Performance Evaluation Report

Pakistan: Punjab Road Development Sector Project

Independent Evaluation ADB

Performance Evaluation Report
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Independent Evaluation ADB

Note: In this report, "$" refers to US dollars.

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The guidelines formally adopted by the Independent Evaluation Department (IED) on avoiding conflict of interest in its independent evaluations were observed in the preparation of this report. To the knowledge of the management of IED, there were no conflicts of interest of the persons preparing, reviewing, or approving this report.

Abbreviations

ADB	–	Asian Development Bank
CWD	–	Communication and Works Department
EIRR	–	economic internal rate of return
HDM	–	highway development and management
IED	–	Independent Evaluation Department
IEM	–	independent evaluation mission
IRI	–	International roughness index
km	–	kilometer
PCR	–	project completion report
PEC	–	project engineering cell
PPG	–	Punjab provincial government
RAR	–	rural access road
TA	–	technical assistance
VOC	–	vehicle operating cost

Currency Equivalents

Currency unit – Pakistan rupee/s (PRe/PRs)

At Appraisal	At Project Completion	At Independent Evaluation
(September 2002)	(December 2008)	(December 2012)
PRe1.00 = $0.0169	$0.01464	$0.0104
$1.00 = PRs56.00	PRs59.00	PRs95.94

Contents

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Basic Data

Loan 1928: Punjab Road Development Sector Project

Key Project Data ($ million)	As per ADB Loan Documents	Actual
Total project cost	222.1	261.6
Foreign exchange cost	105.6	na
Local currency cost	116.5	na
ADB loan amount/utilization	150.0	82.8
ADB loan cancellation		67.2

ADB = Asian Development Bank, na = not available.

Key Dates	Expected	Actual
Fact finding		
Appraisal		3–9 April 2002
Loan negotiations		29 Sept–1 October 2002
Board approval		31 October 2002
Loan agreement		26 March 2003
Loan effectiveness	26 June 2003	26 June 2003
First disbursement		19 December 2005
Loan closing	31 December 2008	2 September 2009
Months (effectiveness to closing)	165	174

Borrower	Islamic Republic of Pakistan
Executing agency	Communication and Works Department, Punjab

Mission Data

Type of Mission	No. of Missions	No. of Person-Days
Project administration		
Inception	1	17
Review before midterm	5	37
Midterm review	1	37
Review after midterm	6	41
Pre-project completion	1	8
Project completion	1	16
Independent evaluation	1	24

Executive Summary

The project performance evaluation report presents the findings of an evaluation of the Punjab Road Development Sector Project in Pakistan, which was approved on 31 October 2002. The project aimed to (i) improve the rural access road network, increase access to markets and social services for rural populations, and reduce rural poverty; (ii) improve important provincial highways to facilitate trade and provide better income and employment opportunities; (iii) support organizational reforms and institutional strengthening of the Punjab Communication and Works Department (CWD); (iv) preserve road infrastructure and improve asset management by increasing the planning and budgeting capacity at the CWD; (v) improve road maintenance management and create a provincial road maintenance funding mechanism; and (vi) increase private sector participation in road infrastructure development and maintenance.

At the time the project was designed, Pakistan underwent a period of macroeconomic instability. Successive years of fiscal and external deficits had resulted in accumulation of large domestic and external debts. Far-reaching reforms focusing on macroeconomic stabilization, debt rescheduling, and an economic restructuring initiative brought relief. Such reforms were at the centre of the project. The project was to support them by, among other things, improving the country's trade competitiveness. Improvements to physical infrastructure were expected to help reduce Pakistan's high trade transaction cost. In addition, the government embarked on sector programs to address national and provincial policy issues.

The project focused on Punjab Province because it suffered from inadequate connectivity and many sections of the provincial road network were in poor condition. The Punjab provincial government took measures to minimize institutional constraints and give attention to some key road sector policy issues, especially road maintenance and private sector involvement. The project design and outputs were consistent with the government's transport sector policy framework and its strategic objectives, which were defined in the Transport Sector Strategy and the Transport Sector Development Initiative that had been developed in collaboration with the World Bank. The country assistance plan of the Asian Development Bank (ADB) envisaged a principal focus on roads, and the project was the first such intervention.

ADB provided a loan of $150 million from its ordinary capital resources, of which $82.8 million was disbursed. Overall, the performance of the project is rated *less than successful* on the basis of the individual ratings—*relevant, less than effective, efficient,* and *less likely sustainable.* In addition, the impact on institutions was deemed negligible, and both ADB's and the borrower's performance was rated *less than satisfactory.*

The following issues have been identified:

Project design. Project quality at entry could have been better. The quality of project formulation is questionable in view of the low original cost estimates and the substantial cost overruns incurred by the civil works, which could have been avoided by taking into account contract prices of a previously completed project. The seemingly

low ownership by the Punjab provincial government of the envisaged institutional and policy reforms should have been mitigated by more thorough baseline analysis of the institutions involved. Instead, key components of institutional development were specified by consultants in the course of project implementation. As none of the institutional capacity building components targets was realized, the expected outcome of a more efficient provincial transport sector was not achieved.

Sector loan approach. Given the wide geographic coverage of the road subprojects and the range of policy and institutional issues, a sector approach was adopted for the project. In hindsight, the chosen approach appears inappropriate. The approach was predicated on:

(i) the existence of a prioritized investment—a condition that was met;
(ii) sufficient implementation capacity of the CWD—a condition that was not met. While the CWD had general experience in carrying out civil works contracts, it had only limited knowledge of ADB's processes and procedures. This applied especially to ADB safeguard requirements; and
(iii) the design of the project containing institutional and policy reforms—was met—however, the commitment to implement the reforms was not evident. Another challenge was that it fell to the CWD to identify, select, and prepare the rural access road subprojects, which had to conform to numerous criteria.

Managing for development results. Adherence to the original loan closing date while the project was incomplete is the main project-related issue. ADB chose to close the project at a time when implementation had just gained momentum. It appears that portfolio management reasons have led to this decision. Pakistan's active portfolio of ADB loans at that time contained about 80 projects, many of which did not perform well. This led to a comprehensive spring-cleaning exercise and the introduction of a no-extension policy for projects and technical assistance (TA) with a low probability of success. The project's "probability of success" was not specifically assessed. The adopted approach to project closure followed summary procedures rather than a strategic winding down. A strategic winding down would involve an analytical process focused on opportunities to be gained or lost and, as importantly, on the detailed lessons drawn from the causes that made the project a winding-down case.

Lessons

The project provides lessons relating to project preparation and quality at entry, and for closing a poorly performing project:

(i) Assess the country context, notably the political situation, as a potential risk at the project design stage.
(ii) Ensure robust cost estimation and due diligence during project design, taking into account realistic base costs and adequate price escalation factors.
(iii) Ensure thorough diagnostics of the institutional and policy environment before embarking on a complex reform program.
(iv) Limit such a program to fewer but better justified components.
(v) Consider realistic timelines for project implementation, taking into account that institutional and policy components typically take longer to complete than the physical components.

(vi) Make full use of ADB's knowledge and review the experience of completed projects, particularly when they are in the same country and sector.

(vii) Consider ADB's role as a development institution, and the development impact to be achieved, when having to decide on the closure of an ongoing project.

(viii) Define the criteria in support of a decision to close incomplete projects.

CHAPTER 1
Introduction

1. The following chapter summarizes the purpose of the evaluation, states the results of departmental self-evaluation through a project completion report (PCR), and provides details of the project to be evaluated.

A. Evaluation Purpose and Process

2. The performance evaluation report for the Punjab Road Development Sector Project[1] is included in the work program of the Independent Evaluation Department (IED) for 2013.[2] The project was evaluated according to the project performance evaluation guidelines of the Asian Development Bank (ADB),[3] based on relevance, effectiveness, efficiency, sustainability, and impact. The report aims to provide lessons and recommendations to future ADB operations in Pakistan.

The project area was mostly in lower and middle Punjab, where the poverty ratio was about 38%

3. The project completion report (PCR)[4] had rated the project *highly relevant, less effective, less efficient,* and *less sustainable.* The PCR's overall rating of the project is *partly successful.* It should be noted, however, that the project was not complete when the PCR was prepared. The coverage of the PCR was limited to the implementation activities of the project up to the physical completion in 2008, rather than the additional 3-year period, during which the project was substantially completed without ADB support.

4. An independent evaluation mission (IEM) visited Pakistan duing 3–12 December 2012 to evaluate the performance of the project. In completing this report, the views of relevant ADB departments and offices and those of the government and executing agency have been considered and incorporated where relevant.

B. Expected Results

5. The project was expected to contribute to sustainable economic development and poverty reduction. The project area was mostly in lower and middle Punjab, where the poverty ratio was about 38%. According to the poverty impact assessment undertaken in connection with the project, the project was to directly benefit about 2.6 million road users, of which an estimated 1 million were poor people. The project's intended impact was therefore poverty reduction. The project's outcomes were (i) deepened institutional reform and organizational change at the Communication and Works Department (CWD) of the Punjab provincial government (PPG), (ii) strengthened

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[1] ADB. 2002. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Islamic Republic of Pakistan for the Punjab Road Development Sector Project.* Manila.

[2] This project is underrated concurrently with the Road Sector Development Program but in separate performance evaluation report..

[3] IED. 2006. *Guidelines for Preparing Performance Evaluation Reports for Public Sector Operations.* Manila: ADB.

[4] ADB. 2009. *Project Completion Report: Punjab Road Development Sector Project (Loan1928-PAK).*

institutional capacity in road maintenance, (iii) stable funding for road maintenance, (iv) improved road safety, and (v) improved axle-load control. The updated design and monitoring framework is in Appendix 1 .

6. The project's outputs were to consist of (i) 302 kilometers (km) of rehabilitated provincial highways and 1,100 km of rehabilitated and improved rural access roads (RARs), (ii) introduction of a roads policy framework and action plan, and (iii) various measures for capacity building at the CWD with a view to improving sector governance and efficiency.

CHAPTER 2

Design and Implementation

7. This chapter summarizes details related to the design of the project, including its rationale, the way the project was formulated, and the resource assumptions underlying the project design. The purpose of the chapter is to allow an assessment of how project quality-at-entry was assured. The chapter also compares implementation arrangements as designed and as actually adopted.

A. Rationale

8. Punjab is Pakistan's most populated and economically significant province. When the project was designed, many parts of Punjab suffered from inadequate connectivity and many sections of the provincial road network were in poor condition. Improvement of provincial highways and RARs was therefore considered essential to enhance transport and communication between the rural population and market centers, and also contribute to poverty reduction and creation of employment opportunities. Given the wide geographic coverage of the roads in need of improvement and the range of pending policy and institutional issues, a sector approach to road development was adopted. The PPG had initiated measures to minimize institutional constraints at the CWD and solve some key policy issues, especially regarding road maintenance and private sector involvement. When the project was designed, major tasks awaiting completion included (i) deepening the institutional reform and organizational changes at the CWD, (ii) strengthening institutional capacity in road maintenance, (iii) securing stable funding for road maintenance, (iv) improving road safety, and (v) improving axle-load control.

At design, many parts of Punjab had inadequate connectivity and many sections of the provincial road network were in poor condition

9. The project design and outputs were consistent with the government's transport sector policy framework and its strategic objectives, which were defined in the Transport Sector Strategy and the Transport Sector Development Initiative that had been developed in collaboration with the World Bank. ADB's country assistance plan envisaged a principal focus on roads. The plan observed that past sector investment had not kept step with the demands of greater mobility and trading opportunities.[5] Moreover, resource constraints had led to inadequate road rehabilitation and maintenance, resulting in rapidly deteriorating roads and an ever-increasing maintenance backlog. ADB's strategic priority was to be accorded to the development of the provincial road networks, including rural roads. The country assistance plan focused on Punjab province, as its share of the country's provincial road network accounted for about 54% of Pakistan's total network.

B. Formulation

10. The design of the project combined physical road improvements with policy and institutional reforms, both focusing on the PPG. As such, the project reflected a

[5] ADB. 2000. *Country Assistance Plan: Pakistan, 2001–2003.* Manila.

departure from the earlier strategy that would typically involve all four provinces under a single project and focus on a single road type. The policy component of the Road Sector Development Program, approved in 2001, included a comprehensive road subsector reform program for the central government, which was intended to provide a blueprint for reforms in other provinces.[6] The reforms centered on (i) improving road maintenance to preserve the assets and increase road safety, (ii) controlling truck overloading, (iii) carrying out institutional reforms of road agencies to achieve greater service efficiency, and (iv) increasing private sector involvement to help relieve development funding constraints and further enhance efficiency.

The policy component included a comprehensive reform program for the central government to provide a blueprint for reforms in the provinces

11. Project formulation benefited from available domestic and international expertise, and active participation of and coordination with counterpart institutions, affected people, and development partners. The seven provincial highway sections (footnote 12) were part of the provincial road master plan and were assessed under a series of ADB technical assistance (TA) projects.[7] The selection of the RARs involved consultation with officials from the newly established district administrations, nongovernment organizations, public representatives, road users, and poor people living along or near the roads. It is unclear, however, whether the preparatory work based on mainly small-scale TA projects was adequate to ensure quality at entry. In hindsight, given the substantial cost overruns, the CWD's institutional weaknesses, and the PPG's wavering ownership of the envisaged reforms, the quality of project formulation is questionable.

12. The rehabilitation of the roads followed a sector approach, which according to the ADB policy for such loans required that (i) a prioritized investment plan existed, (ii) the CWD had the necessary implementation capacity, and (iii) the design of the project included institutional and policy reforms. Implementation was also predicated on the CWD's capacity to identify, select, and prepare the subprojects. The eligibility criteria for the RARs were challenging, as each road would have to (i) be economically viable; (ii) be screened for environmental impacts; (iii) be selected based on prioritized district development ranking; (iv) be selected and designed to avoid or minimize resettlement, with a resettlement plan prepared where needed; (v) be part of the provincial road master plan; (vi) comply with all applicable ADB guidelines; and (vii) have the commitment of the districts to allocate resources for operation and maintenance of the roads under their purview.

13. The institutional development component also drew on the results of TA provided by ADB to the PPG (footnote 7). The component centered on a capacity-building and organizational restructuring program that the PPG had approved in 2002.

C. Cost, Financing, and Executing Arrangements

14. Appendix 2 presents details of the original and actual project costs along with a comparison of the original and actual project scope. At appraisal, the cost of the project was estimated at $222.1 million. An ADB loan of $150 million equivalent was

[6] ADB. 2001. *Report and Recommendation of the President to the Board of Directors: Proposed Loans to the Islamic Republic of Pakistan for the National Highway Development Program.* Manila.

[7] ADB. 2001. *Technical Assistance to Pakistan for Institutional Reform and Road Maintenance Funding Study.* Manila; ADB. 2001. *Technical Assistance to Pakistan for Preliminary Engineering Update*. Manila; ADB. 2001. *Technical Assistance to Pakistan for Poverty Reduction Study*. Manila.

envisaged to contribute to the financing of the project. [8] The PPG was to contribute $72.1 million. When the project was completed, the total project cost amounted to $261.6 million—15.1% more than estimated at appraisal. ADB contributed $82.8 million to the financing of the completed project, accounting for 31.7% of the total cost and 44.8% less than the loan amount determined at appraisal (Table 1).

The low utilization of the loan is due to sluggish progress of preconstruction activities.

Table 1: Cost and Financing Arrangements ($ million)

Appraisal			Project Completion		
ADB	PPG	Total	ADB	PPG	Total
150.0	72.1	222.1	82.8	178.8	261.6
67.5%	32.5%	100.0%	31.7%	68.3%	100.0%

ADB = Asian Development Bank, PPG = Punjab provincial government.
Sources: Independent Evaluation Mission and Communication and Works Department, 2012.

15. The lower than envisaged utilization of the ADB loan is attributable to sluggish progress of preconstruction activities, which took almost 3 years. The time lost made it impossible to complete the scheduled civil works by the end of 2008. At the end of December 2007, physical progress had been only 4% compared with about 90% of elapsed implementation period.[9] Implementation gathered momentum in early 2008. However, at the end of 2008, when about 50% progress had been achieved under the committed civil works contracts, the utilization period of the ADB loan expired. As ADB was unwilling to extend the loan closing date,[10] the CWD forwent about 45% of the original loan amount. It continued project implementation using its own resources. By mid-2011 the CWD had managed to complete 92% of the original provincial road component and about 29% of the RAR component. The cost of completed civil works exceeded the original estimates by a wide margin—for the provincial roads they were triple, and for the rural roads almost double the appraisal estimates (Table 2).

When about 50% progress had been achieved under civil works contracts, the loan utilization period expired

Table 2: Changes in Project Scope and Costs

	Appraisal		Project Completion		Changes	
Project Component	Length km	Unit Cost $ mln/km	Length KM	Unit Cost $ mln/km	Length %	Unit Cost %
Provincial roads	302	0.234	278.5	0.665	(8)	184
Rural access roads	1,100	0.106	319.9	0.198	(71)	87

( ) = negative, km = kilometer, mln = million.
Source: Independent Evaluation Mission and Communications and Works Department, 2012.

16. The main factors that contributed to the cost overruns were:

(i) The relatively long time that had elapsed between project approval and start of construction, and the concomitant price increases of all key construction inputs that occurred during the intervening period.
(ii) Limited availability of contractors and shortage of skilled and unskilled labor.
(iii) The slow provision of local funds after the ADB loan was closed. As funds could often not be provided when they were needed, contractors suspended their activities, leading to further construction delays and cost increases as the contractors had to be compensated for the idle

[8] A loan of ¥18,396,800,000 ($150 million equivalent) from ADB's ordinary capital resources was to be provided under ADB's London interbank offered rate (LIBOR)-based lending facility.
[9] The duration of the implementation period is measured from loan approval to the loan closing date.
[10] During project review missions in 2007 and 2008, ADB staff advised the Government of Pakistan of ADB's no-extension policy.

periods. The CWD has suggested that the civil works could have been completed a year earlier if funds had been available in a more timely fashion.

17. The CWD was the executing agency, and the chief engineer (projects) under the secretary of the CWD was responsible for project implementation. A project engineering cell (PEC) within the CWD was to be in charge of day-to-day management. A project director headed PEC and was supervised by the chief engineer (projects). A steering group chaired by the secretary of the CWD was to supervise the implementation of the project's policy framework and action plan.

18. PEC was assessed at appraisal to have experience with ADB-financed projects. Nonetheless, institutional strengthening was considered necessary to ensure smooth project implementation. To this end, PEC was to be supported by project management consultants as well as project construction supervision consultants. The consultants were also expected to expand implementation capacity at both the CWD and PEC, and to prepare project preparation and implementation manuals.

D. Procurement, Construction, and Scheduling

19. **Procurement.** The civil works under the provincial highways component were awarded through four contracts following international competitive bidding procedures among prequalified bidders in accordance with ADB's Procurement Guidelines. The RAR component was expected to entail about 50 contracts, each with an estimated value of $1.0 million–$2.5 million. For the 320 km of completed RARs, 20 contracts of about $3.1 million each were awarded. Initially, the RAR contracts were to be awarded using national competitive bidding among prequalified bidders, but later, because of poor participation in the prequalification process, post-qualification procedures were adopted. While this was intended to accelerate implementation, contracting capacities were not properly assessed—as would have been possible under prequalification procedures—resulting in poor performance and delays. Overall, awarding of contracts was more than 2 years delayed. While the loan became effective in June 2003, the contracts for the provincial highways component were awarded from July 2005 to October 2006, and those for the RAR component from September 2005 to May 2008. Three international and 38 national civil works contractors were prequalified. However, participation of prequalified national contractors in the actual bidding process turned out to be poor. Most of the bids received exceeded the engineer's estimate.

Project implementation suffered substantial start-up delays

20. **Construction and scheduling.** Project implementation suffered substantial start-up delays caused by (i) late establishment and mobilization of PEC; (ii) delayed procurement of civil works and consultancy contracts; and (iii) insufficient staffing (for PEC as well as the teams of management consultants and contractors). PEC not only suffered from insufficient staffing, but also from frequent staff changes. In fact, during the first 4 years of implementation, six different project directors were in charge of the project. Implementation efforts did not begin in earnest until late 2005. The PCR suggested that these factors reflected the PPG's lack of commitment in implementing the project. This view is supported by CWD international staff who worked on the project. Former ADB staff interviewed by the IEM suggested that high-level political interference in the awarding of contracts also caused delays.

21. A portion of the contract for the provincial highway Jhang–Shorkot–Kabirwala and Kabirwala–Mahni Sial was cancelled because of complex land acquisition issues.

Apparently, potential claimants could not be found or tracked down. Reportedly, ADB did not approve the CWD's proposal to deposit the funds for such uncertain claims in escrow.[11]

E. Design Changes

The project 's physical components were largely followed but institutional development measures were not done

22. The project designs determined at appraisal were largely followed. As to the civil works, the preliminary designs envisaged at appraisal were reflected in the detailed designs of the completed projects, albeit at a reduced scope. The pavement design for provincial roads was an asphaltic concrete wearing course and a four-lane carriage way. The rural roads were widened from 3 to 7 meters and received a triple surface treatment consisting of bitumen and aggregates. As to the design of the entire project, only the civil works component was implemented, while the capacity building component was largely disregarded.

F. Outputs

23. The project had three components: (i) capacity building, (ii) rehabilitation of provincial highways in the primary provincial road network, and (iii) rehabilitation of RARs in the secondary road network. Appendix 2 compares the original and actual project scopes.

24. **Capacity building**. The component was to (i) develop a road asset management system, (ii) provide essential information technology, and introduce the rehabilitate–operate–transfer concession and maintenance contracts. In addition, axle-load devices were to be installed and a traffic safety report system to be tested. The component also comprised consulting services for training, contract management, design, and construction supervision. This component was almost completely neglected. About 13% of it could be completed and was entirely accounted for by inputs to construction supervision for provincial and rural roads, as well as by a small input for design and engineering of rural roads. None of the envisaged measures for institutional development was taken. Thus the expected important initiatives on private concessions, asset management, road safety, axle-load control, and training were never started.

The only axle-load facility that was installed has fallen into disrepair

25. **Provincial highways**. This component aimed to (i) rehabilitate 302 km of provincial highways;[12] (ii) install weighbridges on those highways; (iii) improve road safety and axle-load control by improving highway design and operations, and auditing the road-safety design; (iv) install a pilot accident reporting center; and (v) provide consulting services for construction supervision. About 91% of the civil works were completed. The only axle-load facility that was installed has fallen into disrepair. The scale was installed at the center of one lane as a drive-over facility. In practice, this design turned out to be a major impediment, slowing down traffic and creating congestion at peak hours.

26. **Rural access roads.** This component included (i) rehabilitating about 1,100 km of RARs, with priority to be accorded to a core program of 88 km; (ii) improving road safety by ensuring better road design and audits of road-safety measures; and (iii)

[11] ADB's Policy on Indigenous Peoples (1998) does not explicitly exclude this solution.

[12] Seven provincial highway sections on four highways were to be rehabilitated: (i) Pindi Bhattian–Chiniot, 36 km; (ii) Jhang–Shorkot, 37 km; (iii) Kabirwala–Shorkot, 7 km; (iv) Kabirwala–Mahni Sial, 14 km; (v) Kamalpur–Chiniot–Sargodha, 73 km; (vi) Sargodha–Khushab, 44 km; and (vii) Jhang–Toba Tek Singh–Chichawatni, 91 km.

providing consulting services for supervising construction. Out of the total RAR program, about 320 km (29% of target) were completed.).

Out of the total RAR program, about 320 km (29% of target) were completed.

G. Consultants and Contractors

27. **Consultants.** Consulting inputs were estimated at appraisal to amount to 176 person-months of international and 7,100 person-months of domestic services, all of which were to be financed from the loan. There was no TA associated with the project. The consulting inputs consist of three components:

(i) 100 person-months of international and 6,650 person-months of national consultants for detailed design and construction supervision. The services were to be provided by two firms, one for the provincial highway component and the other for the RAR component.

(ii) 60 person-months of international and 220 person-months of national consultants for project management, supervision of consultants under the institutional development component, coordination and support services to PEC, including preparation of subprojects for the RAR component. An international firm in association with a domestic firm was to provide the services.

(iii) About 16 person-months of international and 250 person-months of national consultants were estimated to be required for institutional development and capacity building. Individual consultants and a national consulting firm were to be selected to carry out the services. The national firm was expected to advance the development of a road asset management system that in some rudimentary form existed at the CWD. It is noteworthy that detailed terms of reference for other consulting services for this component were largely incomplete at appraisal and were to be developed during implementation by the project management consultants under (ii) above.[13]

The Communication and Works Department rated the performance of the project management consultants as poor

28. The CWD rated the performance of the project management consultants as poor. It was generally dissatisfied with those engaged for detailed designs and construction supervision. Problems were encountered in finding qualified staff for the consulting teams. Supervision of construction was apparently unsatisfactory because the number of engineers employed to supervise sites that were spread over a wide area was insufficient, often resulting in poor quality of civil works. Inaccurate designs prepared by the design consultants led to lengthy revisions. The international firms did not deploy staff on time, staff turnover was high, and the consultants displayed limited commitment to getting the work done, citing unsatisfactory contract conditions. The team leader of the international project management consultants did not join the team because of security concerns. According to the CWD, the national consultants performed better than the international consultants.

29. The PCR assessed the consultants' overall performance as partly successful. First, the inputs produced few benefits compared with the appraisal targets. The CWD noted the following deficiencies in consultant performance: (i) inconsistency, discontinuity, and high staff turnover; (ii) inadequate quality of staff replacements; (iii) insufficient staff support at subproject level; (iv) consultants' overall poor performance; (v) low standard of consulting services; (vi) delays in decision making and approval processes;

[13] Terms of reference had only been prepared for one subcomponent—strengthening the road safety environment and social assessment cell.

and (vii) poor quality and inadequate content and context of progress monitoring reports.

30. **Contractors.** The CWD was generally satisfied with the performance of international contractors. In contrast, local contractors did not perform well. Their shortcomings concerned (i) work planning and execution; (ii) holding of sufficient equipment and working capital; (iii) retaining of staff; (iv) management of construction materials and their supply; (iv) equipment maintenance; and (v) handling of occasional security issues near selected project sites. Given the shortcomings and the ensuing implementation delays, the PCR suggested that most of the contractors counted on an extension of the implementation period, for which there is no hard evidence. A new and experienced project director had been appointed and the bidding process accelerated. There is some evidence, that the civil works gained momentum with the date of loan closing approaching.

The Communication and Works Department was generally satisfied with the performance of international contractors

H. Loan Covenants

31. The PPG and the CWD had to comply with 39 covenants, of which 26 were fully and 10 partly complied with. Only one covenant was not complied with. Two covenants were not applicable. Most of the standard covenants were fully complied with. Of those only partly complied with, most related to environmental, social, financial, and economic obligations. The borrower did not comply with the covenant to cause the CWD to carry out a safety audit for the provincial highways and core rural roads during project implementation, and to develop recommendations to be used for other roads in Punjab by December 2005. Details on compliance with loan covenants are in Appendix 3.

I. Policy Framework

32. **Macroeconomic conditions**. During 2000–2001, when the project was designed, Pakistan experienced severe macroeconomic instability. Successive years of fiscal and external deficits had resulted in accumulation of large domestic and external debts. In 2000, the country's ratio of all foreign exchange obligations to foreign exchange earnings stood at over 300%. The subsequent debt rescheduling reduced this ratio to about 30%. Complementary reforms included a far-reaching macroeconomic stabilization and restructuring initiative. The project was to support this initiative by, among other things, improving the country's trade competitiveness. Pakistan's foreign trade had been imbalanced as imports exceeded exports by a large margin, especially due to cancellation of export orders and withdrawal of foreign direct investment as a result of the events in September 2001. Improvements of physical infrastructure, notably roads, were expected to help reduce Pakistan's high trade transaction cost. In addition, the government, supported by donors, embarked on sector programs to address national and provincial policy issues. Such reforms were at the center of the project.

33. After elections in October 2002, new federal and provincial governments were formed in November 2002. The federal government and the highest political levels in the provincial governments reaffirmed their commitment to the ongoing governance and economic reform program, as well as the policy emphasis on macroeconomic stability, poverty reduction, and growth. However, continuing pressure for populist policies exerted by the opposition have affected the reform efforts and caused

Provincial governments manage about 93,000 km of roads. Provincial roads are of worse quality than national roads

continuing political uncertainty in the country.[14] A noteworthy development is the 18th Constitutional Amendment, which was passed in April 2010. As a result, the provincial shares in national revenues have increased significantly and so have allocations to provincial roads.[15] This is reflected in increasing allocations to development works (since 2010 by about 14% per year), while maintenance budgets have not discernibly benefited from the constitutional change. In addition, available resources have been spread over a large number of projects and longer implementation periods, causing implementation delays, cost overruns, and a reduced development impact.[16]

34. **Road maintenance.** Provincial governments manage about 93,000 km of roads. However, the condition of large parts of the road network is poor, and provincial roads are of worse quality than national roads. A maintenance report indicated that 90% of provincial roads in Punjab need rehabilitation or reconstruction.[17] The funds provided from provincial budgets for road maintenance and rehabilitation are inadequate. The yardstick for the cost of routine maintenance in Pakistan for a 4-meter-wide road is about PRs40,000 per km ($420) per annum, which is not adequate. International experience indicates an appropriate maintenance level of about $1,000 per km. The central government has recognized that the main emphasis should be given to maintaining all categories of roads, which would require adequate and stable funding.[18] In the provinces, this has not been happening and maintenance backlogs have mounted in most provinces. The current allocation for routine maintenance in Punjab Province is about $650 per km, which is above the national yardstick, but lower than needed. In addition, the CWD has not created an asset management system or the organizational setup to operate such a system. The distribution of funds to individual roads is based on certain benchmarks and traffic. It is, however, unclear what maintenance has to be covered by the allocation of $650 per km—routine maintenance only, or routine and periodic maintenance. Table 3 shows the resource allocations to roads over the last 5 years. The development budget has grown substantially in both nominal and real terms. Maintenance allocations have been erratic and have dropped in real terms.

The allocation for routine maintenance is about $650 per km, which is above the national yardstick, but lower than needed.

Table 3: Punjab Provincial Government Resource Allocations to Provincial Roads

(PRs million)

Nominal	FY2007	FY2008	FY2009	FY2010	FY2011
Development Works	14,300.0	17,500.0	25,000.0	32,885.0	36,650.0
Maintenance	1,321.2	1,868.3	1,494.6	2,029.7	1,426.1
Real (FY2008=100)					
Development Works	14,300.0	14,583.3	17,349.1	20,212.0	21,197.2
Maintenance	1,321.2	1,556.9	1,037.2	1,247.5	824.8

Note: Fiscal year is from July of the present year to June of the following year- e.g. FY 2007 is July 2007 to June 2008.
Sources: Independent Evaluation Mission and Communication and Works Department, 2012.

[14] ADB. 2003. *Country Strategy and Program Update 2004–2006: Pakistan*. Manila.
[15] Amendment XVIII of the Constitution of Pakistan was passed by the National Assembly of Pakistan on 8 April 2010, removing the power of the President of Pakistan to dissolve the Parliament unilaterally, turning Pakistan from a semi-presidential to a parliamentary republic.
[16] Evidence for spreading resources thinly is given by the high ratio of carry-forward amounts to allocations for ongoing projects. The ratio has risen from 4.4 in 2006–2007 to 11 in 2010–2011, which implies that it will take up to 11 years to complete ongoing projects. Planning Commission. 2011. *Analysis and Review of the Provincial Sector Development Project*. Islamabad.
[17] Annual maintenance plan for fiscal year 2006/07.
[18] For national highways, National Highway Authority has established the dedicated Road Asset Management Directorate to oversee maintenance operations.

35. **Road safety.** The fatality rate on Pakistan's road network remains among the highest in Asia. The causes are high speeds, lack of road safety measures, poor discipline and enforcement, and poor condition of vehicles. Road safety audits are not conducted routinely for all new and rehabilitated roads. The road safety problem is exacerbated by lack of awareness and poor knowledge of road safety matters among the public in general and the road users. Efforts and coordination within the PPG are not concerted, and responsibilities and accountability among the departments of the PPG are unclear. Extensive efforts in education and training of drivers, coupled with awareness building, are required to bring down the high fatality rate. Apart from sporadic public awareness campaigns, there have not been improvements to this situation. The rapidly growing traffic, as also reflected in the traffic figures for the project roads, may have worsened the problem. The design of the project roads would have benefited from better safety measures such as provision of signage and separating lines on the pavement.

The opportunities for private sector participation in road infrastructure projects are greater in Punjab than elsewhere in Pakistan due to higher traffic volumes

36. **Private sector participation.** The opportunities for private sector participation in road infrastructure projects are greater in Punjab than elsewhere in Pakistan due to higher traffic volumes. The role of the domestic private sector in road contracting and provision of engineering services is fairly well developed. The PPG has taken several steps to increase private investment, including the establishment of a private sector cell in the Planning and Development Department. The CWD has limited experience in contracting out maintenance and thus the share of private sector participation in its operations could increase greatly, and network management and performance-based contracts for maintenance could be achieved. However, procurement documentation that could guide agencies like the CWD in applying the concept is not available. There is therefore a need for developing such guidance material.

CHAPTER 3

Performance Assessment

37. The following chapter rates the performance of the program based on individual evaluation criteria as explained below.

A. Overall Assessment

38. The project is rated *less than successful*, based on a review of its relevance, effectiveness, efficiency, and sustainability, and on separate assessments of the project components. The total performance rating is based on four criteria, which are equally weighted at 25% each: relevance, effectiveness, efficiency, and sustainability. Individual criterion ratings are in the range from 0 to 3. Table 4 presents the ratings for the project's overall performance assessment.

Table 4: Overall Performance Assessment

Criterion	Rating	Weighted Rating	Description
1. Relevance (25%)	2.0	0.50	Relevant
2. Effectiveness (25%)	1.0	0.25	Less than effective
3. Efficiency (25%)	2.0	0.50	Efficient
4. Sustainability (25%)	1.0	0.25	Less Likely
Total	**1.5**		**Less than successful**

Overall Rating: Highly successful (HS) >2.7; 2.7 < successful (S) >1.6; 1.6 < less than successful (LS) ≥ 0.8; unsuccessful (US) < 0.8.
Source: Independent evaluation mission.

B. Relevance

The physical components were consistent with the government's strategy and program for rehabilitating provincial highways and the development of rural roads

39. The project is rated *relevant.* The rating considers the (i) relevance to the country's priorities and ADB's country and sector strategies, (ii) extent to which the project was designed to achieve the intended impact and outcome, and (iii) the past and current significance of the project with respect to the country's priorities. The physical components were consistent with the government's strategy and program for rehabilitating provincial highways and the development of RARs. They were also consistent with the ADB country strategy. The project's regional focus on Punjab Province was justified by the significance of the province in terms of population, economic activity, and poverty incidence.

40. The challenges confronting the CWD during implementation, notably the alleged political interference in the bidding process for national contractors, have demonstrated the need to reform the CWD, and the relevance of the capacity development component. In hindsight, however, it appears doubtful whether the chosen approach of sector lending was relevant and appropriate to the existing institutional conditions. With key elements of institutional development were to be specified by consultants in the course of project implementation makes it somewhat difficult to assess how relevant this component was.

41. While the project documentation refers to a series of studies and a small-scale TA for engineering as the basis for project preparation, it is unclear to what extent—or whether at all—feasibility studies were carried out well. The low cost estimates for civil works are evidence that project preparation was not thorough. It could have been a matter of routine to assess the contract prices of a similar project that had just been completed.[19]

42. Another factor was the PPG's limited commitment to the project. The policy and reform initiatives would have required stronger commitment, dedication, encouragement, and incentives for the envisaged changes to occur. On the other hand, leaving a major part of the institutional development and capacity building component undefined and expecting consultants to work out the details during implementation has proven to be ineffective in achieving the expected outcome

C. Effectiveness

Leaving a major part of the institutional development and capacity building component undefined has proven to be ineffective

43. The project is rated *less than effective*. The main expected outcome would have been a more efficient and sustainable provincial transport sector.[20] The physical project components have contributed toward achieving the outcome. Overall, however, the rate of achievement has been much below expectations, particularly regarding the institutional development support, capacity building, and institutional reforms, which have achieved no results and were ineffective. Major factors responsible for the assessment include the following considerations:

(i) In capacity building, several measures for institutional development were envisaged. However, the expected important initiatives on private concessions, asset management, road safety, axle-load control, and training were not started.

(ii) The civil works for the provincial highways component were 91% completed. Problems ensued however when the only axle-load facility was damaged, causing major traffic congestions in the area.

(iii) Of the total rural access program, about 320 km were completed. This represented only 29% of the overall target, although it was beyond the scope of the 88 km core program.

(iv) Given the poor implementation progress, ADB had the choice to abandon an incomplete project at loan closing, or to stay engaged. ADB decided to let the project come to a close. Although the CWD had recommended an extension,[21] ADB did not entertain the option for extending the loan, putting the balance of loan funds to proper use, and increasing the development impact of the project (footnote 10). Effective management for development results could have meant restructuring the project and extending the loan closing date.[22]

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[19] ADB. 2002. *Project Completion Report on the Provincial Highways Project (Loan 1185-PAK [SF]) in the Islamic Republic of Pakistan*. Manila. That project was completed in November 2002 (the last civil works contract ended in 1999). It also included provincial roads in Punjab Province. The actual construction costs of that project were $0.36 million per km, compared with the cost estimates of $0.22 million per km for the project that is being evaluated in this report.

[20] As the project used a project framework (rather than a design and monitoring framework), the outcome is derived from the framework's "goals" and "purposes".

[21] CWD. 2008. *Case Study on Impediments and Causes of Delay in Implementation of ADB Loan No. 1928-PAK*. Lahore.

[22] The World Bank—being faced with a very similar situation—chose to stay engaged and restructure the project, focusing on components that were achievable and cancelling others.

D. Efficiency

44. The overall project is rated *efficient*. This assessment is based on the combined rating of the efficiency of (i) the completed civil works and (ii) the institutional development component. The ratings are discussed below:

The rehabilitation of the provincial highways and rural roads as completed is rated highly efficient

45. The rehabilitation of the provincial highways and RARs as completed is rated *highly efficient*. The economic internal rates of return (EIRRs) of the completed provincial and rural road sections, which the IEM recalculated, have exceeded both the appraisal and project completion estimates. The IEM has used information on the physical conditions of the project road sections, current and anticipated traffic, and vehicle operating costs to recalculate the EIRRs as the principal indicators for efficiency. The recalculated EIRR for the entire provincial road component is 34.1% and for the completed RARs it is 28.5%. The results are substantially above the appraisal EIRRs (19.9% and 21.5%), and also above the values in the PCR (30.6% and 21.4%). The differences are attributable to a better than expected development of traffic, and likely also to different evaluation assumptions.[23] The results of the highway and rural road sections are compared in Table 5. Details of the revised economic evaluation are in Appendix 4.

Table 5: Results of Economic Evaluation – Economic Internal Rates of Return (%)

	Appraisal	PCR	PPER
Provincial Highways			
Pindi Bhattian–Chiniot–Kamalpur	23.6	35.3	18.7
Jhang-Shorkot–Kabirwala	16.3	26.6	19.1
Chiniot–Sargodha–Khushab	28.0	36.7	61.8
Jhang–Toba Tek Singh–Chichawatni	15.5	23.7	25.6
Total Project	19.9	30.6	34.1
Rural Access Roads			
Shorkot City–Shorkot Cantt	20.0	14.5	26.5
Mian Channu–Talamba	16.4	25.4	39.4
Bahawalnagar–Bhukan	21.2	17.8	24.1
Phallia–Kuthiala Sheikhan	30.6	17.4	na
Sheikhupura–Hafizabad	19.1	18.3	29.3
Rasool Barrage–Mandi–Malikwal–Bhera		22.0	62.3
Phallia–Bherowal–Warryam–Sial Morr–Ahmad Nagar		28.9	29.9
Girot–Adhikot–Kaloor Kot		26.9	9.3
Total Project	21.5	21.4	28.5

na = not available, PCR = project completion report, PPER = project performance evaluation report.
Sources: Independent evaluation mission, project completion report, and report and recommendation of the President.

46. The institutional development component is rated *inefficient* as none of the interventions envisaged at appraisal was realized.

The World Bank extended the loan closing date by 5 years. World Bank. 2012. *Restructuring Paper on a Proposed Project Restructuring of Punjab State Road Sector Project* (Loan 4843 – In) (Board approval: 5 December 2006) to the Republic of India. Washington, DC.

[23] In the case of the Jhang–Shorkot–Kabirwala–Mahni Sial Highway, the appraisal EIRR was based on a longer road section so that the EIRR is not fully comparable with the results of the PCR and the performance evaluation report.

E. Sustainability

47. The sustainability of the project is rated *less likely*. While resource allocations to road construction and development have grown steadily, maintenance allocations are inadequate (para. 34). Moreover, as the CWD is yet to develop an asset management system, needs-based allocation of scarce funds is not assured. The CWD has started to put up simple toll booths on key provincial roads. Their contribution to its overall revenue situation could not be established, but is unlikely to be substantial. However, the tolling has created undesirable side effects in certain locations. Trucks and agricultural vehicles try to avoid the toll stations wherever possible by diverting to RARs. While the improved geometric design of the roads can accommodate larger vehicles, the pavements are not strong enough and on some project, roads showed signs of imminent failure.

Overloading of trucks is a common problem leading to premature road deterioration

48. Overloading of trucks is a common problem in Pakistan and a major reason for premature road deterioration and a growing rehabilitation backlog. The PPG is of the view that the problem needs to be overcome nationally. The province-based approach to installing weighbridges and to penalize overloading has not been effective. As in the case of one of the project roads, weighbridges do not appear to be installed in suitable locations. In addition, most of the existing weighbridges can be bypassed. But if violators are caught, the penalties are far too low to act as effective deterrent. Draft legislation to impound overloaded trucks has not been enacted so far.

CHAPTER 4

Other Assessments

49. The following chapter assesses the development impact of the project with regard to institutions, the socioeconomic and the natural environment. ADB's and the Borrower's performance are subsequently examined.

A. Impacts

The project's impact on institutions is negligible

1. Impact on Institutions

50. The project's impact on institutions is *negligible*. While it was designed to support institution building and capacity development at the CWD, the initiatives were aborted. An effective asset management system is yet to be adopted and financial resources applied in a rational manner. The role of private contractors in carrying out maintenance works has so far been limited. While the PPG has made efforts to privatize road maintenance operations, the absence of an assured work program has been a disincentive for private contractors. Thus, the CWD is carrying out most of the routine maintenance, although periodic maintenance is contracted out.

2. Socioeconomic Impact

The road improvements directly benefit 3 million inhabitants, many of whom are poor

51. The project aimed to improve road conditions through rehabilitation and improvement of the existing road infrastructure. No greenfield construction or major realignment of roads was involved. The impacts of land acquisition for the right-of-way, resettlement, and changes in land-use patterns were minimal, as envisaged at appraisal. The civil works have generated about 14,000 person-months of local employment. The road improvements directly benefit 3 million inhabitants in the influence areas of the provincial and rural roads, many of whom are poor. The road improvements also did ensure better access for the poor to markets, economic centers, and social services and amenities.

3. Environmental and Safety Impact

52. **Environment.** A better road structure, better riding surface, wider carriageways, stable and high embankments, and more effective drainage through bridges, culverts, and drains have all improved the local environment. Less traction power is required to traverse the superior and smoother road surfaces, which means less fuel consumption and less air and noise pollution. The interventions reduced noise levels, dust, uncontrolled water and surface flow, and embankment erosion.

53. The initial environmental impact assessment conducted at appraisal did not envisage significant impacts.[24] Environmental mitigation measures were included in the bidding and contract documents. Nonetheless, poor dust control and traffic

[24] Some low-intensity effects on soil erosion during road construction and temporary low-level silting of waterways at bridge sites were expected. Some trees had to be cut to enable road widening, but this had a negligible impact on the environment.

management had some localized negative impacts on the population, crops, and vegetation.

54. At appraisal, the Shorkot City–Shorkot Cantt road was included in the core RAR program. As the road passes through a protected forest and would have affected a wildlife sanctuary and its biodiversity, a section of the road was not implemented. No other subproject required such mitigating measures.

55. **Road safety**. While there are no regular provincial traffic accident statistics, road safety improvements have likely been minimal. The improvements have enabled traffic growth and higher vehicle speeds, both contributing to traffic accidents. The main causes for accident and injury have been: high operating speeds, lack of discipline and enforcement of road rules, lack of safety awareness, encroachment on right-of-ways, poor vehicle conditions, and limited use of seatbelts. In terms of safety, the road design could have benefited from basic features like reflective center-line strips, paved shoulders, and safer pedestrian crossings.

Road design could have incorporated basic road safety features

B. ADB's Performance

56. The performance of ADB is rated *less than satisfactory*. ADB sent 11 review missions and two project completion missions, which helped resolve various technical issues. In this regard, ADB allowed procurement through post-qualification procedures, raised the imprest account ceiling, and approved a minor change in scope. However, ADB's performance is rated less than satisfactory for the following reasons:

(i) Project quality at entry has been less than adequate. A comparison of the civil works cost estimates with contract prices at the time would have shown that the estimates were too low and more realistic estimates could have been obtained by using contract prices of a recently completed project as a reference. The designs on which the cost estimates were based should also have been made explicit. The institutional assessment should have been more thorough. This would have established organizational baseline conditions and facilitated formulation of objectives. The fact that terms of reference for one substantial component were not drafted before loan approval (footnote 13), is evidence for the rather poor preparatory work.

(ii) At the country portfolio review in May 2006, the authorities complained about ADB's cumbersome documentation requirements in addition to often-delayed ADB approvals. CWD staff reiterated this concern during the IEM. A case in point is the lengthy discussion between ADB and the PPG over ADB's revised standard bid document and related guidelines.[25] Owing to the helpful intervention of the Pakistan Resident Mission, the issue was eventually settled pragmatically. The resident mission also pointed out that the new requirement of publishing bidding information on a freely accessible website had no merits for the rural roads component, as many bidders would be from areas where no internet facilities were available.

The authorities complained about ADB's cumbersome documentation requirements

(iii) Managing for development results means to exert every effort to ensure that the expected results of a project are achieved. ADB chose to

[25] After the PPG had apparently revised the bidding documents three times, ADB issued a new standard bid document and insisted that the PPG document be adjusted. Source: Pakistan Resident Mission's communications with the Office of the General Counsel on 20 May 2006.

close the project when it seemed that implementation had gained momentum. The concern about achieving development results is not only related to a single project, but also to the performance of a portfolio of projects. In the case at hand, the prospects for improving the rate of achievement were quite positive.[26] ADB's decision therefore appeared less than supportive.

C. Borrower Performance

The borrower's performance is rated less than satisfactory

57. The borrower's performance is rated *less than satisfactory*. The PPG and CWD share with ADB the responsibility for many of the shortcomings noted above. It was unfortunate that the PPG accepted an institutional and policy reform program to which it was not committed. The CWD could have considered carefully the unrealistic project cost estimates, and should have at least explained under which pavement design options the cost estimates might have been feasible. Reasons for the performance rating include:

(i) limited supervision and commitment by both the PPG and CWD;
(ii) limited guidance, reviews, and inputs provided by the project steering committee;
(iii) late remedial action on serious implementation issues by PEC;
(iv) often delayed activities;
(v) limited knowledge of ADB's processes, procedures, and guidelines;
(vi) considerable processing delays at the PPG and PEC, which improved later; and
(vii) drawn-out land acquisition issues at PEC in March 2008.

[26] ADB's project performance report—shortly before loan closing—rated the project *satisfactory* under "impact & outcome" and "implementation progress". In the terminology of such reports, the project was not considered a "problem project" or a "project at risk".

CHAPTER 5

Issues, Lessons, and Follow-Up Actions

58. This chapter brings out the issues and lessons pertaining to the project. The performance evaluation report does not recommend any follow up actions.

A. Issues

59. **Development effectiveness**. The 2008 Special Evaluation Study on Project Performance and the Project Cycle had pointed out that *"While ex ante economic evaluation is carried out as part of processing the project, little use is made of such evaluation afterwards while implementing, changing, or closing down the project. In brief, exits tend to follow summary procedures rather than strategic winding down."*[27] Despite the project's implementation momentum, extending its closure was not considered. The project's chances of having a sustained implementation could have been reevaluated, which may have reversed the decision for its closure.

60. **Project modality**. The project mode could have been reassessed, given the circumstances. The following conditions could have been taken into consideration:

(i) Existence of a prioritized investment, a condition that was met.
(ii) Presence of the necessary implementation capacity at the CWD, a condition that was not fully met. While the CWD had general experience in carrying out civil works contracts, it had only limited knowledge of ADB's processes and procedures. This applied especially to ADB safeguard requirements.
(iii) Design of the project containing institutional and policy reforms. While this condition was met, the commitment to implement the reforms appeared limited.

61. Reforms in the transport sector—e.g., transformation of the CWD into a highway authority, and a road asset management system—may need to be pursued for a more effective implementation of project and sector assistance.

The project provides lessons relating to project preparation and quality at entry, and for closing a poorly performing project

B. Lessons

62. The project provides basic lessons relating to project preparation and quality at entry, and for closing a poorly performing project:

(i) Assess the country context, notably the political situation, as a potential risk at the project design stage.

[27] IED. 2008. *Special Evaluation Study on Project Performance and the Project Cycle.* Manila: ADB.

(ii) Ensure robust cost estimation and due diligence during project design, taking into account realistic base costs and adequate price escalation factors.
(iii) Ensure thorough diagnostics of the institutional and policy environment before embarking on a complex reform program.
(iv) Limit such a program to fewer but better justified components.
(v) Consider realistic timelines for project implementation, taking into account that institutional and policy components typically take longer to complete than the physical components.
(vi) Make full use of ADB's knowledge and review the experience of completed projects, particularly when they are in the same country and sector.
(vii) Bear in mind ADB's role as a development partner, and the development results to be achieved, when considering closure of an ongoing project.
(viii) Define criteria for the closure of incomplete projects.

C. Follow-Up Actions

63. The IEM does not recommend any follow-up actions.

Appendixes

APPENDIX 1: DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Contribution to sustainable economic development and poverty reduction	By 2015 Increased gross regional product Improved social indicators	National and local socioeconomic statistics	**Assumption** Economic growth in the hinterland of the project road sections will continue. **Risks** Law-and-order situation in the project area will worsen.
Outcome Increased transport connectivity and efficiency, and improved institutional effectiveness	By 2012 On representative provincial highway sections, traffic volumes to grow above 4,500 vehicles by 2012 On representative rural road sections, traffic to grow beyond 2,500 vehicles by 2012 Road-user costs to fall to $0.45/vehicle-km, from $0.68/vehicle-km in 2008 By 2012, CWD routine maintenance allocations increased to $1,000 per km	National and local statistics from the PPG statistics office Periodic classified traffic counts and accident data system PPG budget records	**Assumptions** Availability and quality of transport services improve following the improvement of the project road sections. **Risks** Resistance to reforms
Outputs 1. Reform program: a. Organizational changes at CWD b. Convert the CWD into a highway authority or corporation c. Improve road		CWD and PEC progress reports	**Assumptions** Counterpart resources provided on time Support from local communities is forthcoming. The government is committed to further reforming the road subsector.

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
management practices and redesign processes d. Strengthen capacity at the CWD and in districts for planning, budgeting, and road maintenance e. Strengthen axle-load control f. Improve road safety g. Increase private sector involvement 2. Improve 302 km of provincial highways with installation of weigh stations at strategic locations 3. Improve 1,100 km of rural access roads	By 2008, 302 km of provincial roads rehabilitated By 2009 1,100 km of rural roads rehabilitated CWD a highway authority by 2009 An advanced road asset management system applied by 2009 Weighbridges installed by end 2008 New safety system pilot-tested by 2009		
Activities with Milestones 1. Award of civil works contracts by mid-2006 2. Completion of civil works by October 2008		**Inputs** Asian Development Bank: $150 million Government: $72.1 million Total: $122.1 million	

CWD = Communication and Works Department, PEC = project engineering cell, PPG = Punjab provincial government.
Source: ADB documents.

APPENDIX 2: ESTIMATED AND ACTUAL PROJECT COSTS

Contract	Roads		Appraisal Length (km)	Appraisal Cost ($ million $	Project Completion Length (km)	Project Completion Cost ($ million)	Changes Length (%)	Changes Cost (%)	Unit Cost Appr. $ mn/km	Unit Cost Closing $ mn/km
				PROVINCIAL HIGHWAYS						
P1	Pindi Bhattian – Chiniot – Kamalpur		71.3	17.3	59.5	41.3	(19.8)	138.6	0.243	0.694
P2	Jhang – Shorkot – Kabirwala – Mahni – Sial		57.3	13.8	35.3	37.7	(62.3)	173.1	0.241	1.068
P3	Chiniot – Sargodha – Khushab		82.4	19.7	94.0	58.2	12.3	195.5	0.239	0.619
P4	Jhang – Toba Tek Singh – Chichawatni		91.0	20.0	89.7	48.1	(1.4)	140.3	0.220	0.536
		Subtotal	**302.0**	**70.8**	**278.5**	**185.2**	**(8.4)**	**161.6**	**0.234**	**0.665**
				RURAL ACCESS ROADS (CORE PROGRAM OF 95 km AND UNIDENTIFIED ROADS OF 1,005 km)						
R1	Shortkot City – Shortkot Cantt		18.1	2.0	17.4	3.4	(4.0)	68.9	0.110	0.194
R2	Mian Channu – Talamba – Abdul Hakeem		10.5	1.1	24.9	5.1	57.8	366.9	0.105	
R3	Bahawalganar – Bhukan Pattan		15.3	1.7	16.9	4.1	9.5	140.1	0.111	0.242
R4	Phalia – Kuthala Sheikan		20.6	2.2	0.0	0.0				
R5	Sheikupura – Hafizabad		16.8	1.8	13.1	3.7	(28.2)	107.2	0.107	0.285
R6	Rasool Barrage – Mandi – Malikwal – Bhera		13.2	1.4	74.6	12.2	82.3	769.5	0.106	0.163
R7	Phalia – Bherowal – Warryam – Sial – Ahmed Nagar				101.1	18.9	100.0			0.187
R8	Girot – Adhikot – Kaloor Kot				71.9	15.8	100.0			0.220
	Unified Roads		1,005.5	106.5						
		Subtotal	**1,100.0**	**116.7**	**319.9**	**63.2**	**(243.9)**	**(45.9)**	**0.106**	**0.198**
				CAPACITY BUILDING COMPONENT						
1	**INSTITUTIONAL DEVELOPMENT COMPONENT**									
	Consulting services			1.3		0.0				
	Equipment			0.9		0.0				
2	**AXLE-LOAD CONTROL**			2.8		0.0				
3	**ROAD SAFETY – PILOT ACCIDENT REPORTING CENTER**			0.2		0.0				
4	**CONSULTING SERVICES**									
	Project management			1.6		0.1		(1500.0)		
	Engineering and construction supervision			6.8		7.3		6.6		
		Subtotal		**13.6**		**7.4**		**(84.3)**		
				OTHER COST ITEMS						
1	Incremental costs			1.4		0.1				
2	Physical contingencies			7.7		0.0				
3	Price contingencies			6.6		0.0				
4	Front-end fee			1.5		1.6				
5	Interest during construction			3.8		4.1				
		Subtotal		**21.0**		**5.8**		**(262.1)**		
		TOTAL		**222.1**		**261.6**		**17.8**		

( ) = negative, km = kilometer, mn = million.

Sources: Communication and Works Department's project records; Asian Development Bank—independent evaluation mission, project completion report, and report and recommendation of the President.

APPENDIX 3: COMPLIANCE WITH COVENANTS

Covenant	Reference in Agreement	Status of Compliance
Sector The Borrower shall cause the Provincial Government to continue restructuring of the CWD and reform of the road sector in accordance with the Policy Framework and Action Plan. Specifically the Provincial Government and the CWD shall meet the milestones contained in the Policy Framework and Action Plan including (a) strengthening of functions in the organizational structure in CWD, (b) preparing for conversion of CWD to a highway authority or corporation (c) further development of the road asset management system, (c) strengthening of road maintenance, (d) establishing a road maintenance fund or similar mechanism, (e) measures to improve axle load control, (f) improvement of road safety and enforcement of traffic and safety regulations, (g) further private sector involvement, (h) further involvement of road user associations n the pilot accident reporting center and the provincial road safety committee, resettlement grievance and advisory committee and non-profit company of road maintenance funds and (i) capacity building in environment and social assessment and resettlement planning	LA, Schedule 6, para 1	Partly complied with.
Within six (6) months of the Effective Date, the Borrower shall cause the Provincial Government to prepare a strategy for the road sector to strengthen the application and enforcement of principles of transparency, fairness and propriety with stricter sanctions for violations of these principles, including in procurement procedures, in consultation with civil society and ADB. The Borrower shall cause the Provincial Government to implement such strategy during the remaining Project implementation period.	LA, Schedule 6, para 9	Partly complied with.
The Borrower shall cause the Provincial Government to keep ADB informed of all transport sector and road subsector studies undertaken in Punjab, and shall provide ADB with copies of all documents relevant to such studies, including consultant's reports, and shall ensure that ADB has the opportunity to comment on the recommendations contained therein. The CWD and ADB shall from time to time exchange views on the progress of the Provincial Government in carrying out the policies and actions recommended by transport and road sector studies. The Provincial Government shall maintain a policy dialogue with ADB on problems and constraints affecting the growth and development of the road section, and in particular in respect of road maintenance with investment and road user charges.	LA, Schedule 6, para 13	Partly complied with.
PPG will ensure that Road construction and maintenance will be carried out as required under the Government's environmental laws and regulations and ADB's environmental guidelines including (a) appropriate selection of quarry and borrow sites and their subsequent rehabilitation after use, (b) proper disposal of spoils an construction materials, (c) use of sound environmental design and	LA Schedule 6, para 5(b)	Partly complied with.

Covenant	Reference in Agreement	Status of Compliance
construction techniques that ensure slope stability and drainage, and (d) minimization of construction impacts such as dust, diversion of stream flow and increased turbulence, and equipment noise.		
When project roads pass through or near protected or sensitive areas (e.g. nature reserves, parks, conservation areas, biodiversity reserves, or cultural and historical sites), a rapid assessment will be carried out prior to commencement of any construction works. PPG will ensure cooperation with the responsible authority n preparing and implementing protective measures.	LA, Schedule 6, para 5(c)	Not applicable.
Environmental Considerations: Each subproject shall have been screened for its environmental impacts in compliance with the requirements of the Provincial Government and ADB's requirements, i.e. the "Environmental Assessment Requirements of the Asian Development Bank" (March 1998), and will not cause any major adverse impact on the environment. No subproject shall be category A project under the ADB's environmental guidelines, and the ADB shall have received and reviewed the IEE, if any, prepared for the Subproject.	LA, Schedule 6, para 2(b)	Complied with.
The Borrower shall cause CWD to ensure that all environmental mitigation measures identified in the initial environmental examination are incorporated into the Project design and implemented during Project construction, O&M, in accordance with the ADB's environmental guidelines and the Environmental Management Monitoring Plan agreed with ADB.	LA, Schedule 6, para 5(a)	Complied with.
When Project roads pass through or near protected or sensitive areas (e.g., nature reserves, parks, conservation areas, biodiversity reserves, and cultural and historical sites), the Borrower shall ensure that a rapid assessment is carried out prior to commencement of any construction works. The Borrower shall cause the Provincial Government to ensure cooperation with the authority responsible for the area in preparation and implementation of protective measures which may include any combination of area demarcation, fencing, checkpoints, speed bumps, wildlife passage zone, patrols or other degradation due to road improvement and increased access.	LA, Schedule 6, para 5(c)	Not applicable.
Social Punjab CWD will ensure that land acquisition and resettlement activities are implemented in accordance with all applicable laws and regulations, and ADB's Policy on Involuntary Resettlement, as agreed in the resettlement plans.	LA, Schedule 6, para 4	Complied with.
PPG will ensure that the civil works contracts include an information and education campaign on sexually transmitted diseases and HIV/AIDs for construction workers as part of the health and safety program at campsites during the construction period.	LA, Schedule 6, para 7	Partly complied with.
PPG will ensure that the civil works contractors comply with all	LA, Schedule 6, para 8	Complied with.

Covenant	Reference in Agreement	Status of Compliance
applicable labor laws, and do not employ child labor in construction activities.		
Poverty Targeting; The Subproject shall have been accorded priority based on the district development ranking used by the Provincial Government for determining allocation of its development expenditures. {LA, Schedule 6, para 2(c)}	LA, Schedule 6, para 2(c)	Complied with.
The Subproject shall not involve any involuntary resettlement or land acquisition, and the impact on any affected persons (APs) or their livelihoods of any resettlement or land acquisition shall be minimal. In the event the Subproject involves land acquisition or involuntary resettlement, a resettlement plan acceptable to ADB shall have been prepared in accordance with the RRP.	LA, Schedule 6, para 2(c)	Complied with.
The Borrower shall cause CWD to ensure that all land and right-of way required for the Project will be made available in a timely manner and that the provisions of the RPF and the resettlement plan agreed with ADB, including compensation and entitlements for APs, will be implemented in accordance with all applicable laws and regulations of the Borrower, and ADB's "Policy on Involuntary Resettlement", including but not limited to compensation for land and other assets at replacement cost, compensation for non-land assets and other rehabilitation assistance to the non-titled, and compensation n to be paid to an account for payment to APs before land possession and the award of civil works contracts. In the event of a difference between the requirements under the applicable laws and regulations of the Borrower and ADB's "Policy on Involuntary Resettlement", the requirements under ADB's "Policy on Involuntary Resettlement" shall apply.	LA, Schedule 6, para 4(a)	Complied with.
The Borrower shall cause CWD to ensure that (i) adequate staff and resources are committed to supervision and internal monitoring of the implementation of the resettlement plan and that quarterly reports on resettlement progress are forwarded to ADB; (ii) an independent domestic monitoring agency will be contracted, in accordance with procedures acceptable to ADB, to carry out systematic monitoring twice each year during resettlement plan implement, conduct evaluations after completion, and forward reports to ADB; and (iii) an annual audit of resettlement disbursements and expenditures is conducted by the implementing agencies audit bureau, with a summary report forwarded to ADB.	LA, Schedule 6, para 4(c)	Partly complied with.
The Borrower shall cause CWD to ensure that all APs are provided adequate information and regularly consulted in advance of signing household compensation agreements and other decisions that affect their livelihoods and living conditions as a result of the Project. CWD shall maintain records of consultation and grievances, which will be made available to ADB on request.	LA, Schedule 6, para 4(d)	Complied with.
The Borrower shall cause CWD to update the resettlement plan as necessary to reflect any significant material changes, other than the	LA, Schedule 6, para 4(e)	Complied with.

Covenant	Reference in Agreement	Status of Compliance
agreed resettlement policy, principles and entitlement, in the Project scope or other causes, and such changes shall be reported to ADB as part of Project reporting.		
The Borrower shall cause CWD to ensure that APs have full opportunity to participate in resettlement planning and implementation, particularly income restoration measures, as set out in the resettlement plan.	LA, Schedule 6, para 4(f)	Complied with.
The Borrower shall cause CWD to ensure that civil works contractors comply with all applicable labor laws and regulations and do not employ child labor in the construction activities. The Borrower shall cause CWD to set employment targets for women for road construction activities. The Borrower shall ensure CWD provides equal opportunity for women, as well as require contractors not to differentiate wages between men and women for work of equal value.	LA, Schedule 6, para 8	Complied with.
Financial The Borrower shall cause CWD to ensure the timely provision of counterpart funds for land acquisition and resettlement activities specified in the resettlement plan, and shall meet any unforeseen obligations in excess of the resettlement plan's budget estimate in order to satisfy resettlement objectives. CWD shall ensure that counterpart funds for compensation and entitlements under the resettlement plan are fully provided directly to APs through an account for payment to AP, prior to loss of land, livelihood, income or other assets, and prior to land possession. In addition, CWD shall ensure that no emergency provisions are applied to land possession for the Project that would result in possession in advance of payment.	LA, Schedule 6, para 4(b)	Complied with.
Punjab shall make available, as needed, the funds facilities, services, equipment, land and other resources which are required in addition to the proceeds for the loans, for carrying out the Project.	PA, Section 2.02	Complied with.
Punjab shall cause CWD to (i) maintain separate accounts for the Project and for its overall operations; (ii) have such accounts and related financial statements (balance sheet, statement of income and expenses, and related statements) audited annually, in accordance with appropriate auditing standards consistently applied, by independent auditors whose qualifications, experience and terms of reference are acceptable to ADB; and (iii) furnish to ADB, promptly after their preparation but in any event later than six months after the close of the fiscal year to which they relate, certified copies of such audited accounts and financial statements and the report of the auditors relating thereto (including the auditors' opinion on the use of the proceeds of the loans and compliance with the covenants of the loan agreement as well as on the use of procedures for imprest account/statement of expenditures), all in the English language. Punjab shall cause CWD to furnish to ADB such further information	PA, Section 2.09(a)	Complied with.

Covenant	Reference in Agreement	Status of Compliance
concerning such accounts and financial statements and the audit thereof as ADB shall from time to time reasonably request.		
Punjab shall enable ADB, upon ADB's request, to Punjab's financial statement and its financial affairs from time to time with Punjab's auditors, and shall authorize and require any representative of such auditors to participate in any such discussions requested by ADB, provided that any such discussion shall be conducted only in the presence of an authorized officer of Punjab unless Punjab shall otherwise agree.	PA, Section 2.09(b)	Complied with.
Except as ADB may otherwise agree, Punjab shall apply the proceeds of the loan to the financing of expenditures on the Project in accordance with the provisions of the Loan Agreement and this Project Agreement, and shall ensure that all goods and services financed out of such proceeds are used exclusively in the carrying out of the Project.	PA, Section 2.13	Complied with.
Economic The Subproject shall have an economic internal rate of return of at least 12%.	LA, Schedule 6, para 2(e)	Complied with.
Others Established, Staffed, and Operating PMU/PIU: CWD shall be the Executing Agency of the Project. The Chief Engineer Projects (CEP) placed under the Secretary of CWD shall assume overall responsibility for project implementation. The Secretary of CWD shall chair a steering group, comprising senor staff of the Provincial Government and the CWD, which will guide the implementation of the CWD restructuring program and the Policy Framework and Acton Plan. CWD shall ensure that the project engineering cell (PEC), which has already been established under CEP, shall be responsible for Project management and headed by a Project Director (PD). The PD shall be supported by other staff including two deputy PDs who will be n charge of day-to-day administration of the provincial highways and rural access roads.	LA, Schedule 6, para 1	Partly complied with.
Fielding of Consultants: The consultant shall be selected and engaged in accordance with procedures acceptable and subject to approval of ADB. Advance procurement action has been approved by ADB.	LA, Schedule 5, para 7	Complied with.
Punjab, through CWD shall employee competent and qualified consultants, acceptable to ADB to an extent and upon terms and conditions satisfactory to ADB.	PA, Section 2.03(a)	Complied with.
Punjab through CWD shall furnish to ADB all such reports and information as ADB shall reasonably request concerning (i) the loan and the expenditure of the proceeds thereof; (ii) the goods and services and other items of expenditure financed out of such proceeds; (iii) the project; (iv) the administration, operations and	PA, Section 2.08(a)	Complied with.

Covenant	Reference in Agreement	Status of Compliance
financial condition of the Punjab; and (v) any other matters relating to the purposes of the loan.		
Without limiting the generality of the foregoing, Punjab through CWD shall furnish to ADB brief and full quarterly reports on the execution of the project and on the operation and management of the project facilities.	PA, Section 2.08(b)	Complied with.
Each Sub project shall have a minimum length of 5 kilometers (km), and a maximum estimated cost of $2.5 million equivalent.	PA, Schedule 6, para 2(a)	Complied with.
The Subproject shall be included in the provincial road master plan of the Provincial Government.	LA, Schedule 6, para 2(f)	Complied with.
The relevant districts of the Provincial Government shall have confirmed in manner acceptable to ADB, its commitment to the Subprojects, including but not limited to the provision of budgetary allocation for the rehabilitation and operation and maintenance of the subprojects of roads.	LA, Schedule 6, para 2(g)	Complied with.
The Borrower shall cause CWD to continuously monitor and evaluate Project benefits by compiling and analyzing socioeconomic data and traffic on the Project financed provincial highways and rural access roads. The form and content of reporting shall be agreed between CWD and ADB during Project implementation, and shall be in accordance with ADB's Project Performance Systems Guidelines for Bank Staff darted September 1999, as amended from time to time.	LA, Schedule 6, para 3	Partly complied with.
The Borrower shall cause CWD to be responsible for the operation and maintenance of the Project roads through proper technical supervision and adequate allocation of funds, CWD shall also ensure that maintenance needs will be met through resources generated for the road maintenance financing mechanism to be developed and set in place during the Project implementation period. The Borrower shall cause the Provincial Government to ensure that the improved roads are maintained to design standards and in accordance with sound maintenance practices. The Provincial Government shall further ensure that new roads maintenance procedures and annual maintenance plans are prepared for the improved roads with support of the consultants, on the basis of the modern and agreed-upon maintenance standards, traffic volumes, and assessment of needs and in accordance with the action plan agreed with ADB.	LA, Schedule 6, para 6	Complied with.
The Borrower shall cause CWD to strengthen the capacity and increase the number of core staff in RSESAC with five experienced experts by June 2003 to deal with such issues, including road safety resettlement planning and management, poverty reduction monitoring, labor practices, gender analysis, and environment.	LA, Schedule 6, para 10	Partly complied with.
The Borrower shall cause CWD to carry out a safety audit for the	LA, Schedule 6, para	Not complied

Covenant	Reference in Agreement	Status of Compliance
provincial highways and core rural roads during the Project implementation and develop recommendations to be used for other roads in Punjab by December 2005.	11	with.
The Borrower shall cause the Provincial Government to carry out Project performance monitoring and evaluation by compiling and analyzing appropriate traffic and socioeconomic data and other data for Project roads. Prior to commencing of civil works, the CWD and ADB shall agree upon the data to be collected and the methodology for their analysis based upon the baseline survey that was carried out in 2002.	LA, Schedule 6, para 14	Partly complied with.
Punjab through CWD shall furnish to ADB brief monthly and full quarterly reports on the execution of the Project and on the operation and management of the Project facilities. Such reports shall be submitted in such form and in such details and within such a period as ADB shall reasonably request, and shall indicate, among other things, progress made and problems encountered during the period under review, steps taken or proposed to be taken to remedy these problems, and proposed program of activities and expected progress during the following period.	PA, Section 2.08(b)	Complied with.

APPENDIX 4: ECONOMIC ANALYSIS

1. The reevaluation followed the standard approach to cost–benefit analysis, based on the Asian Development Bank's (ADB's) Guidelines for the Economic Analysis of Projects.[1] Accordingly, border prices were used for tradable goods, or nontraded goods adjusted to reflect the real consumption of domestic resources, the underlying rationale being to measure any gain or loss to the economy in terms of external trade. For that purpose, the inputs and outputs of the project were broken down into their traded and nontraded components. The process of converting financial costs and prices to their economic corollaries resulted in a standard conversion factor of 0.83, implying that the costs were reduced by about 17% to reflect conditions of economic resource consumption. Table A4.1 shows the calculation of the standard conversion factor.

Table A4.1: Calculation of Standard Conversion Factor

	Conversion Items	Cost Composition %	Adjustment Factor	
Materials				
Tradable	Exchange rate	18	1.07	0.1926
Nontradable		20	0.85	0.1700
Equipment (tradable)		20	1.07	0.2140
Labour				
Skilled	Skilled SWR	10	0.95	0.0950
Unskilled	Unskilled SWR	20	0.80	0.1600
Tax		12	0.00	0.0000
		100		0.8316

SWR = shadow wage rate.

2. The approach to estimating the economic feasibility of the proposed road sections follows the analytical framework of the Highway Development and Management (HDM) model, which is based on the concept of pavement life cycle analysis.[2] The key assumption is that road pavements deteriorate as a result of several factors, including traffic loading, climatic conditions, and maintenance regimes. Impacts of the road condition and design standards on road users are measured to predict economic resource consumption reflected in economic costs. Such road user costs comprise vehicle operating costs (VOCs—fuel, tires, oil, spare parts consumption, depreciation, and capacity utilization); costs of travel time for both passengers and cargo, and costs to the economy of road accidents.

3. Sensitivity analysis is carried out to study the impact of variations in key parameters on the feasibility of the proposed road investment project. This analysis indicates which of the parameters examined are likely to have the most significant effect on the feasibility of the project. The important variables that are to be considered in this regard are:

(i) Cost of the proposed investment;
(ii) Traffic volumes, both baseline flows and future forecast growth rates;
(iii) Vehicle use, loading and utilization; and
(iv) Net benefits streams, reflecting variations in transport costs.

4. The economic evaluation is based on the comparison of two scenarios—with project and without project. This comparison generates the standard decision criteria for the investment, notably the net present value and the economic internal rate of return (EIRR). The with-project condition assumes improved road quality and a more systematic and rational maintenance regime. In the

[1] ADB. 1997. *Guidelines for the Economic Analysis of Projects*. Manila.
[2] World Road Association (PIARC). 2002. *HDM-4 Version 2*. Paris.

without-project scenario, a status quo in the maintenance regime is assumed, resulting in roughness of the road surface increasing in step with the expected rise in traffic.

5. The development of pavement conditions over time, reflecting different maintenance regimes and traffic loads, is expressed by the international roughness index (IRI) when measuring pavement performance and riding quality.[3] At appraisal, the pavement on several subsections was about to fail. Based on this, the initial IRI was in the range of 9–14. This assumption was made by the performance completion report and will also be made by the independent evaluation mission.

6. The benefits are related to traffic accruing to normal, generated, and diverted traffic, as a function of a reduction in VOCs and time costs. The quantities of resources consumed and vehicle speeds were calculated first and then multiplied by unit costs of the resources to obtain total operating costs and travel time costs. The resources consumed and the vehicle operating conditions are a function of traffic volumes and the composition of traffic by vehicle types, the pavement type and geometric characteristics of the road, as well as the roughness of the road surface.

A. Vehicle Fleet

7. The vehicles used in the analysis were selected from among the HDM-4 default fleets and adjusted to current price levels. The vehicles are representative for the vehicle fleet in Pakistan and the consequent determinants of the VOCs. As it was not possible to simulate the operating costs of every individual vehicle brand or model, representative vehicles for major types operating on the project road were chosen.

B. Vehicle Operating Costs

8. Road rehabilitation projects lead to a reduction in VOCs for the users of the improved road. For the project now being evaluated, the corresponding VOC savings are the most substantial and direct benefit category. The resources consumed are reflected in the major VOC items—e.g., fuel, tires, maintenance parts, maintenance labor, lubricants, crew, depreciation, interest, overheads, passenger time, and capital tied up by freight in transit.

9. The economic evaluation is based on VOC relationships under the with-project and without-project conditions. Under the without-project condition, the road quality is assumed to depreciate in step with forecast traffic volumes, increasing from an initial IRI of 9 to an IRI of 16 depending on the road. It is assumed that lower VOCs will generate additional traffic. The benefits are expected to grow in step with economic growth and the growth of normal traffic.

10. Time savings were computed with respect to passengers and freight. All passengers were assumed to accrue a monetary benefit from the saving in travel time. Given the better road quality under the with-project condition, the travel time was assumed to be reduced, generating time savings of 1.5 hours per passenger or freight trip. This assumption is consistent with the project completion report.

[3] The IRI is used to define a characteristic of the longitudinal profile of a traveled wheel track and constitutes a standardized roughness measurement. The measurement units are meters per kilometer (m/km) or millimeters per meter (mm/m). The IRI is based on the ratio of a standard vehicle's accumulated suspension motion caused by roughness (in mm, cm, or inches) divided by the distance traveled by the vehicle during the measurement (m, km). The IRI scale is open-ended.

C. Investment and Maintenance Costs

11. Consistent with the envisaged 4-year construction period (2008–2011), the project funds were to be released over 4 years. The costs are net of taxes and duties and reflect the true costs of resource consumption and resource scarcity. Other adjustments were made for the cost of labor, and the value of time for passengers accordingly. Overall, a factor of 0.83 was used to convert the financial costs to economic costs.

12. Maintenance costs include periodic and routine maintenance costs. Periodic maintenance is scheduled at intervals of 6 years. No periodic maintenance was assumed for the without-project condition. This assumption reflects a rational maintenance regime. As the sub-base and wearing courses of the pavement are beyond repair, periodic maintenance, which is typically in the form of simple pavement overlays, would not sustainably arrest the trend of structural deterioration.

D. Traffic

13. Table A4.2 shows the current and projected traffic volumes. The figures are based on the 2011 traffic counts of the Communication and Works Department. A growth factor of 3% per year was applied to the traffic projections.

Table A4.2: Traffic on the Project Roads, 2011
(No. of vehicles)

Road No.	Animal -Drawn Vehicle	Motorcycle / Rickshaw	Motor Car Pickup	Mini Bus Wagon	Bus Flying Coach	Trk 2 Axle	Trk 3 Axle	Trk 4 Axle	Trk 5 Axle	Trk 6 Axle	Tractors	Tractor Trolley 3 Axles	Tractor Trolley 4 Axles	Total
P1	104	1,400	1,361	494	252	361	869	48	18	22	31	158	6	5,124
P2	87	1,711	2,231	767	564	1,078	576	549	86	121	38	208	49	8,065
P3	63	5,215	3,445	1,223	273	1,642	2,917	61	20	67	28	160	11	15,125
P4	153	2,550	1,437	600	56	245	204	21	11	12	32	83	11	5,415
R1	161	1,827	998	272	46	96	14	19	2	2	28	205	37	3,707
R2	285	2,588	1,051	307	182	171	47	22	9	9	59	129	7	5,866
R3	64	1,551	1,198	460	280	332	57	21	5	10	21	199	6	4,204
R5	239	2,499	1,540	903	147	203	54	12	6	5	38	360	6	6,012
R6	77	2,647	2,534	843	275	539	154	35	18	16	32	153	8	7,331
R7	70	1,409	582	471	68	73	7	6	0	0	17	77	40	2,820
R8	29	620	410	224	23	97	33	1	0	0	16	26	0	1,479

Trk = truck.
Source: Communication and Works Department, 2012.

E. Evaluation Results

14. Table A4.3 shows that all road sections are economically feasible. The provincial road sections together yield an EIRR of 34.1%, while the rural road sections together have an EIRR of 28.5%. Overall, the economic feasibility of the entire project is robust and can tolerate adverse developments to the primary benefit and cost categories, and changes in parameters. This was assessed in the risk and sensitivity analysis supporting the EIRR calculation.

Table A4.3: Economic Internal Rates of Return and Sensitivity Analysis

Description	Length (km)	Project Cost $ mln	Economic Internal Rates of Return			
			Base Case	Case A: 15% Cost Increase	Case B: 15% Decrease in Benefit	Combined A & B
Provincial Highways						
Pindi Bhattian–Chiniot–Kamalpur	59.54	41.30	18.7	31.6	31.4	28.1
Jhang–Shorkot–Kabirwala–Mahni Sial	35.32	37.80	19.1	19.4	19.1	17.2
Chiniot–Sargodha–Khushab	93.99	58.20	61.8	37.7	37.2	33.6
Jhang–Toba Tek Singh–Chichawatni	89.69	48.10	25.6	31.5	29.9	27.8

Description	Length (km)	Project Cost $ mln	Economic Internal Rates of Return			
			Base Case	Case A: 15% Cost Increase	Case B: 15% Decrease in Benefit	Combined A & B
Total Provincial Highways	**278.50**	**185.20**	**34.1**	**31.6**	**31.3**	**28.1**
Rural Access Roads						
Shorkot City–Shorkot Cantt	17.40	3.38	26.5	25.2	22.0	18.8
Mian Channu–Talamba	24.90	5.14	39.4	35.5	34.3	31.5
Bahawalnagar–Bhukan	16.90	4.08	24.1	21.2	21.0	19.1
Phallia–Kuthiala Sheikhan	na	na	na			
Sheikhupura–Hafizabad	13.10	3.73	29.3	26.1	26.1	23.4
Rasool Barrage–Mandi–Malikwal–Bhera	74.60	12.17	62.3	56.1	55.4	49.2
Phallia–Bherowal–Warryam–Sial Morr–Ahmas Nagar	101.10	18.89	29.9	26.9	26.3	23.3
Girot–Adhikot–Kaloor Kot	71.90	15.79	9.3	8.1	8.2	7.5
Total Rural Access Roads	**319.90**	**63.20**	**28.5**	**25.2**	**24.9**	**22.2**

EIRR = economic internal rate of return, km = kilometer, mln = million.
Note: The sensitivity indicator is defined as the percentage change of the EIRR resulting from the percentage change in the independent variable.

APPENDIX 5: RESULTS OF ECONOMIC EVALUATION (CONSOLIDATED RESULT FOR PROVINCIAL ROADS)

Study Name: PUNJAB PROVINCIAL ROADS
Currency: US dollar (million)
Discount Rate: 12%

Section	From	To	Cumulative Trip	Length	%Trip/Length
km	1	278.5	153	278.5	0.55

Comparison of Cost Streams (Discounted)

	Road Agency Cost				Road User Cost and Savings										
	Capital	Recurrent Works		Total	Normal Traffic			Time Savings			Generated Traffic			Total	Net
Year	Works	With	Without		With	Without	Net	Pass	Freight	Total	VOC	Time	Total	Benefits	Benefits
2007	7.87		0.69	7.18	125.99	125.99	0.00				0.00		0.00		(7.18)
2008	31.48		0.47	31.01	133.43	133.43	0.00				0.00		0.00		(31.01)
2009	62.97		0.47	38.87	141.42	141.42	0.00				0.00		0.00		(38.87)
2010	15.74	0.7241	0.50	63.19	154.63	163.61	8.98	0.44	0.13	0.57	1.17	0.09	1.25	10.80	(52.39)
2011		0.7458	0.52	15.97	104.66	133.57	28.91	0.45	0.14	0.59	3.76	0.09	3.85	33.34	17.37
2012		0.7682	0.53	0.24	170.16	219.37	49.22	0.56	0.62	1.18	6.40	0.18	6.57	56.97	56.73
2013		1.7912	0.55	0.24	176.02	231.10	56.09	0.57	0.64	1.21	7.29	0.18	7.47	64.77	64.53
2014		0.8150	0.57	0.25	182.25	245.56	63.31	0.59	0.66	1.25	8.23	0.19	8.42	72.98	72.73
2015		0.8394	0.58	0.26	188.91	259.76	70.84	0.61	0.70	1.31	9.21	0.20	9.41	81.56	81.30
2016		0.8646	0.60	0.27	196.09	274.70	78.61	0.63	0.72	1.35	10.22	0.20	10.42	90.38	90.11
2017	15.32	0.7241	0.62	15.42	196.68	282.94	86.26	0.65	0.74	1.39	11.21	0.21	11.42	99.07	83.64
2018		0.7458	0.64	0.11	203.40	291.43	88.03	0.67	0.76	1.43	11.44	0.21	11.66	101.11	101.00
2019		0.7682	0.66	0.11	210.5	300.38	89.88	0.69	0.79	1.47	11.68	0.22	11.91	103.26	103.14
2020		0.7912	0.67	0.12	218.07	309.39	91.33	0.71	0.81	1.52	11.87	0.23	12.10	104.94	104.83
2021		0.8150	0.70	0.12	226.17	218.68	92.51	0.73	0.83	1.56	12.03	0.23	12.26	106.33	106.21
2022		0.8394	0.72	0.12	234.93	328.24	93.31	0.75	0.86	1.61	12.13	0.24	12.37	107.29	107.17
2023	15.32	0.7241	0.74	15.30	235.81	338.08	102.27	0.77	0.88	1.66	13.30	0.25	13.54	117.47	102.17
2024		0.7458	0.76	(0.01)	244.02	348.23	104.21	0.79	0.91	1.71	13.55	0.26	13.80	119.72	119.73
2025		0.7682	0.78	(0.01)	252.77	358.67	105.9	0.82	0.94	1.76	13.77	0.26	14.03	121.69	121.70
2026		0.7912	0.81	(0.01)	262.16	369.43	107.27	0.84	0.97	1.81	13.95	0.27	14.22	123.30	123.32
2027		0.8150	0.83	(0.01)	272.30	380.52	108.22	0.87	1.00	1.86	14.07	0.28	14.35	124.43	124.44
2028		0.8394	0.85	(0.02)	283.33	391.93	108.60	0.89	1.03	1.92	14.21	0.29	14.41	124.93	124.94
2029	15.32	0.7241	0.88	15.16	282.91	403.69	120.78	0.92	1.06	1.98	15.70	0.30	16.00	138.75	123.59
2030		0.7458	0.91	(0.16)	293.06	415.80	122.74	0.95	1.09	2.04	15.96	0.31	16.26	141.04	141.20
														EIRR	**34.1%**
														NPV	**292.97**

( ) = negative, EIRR = economic internal rate of return, km = kilometer, NPV = net present value.

APPENDIX 6: RESULTS OF ECONOMIC EVALUATION (CONSOLIDATED RESULT FOR RURAL ACCESS ROADS)

Study Name: PUNJAB RURAL ACCESS ROADS
Currency: US dollar (million)
Discount Rate: 12%

Section	From	To	Cum Trip	Length	%Trip/Length
km	1	336	168	336.1	0.5

Comparison of Cost Streams (Discounted)

	Road Agency Cost				Road user Cost and Savings										
	Capital	Recurrent Works		Total	Normal Traffic			Time Savings			Generated Traffic			Total	Net
Year	Works	With	Without		With	Without	Net	Pass	Freight	Total	VOC	Time	Total	Benefits	Benefits
2007	2.69		0.76	1.93	50.89	50.89	0.00				0.00		0.00		(1.93)
2008	8.06		0.53	7.53	57.93	57.93	0.00				0.00		0.00		(7.53)
2009	13.43		0.56	12.87	61.19	61.19	0.00				0.00		0.00		(12.87)
2010	21.49	0.44	0.58	21.34	64.62	64.67	0.05	0.30	0.21	0.51	0.01	0.08	0.08	0.64	(20.70)
2011	13.43	0.45	0.61	13.27	54.68	68.39	13.71	0.31	0.21	0.52	1.78	0.08	1.86	16.10	2.83
2012		0.47	0.64	(0.18)	56.49	72.34	15.86	0.32	0.22	0.54	2.06	0.08	2.14	18.53	18.71
2013		0.48	0.68	(0.19)	58.41	76.54	18.13	0.33	0.23	0.55	2.36	0.08	2.44	21.13	21.32
2014		0.50	0.71	(0.21)	60.44	80.98	20.54	0.34	0.23	0.57	2.67	0.09	2.75	23.86	24.07
2015	33.60	0.52	0.74	33.37	62.62	85.66	23.04	0.35	0.24	0.59	3.00	0.09	3.08	26.71	(6.66)
2016		0.54	0.78	(0.25)	64.96	90.59	25.63	0.36	0.25	0.60	3.33	0.09	3.42	29.65	29.90
2017		0.44	0.82	33.22	65.32	93.30	27.98	0.37	0.26	0.62	3.64	0.09	3.73	32.34	(0.88)
2018		0.45	0.86	(0.41)	67.52	96.10	28.59	0.38	0.26	0.64	3.72	0.10	3.81	33.04	33.45
2019		0.47	0.91	(0.44)	69.84	99.04	29.21	0.39	0.27	0.66	3.80	1.10	3.90	33.76	34.20
2020		0.48	0.95	(0.47)	72.31	102.02	29.71	0.40	0.28	0.68	3.86	0.10	3.96	34.35	34.82
2021	33.60	0.50	1.00	33.10	74.95	105.08	30.13	0.41	0.29	0.70	3.92	0.10	4.02	34.85	1.74
2022		0.52	1.05	(0.53)	77.81	108.23	30.42	0.42	0.30	0.72	3.95	0.11	4.06	35.21	35.74
2023		0.44	1.10	32.94	78.27	111.48	33.20	0.44	0.31	0.74	4.32	0.11	4.43	38.37	5.44
2024		0.45	1.16	(0.70)	80.96	114.82	33.86	0.45	0.31	0.76	4.40	0.11	4.52	39.15	39.85
2025		0.47	1.21	(0.75)	83.81	118.26	34.45	0.46	0.32	0.79	4.48	0.12	4.60	39.83	4.58
2026		0.48	1.27	(0.79)	86.88	121.81	34.93	0.48	0.33	0.81	4.54	0.12	4.66	40.41	41.20
2027	33.60	0.50	1.34	32.76	90.19	125.47	35.28	0.49	0.34	0.84	4.59	0.13	4.71	40.83	8.07
2028		0.52	1.40	(0.89)	93.78	129.23	35.45	0.51	0.35	0.86	4.61	0.13	4.74	41.05	41.93
2029		0.44	1.47	32.56	93.86	133.11	39.25	0.52	0.36	0.89	5.10	0.13	5.24	45.37	12.81
2030		0.45	1.55	(1.10)	97.17	137.10	39.93	0.54	0.38	0.91	5.19	0.14	5.33	46.17	47.26
														EIRR	**28.5%**
														NPV	**60.3**

( ) = negative, EIRR = economic internal rate of return, km = kilometer, NPV = net present value.