growth and reducing poverty in the regions that it serves. The report also highlights the key initiatives developed by ADB for managing railway development. The report concludes with an overview of how railway development has helped change the lives of the ordinary people in the PRC.

About the Asian Development Bank

ADB aims to improve the welfare of the people in the Asia and Pacific region, particularly the nearly 1.9 billion who live on less than $2 a day. Despite many success stories, the region remains home to two thirds of the world’s poor. ADB is a multilateral development finance institution owned by 67 members, 48 from the region and 19 from other parts of the globe. ADB’s vision is a region free of poverty. Its mission is to help its developing member countries reduce poverty and improve their quality of life.

ADB’s main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

ADB’s headquarters is in Manila. It has 26 offices around the world and more than 2,000 employees from over 50 countries.