



# Validation Report

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Reference Number: PCV: PRC 2008-14  
Project Number: 33175  
Loan Number: 1748  
July 2008

## People's Republic of China: Hefei–Xi'an Railway Project

Operations Evaluation Department

**Asian Development Bank**

## ABBREVIATIONS

ADB	–	Asian Development Bank
ADF	–	Asian Development Fund
EA	–	executing agency
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
HXR	–	Hefei-Xi'an Railway
M&E	–	monitoring and evaluation
MOR	–	Ministry of Railways
OCR	–	ordinary capital resources
PCR	–	project completion report
PRC	–	People's Republic of China
RRP	–	report and recommendation of the President

## NOTE

In this report, "\$" refers to US dollars.

### Key Words

people's republic of china, roads, lessons, adb, asian development bank, operations evaluation department, performance evaluation

<b>Director</b>	R.B. Adhikari, Operations Evaluation Division 2, Operations Evaluation Department (OED)
<b>Team leader</b>	N. Singru, Evaluation Specialist, Operations Evaluation Division 2, OED
<b>Team members</b>	R. Lumain, Senior Evaluation Officer, Operations Evaluation Division 2, OED C. Roldan, Senior Operations Evaluation Assistant, Operations Evaluation Division 2, OED

## PROJECT COMPLETION REPORT VALIDATION

A. Basic Project Data		PCR Validation Date:		
<b>Project and Loan/Grant Number:</b>	33175 1748-PRC		<b>Approved</b>	<b>Actual</b>
<b>Project Name:</b>	Hefei–Xi’an Railway Project	<b>Total Project Costs</b> (\$ million):	2,835.0	2,616.7
<b>Country:</b>	People’s Republic of China	<b>Loan/Grant</b> (\$ million):	300.0	290.1
<b>Sector(s):</b>	Transport/Railways	<b>Total Cofinancing</b> (\$ million):	1,221.7	1,221.7
<b>ADB Financing</b> (\$ million):	<b>ADF:</b>	<b>Borrower</b> (\$ million):	1,317.3	1,104.9
	<b>OCR:</b> 300.0	<b>Beneficiaries</b> (\$ million):		
<b>Cofinanciers:</b>	China Development Bank	<b>Others</b> (\$ million):		
<b>Approval Date:</b>	17 Aug 2000	<b>Effectiveness Date:</b>		2 Mar 2001
<b>Signing Date:</b>	4 Dec 2000	<b>Closing Date:</b>	30 Dec 2005	28 Jun 2007
<b>Project Officers:</b>	<b>Name:</b>	<b>Designation:</b>	<b>From</b>	<b>To</b>
	R. Soin	Senior Project Engineer, IETC	2000	2001
	J. M. Lacombe	Senior Transport Specialist, ECID	2002	2002
	M. Parkash	Project Specialist (Railways), ECTC	2002	2005
	X. Yang	Senior Financial Analysis Specialist, EATC	2006	2006
S. H. Yoon	Transport Economist, EATC	2006	2007	
<b>Evaluator:</b>	T. F. Jones	<b>Director:</b>	R. B. Adhikari, OED2	
<b>Quality Control Reviewer:</b>	N. Singru, OED2			

### B. Project Description (summarized from the report and recommendation of the President)

- (i) **Rationale.** The Hefei–Xi’an Railway (HXR) is an east–west rail transport corridor traversing 27 counties, including 16 poverty counties.<sup>1</sup> The counties in the project area are overwhelmingly rural; over 80% of the population in 22 of the counties is rural, compared with 70% nationwide. The per capita gross domestic product in these counties ranges from 19% to 69% of the national average. About one third (31%) of the rural population in the project area lives on the equivalent of less than \$1 per capita per day, compared with 16.5% nationwide. The Hefei–Xi’an Railway Project (the Project) was conceived as a key intervention to promote pro-poor growth and create the employment and income-generating activities needed to reduce poverty. The Government of the Peoples Republic of China (PRC) has sought to reduce the economic disparity between inland and coastal provinces, and the Project received a high priority in the Ninth Five-Year Plan (1996–2000) and the Railways Development Plan (1998–2004).

In the largely rural project area, value-added agro-processing and manufacturing industries are essential for employment creation. Such industries usually require a large labor force, low-cost energy, and efficient and low-cost transport for both raw materials and finished products. Without the HXR, the project area was marginally attractive for potential investors in employment-generating industries. The HXR was intended to provide low-cost and efficient transportation, allowing new agro-processing to develop that would increase the income of local communities. In addition, cost-effective transportation was projected to create business opportunities for energy-intensive industries such as cement, fertilizers, and various manufactured goods.

In addition to increasing transport capacity in the east-west corridor, the HXR’s connections with four major north-south railway lines were intended to improve overall rail efficiency in the central PRC, with significant impacts on the poor areas west of Xi’an, particularly in Gansu and Qinghai provinces, and the autonomous regions of Ningxia and Xinjiang. The Project thus supported the

<sup>1</sup> From 1986 to 2001, poor counties were the basic units for central government poverty reduction funds. The original poor county designation system initiated in 1986 was based on average per capita income of rural residents. This was superseded by other criteria whereby counties receive poor designation despite a per capita income above the norm. In 2001, the focus shifted from “poor county” to “poor village” designation so that poor villages in principle could receive poverty funding even if they are not located within a poor county.

Government's strategic objective of accelerating development of the central and western regions of the PRC by improving transportation links to the coastal regions.

- (ii) **Objectives or expected outcomes.** The goal of the Project was to promote economic growth in poor interior provinces to raise living standards and reduce poverty. This was to be achieved by providing railway infrastructure facilitating economic transportation of goods and people, and resulting in improved access by the poor to employment opportunities and income-generating activities.

As designed the HXR started in the west at Xinfeng in Shaanxi Province, crossed the Qinling Mountains, traversed Henan Province, and after crossing the north tip of Hubei Province, terminated at Hefei in Anhui Province. From the west, the alignment is characterized by numerous tunnels through mountainous terrain, with patchy forest and grassland areas rooted in mountain rocky soil. From Nanyang to Hefei, the surrounding areas are mainly open, cultivated plains alternating with mildly undulating topography, where a number of major rivers must be crossed. The land supports grain and industrial crops including rice, winter wheat, and cotton. About 82% of the population in the project area live in rural areas and are engaged primarily in agricultural activities.

- (iii) **Components.** At appraisal, the project scope comprised (a) constructing a 954 kilometer (km) single-track, standard-gauge railway between Hefei and Xi'an, including subgrades; 407 major bridges with a total length of about 88 km; 4,732 minor bridges and culverts; and 83 tunnels with a total length of about 81 km; (b) laying railway track consisting of rails and accessories, concrete sleepers, and stone ballast; (c) constructing 52 new railway stations, complete with facilities; (d) electrifying the 407 km Xi'an to Nanyang section, including power supply arrangements; (e) providing modern technology and equipment for signaling, telecommunications, freight yard operation, and mechanized track maintenance; (f) providing training on the use and maintenance of modern equipment; (g) protecting the environment and mitigating adverse environmental effects; (h) acquiring land and resettling affected people; (i) providing consulting services for design, construction supervision and quality control; procurement; environmental monitoring; and monitoring of resettlement and social impact; and (j) strengthening marketing and business development capabilities.

- (iv) **Outputs.** The project completion report (PCR) does not provide a direct comparison between the components described at appraisal and those actually achieved. It mentions certain components envisioned at appraisal but does not directly state that they were completed, although this is the presumption. The PCR concludes that the works were completed with a quality equivalent to international standards. Service roads were comprehensively discussed in the report and recommendation of the President (RRP), with about 550 km to be turned over to local authorities, but only 298 km were ultimately turned over. In addition the RRP estimated that a total of about 1,529 km of access and link roads would be built. The PCR mission was unable to obtain this information from the Ministry of Railways (MOR), as this was not in their jurisdiction. The institutional strengthening component appears to have been carried out, and is effective.

### C. Evaluation of Design and Implementation (PCR assessment and validation)

- (i) **Relevance of design and formulation.** The rationale for the Project, which was clearly set forth in the RRP, stemmed from the need for a more direct and efficient transportation corridor from the four poor interior provinces to the coastal regions. In particular, the rail line serves as an efficient outlet for large quantities of high-grade, low-sulfur coal from Shaanxi, helping to reduce environmental emissions from the use of high-sulfur coal. The increased transport capacity was expected to encourage development of other natural resources and establishment of new industries, including agro-processing in the area influenced by the Project. The need appeared clear, as no other efficient transport was available; the financial and economic rates of return were both high.

Early operations show that the volume of freight and passengers is considerably higher than that estimated at appraisal; further growth appears to be constrained by a shortage of wagons to carry additional freight. The constrained growth primarily impacts project effectiveness and efficiency, while relevance relates to the value added by the involvement of the Asian Development Bank (ADB) in the Project, as the ADB loan covered only about 10%–11% of the total project cost. Much

of the value added stemmed from policy dialogue and the use of ADB guidelines for resettlement, environment, and anticorruption measures, as well as standard ADB requirements throughout the Project. Additionally, consulting services were provided under the loan to strengthen MOR's marketing and business development functions and project management. The design, and presumably the Project at completion, are considered highly relevant.

(ii) **Outputs and costs by component as envisioned during appraisal as compared with actual costs and achievement of outputs; reasons for any deviation.**

**Project Cost: Appraisal And Actual**  
(\$ million)

Item	Appraisal			Actual		
	Foreign	Local	Total	Foreign	Local	Total
<b>A. Base Cost</b>						
1. Civil Works	387.8	905.0	1,292.8	398.9	931.5	1,330.4
2. Buildings and Facilities	17.3	65.1	82.4	11.8	43.7	55.5
3. Railway Track Work	150.6	120.3	270.9	145.3	126.4	271.7
4. Signaling, Telecommunications	72.7	36.6	109.3	63.7	40.8	104.5
5. Electrification	85.3	45.9	131.2	76.5	45.2	121.7
6. Operational Equipment	70.2	30.2	100.4	89.6	18.8	108.4
7. Safety Transport Equipment	0.0	0.0	0.0	7.7	0.0	7.7
8. Environmental Protection, Mitigation, and Monitoring	6.5	32.0	38.5	5.7	49.8	55.5
9. Land Acquisition, Compensation, and Resettlement	0.0	211.2	211.2	0.0	146.6	146.6
10. Administration, Consulting Services, and Miscellaneous	0.2	121.9	122.1	0.2	146.6	146.7
<b>Subtotal A</b>	<b>790.6</b>	<b>1,568.2</b>	<b>2,358.8</b>	<b>799.4</b>	<b>1,549.4</b>	<b>2,348.9</b>
<b>B. Contingencies</b>						
1. Physical	45.5	101.5	147.0	0.0	0.0	0.0
2. Price	45.0	101.1	146.1	0.0	0.0	0.0
<b>Subtotal B</b>	<b>90.5</b>	<b>202.6</b>	<b>293.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>Subtotal A+B</b>	<b>881.1</b>	<b>1,770.8</b>	<b>2,651.9</b>	<b>799.4</b>	<b>1,549.4</b>	<b>2,348.9</b>
<b>C. Interest and Other Charges During Construction and Front-End Fee</b>	<b>31.9</b>	<b>151.2</b>	<b>183.1</b>	<b>71.1</b>	<b>196.7</b>	<b>267.8</b>
<b>Total Project Cost</b>	<b>913.0</b>	<b>1,922.0</b>	<b>2,835.0</b>	<b>870.6</b>	<b>1,746.1</b>	<b>2,616.7</b>

Source: Asian Development Bank. 2007. *Project Completion Report: Hefei–Xi'an Railway Project*. Manila.

Total project cost was 7.8% less than the total cost estimated at appraisal. Costs in most categories were very close to or less than the appraisal estimates, with the exception of land acquisition and resettlement, which was 11.6% less due to lower-than-expected compensation rates. As explained by the mission leader, the use of additional funds for land acquisition reduced the difference from 11.6% to 5.9%. The cost of environmental protection, mitigation, and monitoring increased by 44%, due mainly to unexpected difficulties in the construction of a long tunnel in poor soil and rock conditions. A total of \$9.9 million was cancelled with the closing of the loan account.

(iii) **Project cost, disbursements, borrower contribution, and conformance to schedule (as relevant to project performance).** The final cost of the Project was \$2,616.7 million, compared with \$2,835.0 million estimated at appraisal. Final cost comprised \$870.6 million in foreign exchange costs (\$913.0 million at appraisal) and \$1,746.1 million equivalent local currency cost (\$1,922.0 million at appraisal). Disbursement was generally accomplished through reimbursement, commitment letter, and direct payment. An imprest account facility was also used to help reduce cash flow difficulties in financing project expenditures during implementation. The disbursement schedule at appraisal was very optimistic and showed the last payment occurring at the end of 2003, while the actual final payment was made in mid-2007. Most project activities were completed prior to or in accordance with the appraisal implementation schedule. The main categories that were delayed involved operations, safety inspections, and acquisition of maintenance equipment; in addition, trial operations were delayed by 3 months. The loan closing date was extended twice, for about 18 months (from 30 December 2005 to 28 June 2007), mainly to allow for disbursements for procurement of additional safety equipment.

- (iv) **Implementation arrangements, conditions and covenants, and related technical assistance.** As envisioned and agreed at appraisal, MOR's Railway Construction Management Center assumed overall responsibility for project implementation. To provide continuity, it was agreed at appraisal that MOR would be the executing agency (EA) for the Project, because the Project traversed four provinces and operation of the completed railway would be the responsibility of three separate railway administrations (PCR, para. 69). MOR, through the Foreign Capital and Technical Import Center, was responsible for procurement and liaising with ADB. For onsite project management, RCMC established the HXR Construction Headquarters in Xi'an in May 2000.

Construction supervision and quality control supervision were provided by 17 domestic consulting firms under 30 supervision contracts, with 850 supervision engineers engaged for the work. Land acquisition and resettlement monitoring was undertaken by the Research Institute of Foreign Capital Utilization in Southwest Jiatong University. MOR was responsible for land acquisition and resettlement in accordance with the agreed resettlement plan, with implementation carried out by local authorities. The latter used local compensation rates and followed local regulations and standards, which often did not meet ADB requirements, as detailed in the resettlement plan. In addition, compensation rates varied significantly among local authorities. Input from ADB resettlement specialists during project review missions might have helped achieve ADB's requirements, but neither the preparatory nor the review missions included any resettlement specialists.

The PCR states that 40 out of 41 covenants attached to the Project have been or are being complied with, with the remaining covenant not yet due. However, the PCR does not clearly confirm the completion of the access and link roads, implying that Schedule 6, para. 7 of the loan agreement may not have been fully complied with.

The loan included a provision for institutional strengthening, in the form of improved marketing and business development to attract industrial development. The objectives of this loan-financed technical assistance were carried out. Although the PCR indicates that the consultants' efforts were well received by MOR, the PCR does not mention the effectiveness of these consultants or their recommendations.

- (v) **Performance of the Borrower and Executing Agency.** The PCR indicated that the Borrower (Ministry of Finance) and the EA (MOR and its implementing agencies) performed satisfactorily. This evaluator agrees with this assessment, considering the size and complexity of the Project and its timely completion.
- (vi) **Performance of the Asian Development Bank.** During implementation, a total of six missions were fielded. Although some mission members visited resettlement sites during the reviews, their performance was limited by the fact that none were resettlement specialists, and there is some concern that resettlement activities could have been significantly improved. Many EAs prefer staff continuity in ADB review missions, but there was little continuity in this project. The problem is systemic rather than project-specific, stemming from promotion, policies regarding staffing expertise, and the limited number of available staff members, given the heavy workloads generally handled by project staff. In light of internal constraints and the many issues to be addressed, ADB's performance is considered satisfactory.

#### D. Evaluation of Performance (PCR assessment and validation)

- (i) **Relevance.** The Project was and is relevant in terms of ADB's country strategy and the PCR's priority of opening and developing poorer regions of the country. This validation agrees with the PCR rating of "highly relevant". The project design was comprehensive, involving input to a very large railway investment and providing some guidance for developing the market for railway services. The main shortcomings were inadequate commitments regarding the resettlement plan and a lack of guidance during implementation; the latter could have been avoided through better staffing of review missions.
- (ii) **Effectiveness in achieving outcome.** The Project was "highly effective" in meeting its initial objectives, because it (a) increased cost-effective transport capacity for freight (industrial outputs and inputs) and people in the project area; (b) encouraged some new industries to locate in the project area, thus providing employment and helping reduce poverty; (c) is providing safer transportation, particularly in winter; and (d) helps facilitate the delivery of health, education,

communication, and other public services to the rural poor. Traffic has grown substantially, exceeding forecast levels and exceeding the practical capacity of the railway. Its long-term effectiveness will be determined by how quickly new and appropriate wagons can be acquired.

- (iii) **Efficiency in achieving outcome and outputs.** The Project was completed efficiently and largely on schedule, and traffic has exceeded expectations. As a result, the revised economic internal rate of return (EIRR) is 19.6%, resulting in a “highly efficient” rating for the Project.
- (iv) **Preliminary assessment of sustainability.** A number of factors suggest the Project is highly likely to be sustainable. Production trends indicate that coal production has increased significantly and is likely to increase further in line with demand. With further development of industry and other economic activities in the area influenced by the Project, demand for transport services will increase. The railway administrations are well equipped to operate and plan railway operations, including railway maintenance. The financial internal rate of return (FIRR) at 8.1% exceeds the weighted average cost of capital at 4.9%, and supports sustainability. However, there are two factors that negatively affect sustainability. First, operations are constrained by a chronic nationwide shortage of wagons (recently estimated at 35%). This problem has existed for some time and is likely to continue, constraining the ability of the Project to sustain its rapid growth, and placing both the FIRR and EIRR at risk. Second, the PCR did not determine the extent to which road facilities were constructed into the hinterland to allow the rural poor to access the railway. Also, a dramatic positive impact on the economic wellbeing of rural, largely unskilled people is identified, but it is questionable whether this can be maintained after construction. The industries established in close proximity to the railway tend to be capital intensive, and do not employ large numbers of unskilled persons. It is not clear that the service industries established to serve construction will have a substantial customer base following construction. The railway and associated industries will generate some trickle-down service industry employment, but the amount will have to be measured through a future survey. For these reasons, overall sustainability is rated “likely”, but not “highly likely”.
- (v) **Impact (both intended and unintended).** The PCR clearly shows that the direct impact of the Project during construction was substantial, with per capita income increasing by up to 78%. The accessibility impact has also undoubtedly improved. Urban populations have also benefited from economic development, as expressed by increases of up to 81% in per capita income. However, two questions arise: (i) can this growth be sustained after construction; and (ii) is it due entirely to the new rail line, or is it in part development that would have occurred without the Project?

The PCR correctly identifies some resettlement inequities, which are largely attributed to the lack of agreed compensation for land and other resettlement activities. The PCR strongly recommends that steps be taken to avoid such problems in the future.

Environmental aspects (including mitigation) were carried out and monitored by local institutes and centers. The PCR concludes that all environmental mitigation measures were adequately carried out, although the issue of how excess spoil was actually treated is not adequately resolved. The PCR appears contradictory in discussing this, suggesting on the one hand that all spoil was used in construction, and stating elsewhere that it was deposited in nearby valleys where such disposal would not be monitored. The issue should be clarified for preparation of future projects.

#### **E. Overall Assessment, Lessons, and Recommendations** (validation of PCR assessment)

- (i) **Overall assessment.** Overall, the Project is rated “highly successful”. The Project is rated “highly relevant”, “highly effective”, “highly efficient”, and “likely” to be sustainable.
- (ii) **Lessons.** The PCR identified several important lessons including the importance of accurate traffic forecasts, the need to plan for expansion, and the importance of monitoring project-related activities such as the construction of access and link roads. This evaluator agrees with those lessons. An additional lesson involves the need to have tighter control and monitoring of resettlement activities, including compensation levels. A similar lesson involves monitoring of environmental mitigation measures.

- (iii) **Recommendations.** The PCR makes a few recommendations generally related to lessons from the Project, such as the need for effective monitoring and the need to arrange for additional wagons based on realistic traffic forecasts. ADB monitoring of all project-related activities could have been improved if appropriate specialists had been assigned to review missions.

#### **F. Monitoring and Evaluation Design, Implementation, and Utilization (PCR assessment and validation)**

The monitoring and evaluation (M&E) design during appraisal was adequate. It involved (i) M&E of the resettlement plan, socioeconomic impact assessment, and evaluation of poverty reduction; (ii) M&E of environmental management; and (iii) M&E of project impacts through the project performance monitoring system. The latter was reported by the PCR as being complied with at project completion.

In compliance with ADB requirements (Item i above), MOR entrusted an independent monitoring agency (external monitor) to undertake the external resettlement and social M&E work. As agreed with ADB, 1 external M&E report on resettlement, 2 evaluation reports on social development and gender, 1 completion report on resettlement, and 1 postevaluation report for both resettlement and social impact were prepared and submitted. These reports described the resettlement organizations, compensation standards, resettlement implementation, as well as social and gender issues, especially the detailed records of the field investigation. However, the PCR found that much of the reporting was anecdotal and with no systematic analysis of resettlement impacts, implementation issues and results, as required by ADB. It attributed the problem to the long length of the alignment and the very small budget for M&E paid by MOR. Despite the shortcomings with the external analysis, the PCR concluded that documentation provided by the external monitor was a significant improvement from earlier transport projects in the PRC.

#### **G. Other (e.g., safeguards, including governance and anticorruption; fiduciary aspects; Government assessment of the Project, as applicable) (PCR assessment and validation)**

There appear to have been some shortcomings regarding safeguards, as described previously. There do not appear to have been any major issues regarding governance and corruption. Fiduciary aspects appear to have been well handled.

<b>H. Ratings</b>	<b>PCR</b>	<b>OED Review</b>	<b>Reason for Disagreement/Comments</b>
Relevance:	Highly relevant	Highly relevant	
Effectiveness in Achieving Outcome:	Highly effective	Highly effective	
Efficiency in Achieving Outcome and Outputs:	Highly efficient	Highly efficient	
Preliminary Assessment of Sustainability:	Highly likely	Likely	Maintenance sustainability is highly likely but benefit sustainability is less likely for reasons stated in D(iv).
Borrower and EA:	Satisfactory	Satisfactory	
Performance of ADB:	Satisfactory	Satisfactory	
Impact:	Positive	Positive	
Overall Assessment:	Highly successful	Highly successful	
Quality of PCR:		Satisfactory	

#### **I. Comments on PCR Quality**

Overall, the PCR was reasonably comprehensive. The following are a few comments for consideration:

- (i) The PCR quality could have been improved. For example, although para. 6 lists the outputs targeted at appraisal, it does not confirm that these have been achieved. This confirmation is provided much later in the document.

- (ii) While it has been assumed that the three operating railway administrations are capable of operating and maintaining the additional link, there was limited evaluation of their capabilities.
- (iii) There was no mention of the land temporarily acquired during project construction and its subsequent disposition.
- (iv) It is not clear how the economic costs were derived, especially considering how close they are to financial costs.
- (v) The data regarding link and access roads could have been consistently presented in one section.
- (vi) The underlying reasons causing the shortage of wagons could have been better analyzed.
- (vii) The PCR was sometimes inconsistent (see para. 48, also Table A3.1 that shows ADB financing local costs). Table A7.3 is incorrect.
- (viii) The economic evaluation expects sustained traffic growth and shows continuing capital costs occurring during the project life. It is unclear what these additional costs were for (e.g., new wagons, line expansion in congested areas, or other capital expenditures). Clarification would be useful.

#### **J. Recommendation for OED Follow-Up**

No follow-up action required.

#### **K. Data Sources for Validation**

- (i) PCR, RRP, legal documents, Government's PCR, TA completion reports;
- (ii) Management review meeting and staff review committee documents and summary record of discussion of ADB's Board of Directors;
- (iii) Board reports and other progress reports;
- (iv) project administration memorandum and list of archived documents;
- (v) supervision reports, including most recent midterm review or progress reports, and back-to-office report of PCR Mission, etc.; and
- (vi) OED evaluations of previous projects, including PCR reviews.

## **REGIONAL DEPARTMENT'S RESPONSE TO THE PROJECT COMPLETION REPORT VALIDATION REPORT**

On 25 April 2008, Director, OED2, Operations Evaluation Department (OED), received the following comments from the Transport Division, East Asia Department.

We have reviewed OED's earlier draft Project Completion Report (PCR) Validation Report circulated to us on 30 October 2007. We appreciate that our comments made on the earlier draft have been adequately incorporated in the final draft. Therefore, we have no formal comment to make on the final draft, except a clarification on the rating of preliminary assessment of sustainability.

The PCR Validation Report qualifies rating for sustainability of the Project as "likely", reflecting that maintenance sustainability is highly likely but benefit sustainability is less likely. For the shortage of wagons to limit benefit sustainability, ADB had pointed out during trial operation stage the railway was unable to meet the demand. However, the current traffic flows in both up and down directions are quite balanced, indicating no wagon dispatching problems on this route. Though shortage of wagons on a national network was noted as an issue, this is being resolved through policy dialogue with Ministry of Railways as well as use of innovative approaches of using double-stack container flat wagon, high capacity freight car, and double-decker passenger cars.