ADB

Completion Report

Project Number: 36320
Loan Number: 2018
November 2011

India: Rural Roads Sector I Project

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – Indian rupee/s (Re/Rs)

		At Appraisal (20 October 2003)	At Project Completion (30 June 2009)
Re 1.00	=	$ 0.022	$ 0.021
$ 1.00	=	Rs 45.34	Rs 48.105

ABBREVIATIONS

	ADB	–	Asian Development Bank
	CGRRDA	–	Chhattisgarh Rural Roads Development Agency
	CSP	–	country strategy and program
	EIRR	–	economic internal rate of return
	IEE	–	initial environmental examination
	km	–	kilometer
	LAF	–	land acquisition framework
	LAP	–	land acquisition plan
	m	–	meter
	MORD	–	Ministry of Rural Development
	MPRRDA	–	Madhya Pradesh Rural Roads Development Agency
	NGO	–	nongovernment organization
	NRRDA	–	National Rural Roads Development Agency
	PCR	–	project completion report
	PIC	–	project implementation consultant
	PIU	–	project implementation unit
	PMC	–	project management consultant
	PMGSY	–	Pradhan Mantri Gram Sadak Yojana (Prime Minister's Rural Roads Program
	RRP	–	report and recommendation of the President
	SRRDA	–	State Rural Roads Development Agency
	TA	–	technical assistance
	TOR	–	terms of reference
	VOC	–	vehicle operating cost

NOTES

(i) The fiscal year (FY) of the Government of India ends on 31 March. FY before a calendar year denotes the year in which the fiscal year begins, e.g., FY2002 ends on 31 March 2003.

(ii) In this report, "$" refers to U.S. dollars.

Vice-President	X. Zhao, Operations 1
Director General	S. Rahman, South Asia Department (SARD)
Director	S. Widowati, Transport and Communications Division, SARD
Team leader	T. Suzuki, Transport and Communications Division, SARD
Team members	S. Zhao, Transport and Communications Division, SARD
	V. A. Faulmino, Transport and Communications Division, SARD

CONTENTS

BASIC DATA

A. Loan Identification

1.	Country	India
2.	Loan Number	2018
3.	Project Title	Rural Roads Sector I
4.	Borrower	Government of India
5.	Executing Agency	MORD, state governments of MP and CG.
6.	Amount of Loan	$400 million
7.	Project Completion Report Number	IND 1279

B. Loan Data

1.	Appraisal	
	– Date Started	5 June 2003
	– Date Completed	18 June 2003
2.	Loan Negotiations	
	– Date Started	13 October 2003
	– Date Completed	15 October 2003
3.	Date of Board Approval	20 November 2003
4.	Date of Loan Agreement	25 November 2004
5.	Date of Loan Effectiveness	
	– In Loan Agreement	(90 days from the Loan Agreement)
	– Actual	25 January 2005
	– Number of Extensions	
6.	Closing Date	
	– In Loan Agreement	30 June 2008
	– Actual	30 June 2009
	– Number of Extensions	One
7.	Terms of Loan	
	– Interest Rate	LIBOR-based
	– Commitment charges	0.75% per annum
	– Maturity (number of years)	25
	– Grace Period (number of years)	5

8. Disbursements

a. Dates

Initial Disbursement	Final Disbursement	Time Interval
25 November 2005	9 October 2009	47 months
Effective Date	**Revised Closing Date**	**Time Interval**
25 January 2005	30 June 2009	54 months

b. Amount ($ million)

Category	Original Allocation	Last Revised Allocation	Amount Disbursed	Undisbursed Balance
Civil Works	**394.400**			
(1A) Civil Works MP		184.000	163.636	20.364
(1B) Civil Works CG		184.000	185.511	–1.511
Consultants				
(2A) PMC		3.700	1.523	2.177
(2B) PIC MP		13.400	8.517	4.883
(2C) CG		13.000	7.255	5.745
Capacity Building	5.600	1.900		1.900
Total	**400.000**	**400.000**	**366.442**	**33.558**

Note: the undisbursed amount of $33.558 million was cancelled after the last disbursement on 9 October 2009

9. Local Costs (Financed)
   - Amount ($) 142.4
   - Percent of Local Costs 53.1
   - Percent of Total Cost 27.9

C. Project Data

1. Project Cost ($ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	269.1	242.4
Local Currency Cost	301.9	268.3
Total	571.0	510.7

2. Financing Plan ($ million)

Cost	Appraisal Estimate	Actual
Implementation Costs		
Borrower Financed	131.3	113.6
ADB Financed	400.0	366.4
Other External Financing		
Total	531.3	480.0
Financial Charges		
Borrower Financed	39.7	30.7
ADB Financed		
Other External Financing		
Total	**571.0**	**510.7**

ADB = Asian Development Bank, CG = Chhattisgarh, IDC = interest during construction, LIBOR = London interbank offered rate, MP = Madhya Pradesh.
Financial charges include front-end fee, interest during construction, and commitment fee.

3. Cost Breakdown by Project Component ($ million)

Component	Appraisal Estimate	Actual
1. Road Connectivity Component	**523.1**	**475.4**
Land Acquisition and Resettlement	9.6	0.2
Civil Works	487.1	459.4
PIC and Independent Monitoring of Land Acquisition	26.4	15.8
2. Asset Management & Capacity Building Component	**8.2**	**4.6**
PMC and Performance Audit	3.7	1.5
Road Safety Consultant	0.2	
Community Road Safety Program	1.4	
Capacity Building	1.9	
Incremental Administration	1.0	3.1
3. Front End Fee	**2.0**	**2.0**
4. Interest During Construction	**37.7**	**28.7**
Total	**571.0**	**510.7**

PIC = project implementation consultant, PMC = project management consultant.

4. Project Schedule

Item	Appraisal Estimate	Actual
Date of Contract with Consultants		
Project Management Consultants	Q1 2004	Apr 2005
Project Implementation Consultants	Q1 2004	May 2005
Civil Works Implementation Schedule		
Madhya Pradesh State		
Batch I	Q4 2004–Q4 2005	Dec 2004–Aug 2008
Batch II	Q1 2005–Q1 2006	Jun 2005–Jun 2009
Batch III	Q3 2005–Q3 2006	Dec 2005–Jun 2009
Batch IV	Q4 2006–Q4 2007	Jan 2006–Jun 2009
Chhattisgarh State		
Batch I	Q4 2004–Q4 2005	Jan 2005–Jun 2008
Batch II	Q1 2005–Q1 2006	Dec 2005–Jun 2009
Batch III	Q3 2005–Q3 2006	May 2006–Jun 2009
Consultant Service Schedule		
Project Management Consultants	Q2 2004–Q4 2007	Apr 2005–Sep 2008
Project Implementation Consultants	Q2 2004–Q4 2007	Jul 2005–Jun 2009
NGOs		Jun 2006–Jun 2009

5. Project Performance Report Ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
From 31 Dec 2003 to 30 Jun 2004	S	S
From 1 Jul 2004 to 31 Dec 2004	S	U
From 1 Jan 2005 to 30 Jun 2005	S	S
From 1 July 2005 to 31 Dec 2005	S	S
From 1 Jan 2006 to 30 Jun 2006	S	S
From 1 July 2006 to 31 Dec 2006	S	S
From 1 Jan 2007 to 30 Jun 2007	S	S
From 1 Jul 2007 to 31 Dec 2007	S	S
From 1 Jan 2008 to 30 Jun 2008	S	S
From 1 Jul 2008 to 31 Dec 2008	S	S
From 1 Jan 2009 to 30 Jun 2009	S	S

S = satisfactory, U = unsatisfactory.

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members[a]
Identification Mission				
Fact-finding Mission	28 Oct–12 Nov 2002	7	105	a, b, c, d, a, a, a
Consultation Mission	5–11 Mar 2003	1	7	a
Appraisal Mission	5–18 Jun 2003	4	44	a, j, a, i
Inception Mission	22–30 Aug 2005	3	27	a, g, h
Special Loan Administration Mission	12–21 Oct 2005	4	32	a, a, c, d
Tripartite Portfolio Review	18–19 Nov 2005	2	2	a, i
Review Mission 1	12–19 Oct 2006	2	16	a, h
Review Mission 2	29 Jan–2 Feb 2007	2	8	a, b
Review Mission 3	19–22 Jun 2007	2	4	a, a
Disbursement Review Mission	2–5 Jul 2007	1	5	f
Review Mission 4	29–31 Jul 2007	2	6	a, b
Midterm Review Mission	15–21 Sep 2007	3	21	a, b, h
Review Mission 5	14–21 Jul 2008	5	40	a, b, c, d, e
Special Loan Administration Mission	17–20 Apr 2009	2	8	a, b
Consultation Mission	9–11 Mar 2011	4	10	a, d, h, k
Project Completion Review Mission	15–25 Apr 2011	3	30	a, d, h

[a] a = transport specialist, b = project engineer, c = environment specialist, d = social specialist, e= procurement consultant or specialist, f = disbursement assistant, g = director's advisor, h = analyst, i = director, j = counsel, k = portfolio management specialist

I. PROJECT DESCRIPTION

1. Lack of road connectivity was among the main underlying causes of poverty in India, and was an obstacle to realizing the growth potential in rural areas. Past neglect of the road network meant that much of the rural population lived in areas that were cut off from the economic and social mainstream. In an effort to address this issue, the Government of India established a national rural roads program known as Pradhan Mantri Gram Sadak Yojana (PMGSY—Prime Minister's Rural Roads Program) in 2000. Under PMGSY, more than 160,000 habitations[1] were identified for new road connectivity investments. The total cost for 2002–2007 was estimated at Rs. 550 billion (about $11 billion equivalent), of which the government would fund 32%.[2] The Asian Development Bank (ADB) was asked to fund part of the balance of 68% through a series of loans beginning with the proposed project in the states of Madhya Pradesh and Chhattisgarh.

2. Upon request from the government in 2002, ADB approved a loan for Rural Roads Sector I Project in November 2003. [3] The project aimed to reduce poverty and support economic growth by providing enhanced access to markets, employment opportunities, and social services, including health and education. The total project cost was estimated at $571.0 million equivalent, which would be financed by an ADB loan of $400.0 million and a counterpart fund of $171.0 million equivalent from the government.

3. At appraisal, the project would finance the construction of about 11,000 kilometers (km) of rural roads—about 5,500 km each in the states of Madhya Pradesh and Chhattisgarh. Consulting services would be provided to support preparation and implementation of road construction, to establish sustainable asset management systems for PMGSY rural road networks in these two states, and to build capacity and provide training. The project was to be implemented in four batches over a period of 5 years and completed by December 2007. The first batch of subprojects (the sample roads) would be ready for contract award in July 2004 and the remaining three batches would be agreed during the ADB Inception Mission. The project's executing agency was the Ministry of Rural Development (MORD) at the central level and the respective state governments at the state level. The implementing agencies were Madhya Pradesh Rural Roads Development Agency (MPRRDA) and Chhattisgarh Rural Roads Development Agency (CGRRDA) at the state level.

4. The project's beneficiaries comprise the bulk of the rural population of the two states, including (i) direct users of road transport; (ii) those benefiting indirectly by living in the areas of the roads' influence, or because of higher economic growth in their districts and in the states as a whole. The economic internal rate of return (EIRR) of the sample subprojects was estimated at 26.6%. The project would also establish the financial and contractual commitments necessary to ensure that assets created would be adequately maintained. The subproject selection criteria incorporated provisions for reducing poverty in very poor and remote areas. The project would also offer a unique opportunity to document the impact of rural road development on poverty reduction and human development in India. The implementation arrangements, notably the establishment of State Rural Roads Development Agencies (SRRDAs) in Madhya Pradesh and Chhattisgarh, were expected to enhance PMGSY's implementation and avoid the problem of

[1] A habitation is the unit used by PMGSY. A habitation is a cluster of population, living in an area, the location of which does not change over time. It is not a 'revenue village' or a '*Panchayat'*.

[2] The government financed PMGSY from a 50% share of the additional excise duty (cess) on high-speed diesel.

[3] ADB. 2003. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to India for the Rural Roads Sector I Project.* Manila. (Loan 2018-IND, approved on 20 November 2003.)

staff overhang. Also, the project included road safety measures targeted at mitigating the accident risks associated with project road connectivity improvements.

5. In conjunction with the project, technical assistance (TA) was provided to assist in preparing the Rural Roads Sector II Investment Program (RRSIIP).[4] The total cost of the TA was estimated at $1.25 million equivalent. The Government of the United Kingdom would finance $1 million equivalent, on a grant basis, covering all the foreign exchange costs ($327,800) and part of the local currency costs.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

6. The project focused on assisting the poor by providing road connectivity. In line with the government's priorities for the Tenth Five-Year Plan 2002–2007,[5] this was to be addressed primarily by supporting economic growth, including both high growth and equitable, pro-poor growth. The theme of ADB's country strategy and program (CSP) for 2003–2006 was mainstreaming poverty reduction. Specifically, the CSP pointed to emerging consensus over the importance of infrastructure in poverty reduction through both its indirect impact on growth leading to increased incomes and employment and its direct contributions to incomes, employment, and improved access to social services. The CSP also identified the need for infrastructure projects to incorporate institutional reforms to improve sustainability, particularly by establishing sound approaches to maintenance.

7. In the two states of Madhya Pradesh and Chhattisgarh, where the poverty rates were among the highest in India, about three-quarters of the population lived in rural areas, majority of which did not have an all-weather road connection. The necessary new road connectivity investments in these two states comprised 15% of the total investments under PMGSY.

8. During and after implementation, the project was deemed highly relevant for the government's objectives and policies, as well as ADB's country strategy. At completion, 9,574.7 km of rural roads were constructed, which significantly improved connectivity in the project area. The project had remarkable socioeconomic impacts and directly benefited 3,207 habitations, about 11 million people (see para 9). Consulting services assisted successful implementation and capacity building of rural road development and maintenance. Although some of the project's components were cancelled or revised (see paras. 15, 26, and 27), they were still implemented under other funding programs. Overall, the project's design and formulation were adequate and the implementation results successfully fulfilled the government's development objectives and ADB's country strategy. The project framework is in Appendix 1.

B. Project Outputs

1. Civil Works

9. A total of 9,574.7 km of all-weather rural roads (5,061.8 km in Madhya Pradesh, 4,512.9 km in Chhattisgarh) were rehabilitated under the project, which covered 2,175 roads (1,083 in

[4] ADB. 2005. *Report and Recommendation of the President to the Board of Directors on a Proposed Multitranche Financing Facility India: Rural Roads Sector II Investment Program*. Manila.

[5] *Tenth Five Year Plan (2002–2007)*, Planning Commission, Government of India. http://www.planningcommission.nic.in/plans/planrel/fiveyr/10th/default.htm

Madhya Pradesh and 1,092 in Chhattisgarh) and 3,207 habitations (1,551 in Madhya Pradesh and 1,656 in Chhattisgarh). Also 1,222 habitations with populations below 500 were incidentally connected. The beneficiaries from the project are estimated to be more than 11 million people.[6] The output of road length was shorter, but the number of connected habitations was larger than those at appraisal (11,000 km and 1,900 habitations in total). The rehabilitation comprised mainly (i) strengthening and widening the roads; (ii) adding black top to the existing roads; and (iii) adding structures to enhance road protection. According to the PMGSY standard, the rural roads were designed to be 7.50 meters (m) roadway width with 3.75 m carriageway. At completion, the civil works were implemented in four batches,[7] with a road length of 834.68 km for Batch I, 2,758.57 km for Batch II, 3,906.27 km for Batch III, and 2,075.00 km for Batch IV. During implementation, minor engineering revisions of civil works were made to meet real needs, mainly on (i) strengthening drainages; (ii) adding more cement concrete top at the sections of water crossing and residential areas; and (iii) enhancing road protection and safety.

10. During implementation, quality control was conducted out as the contracts required. The consultants inspected and assessed the works to ensure that specifications had been met. Most roads are in the defect liability period (within five years after completion) at the time of this report, and the ADB's project completion review (PCR) mission observed that the rehabilitated roads visited were of good quality; the road surface roughness was within the international roughness index for a comfortable ride; safety and environmental protection facilities were installed on some roads; and routine maintenance of the project roads was in place.

2. Consulting Services

11. The project management consultant (PMC) and project implementation consultants (PICs) were recruited for project management and construction supervision as envisaged at appraisal. One consulting firm was recruited as the PMC to assist MORD through NRRDA, and six consulting firms were recruited as the PICs to assist the two implementing agencies in Madhya Pradesh and Chhattisgarh. In addition, two nongovernment organizations (NGOs) were recruited to carry out independent monitoring of implementation of the land acquisition plan (LAP). Upon completion, total consulting services of 139 person-months for the PMC and 24,726 person-months for the PICs had been provided. However, some outputs required in the initial terms of reference (TOR) were cancelled during implementation (see paras. 26–27).

C. Project Costs

12. The project cost at completion was $510.7 million, about $60 million (11%) lower than the $571.0 million estimated at appraisal. The actual cost of civil works was $459.4 million, against $487.1 million at appraisal (6% lower). The cost decrease was mainly due to some

[6] Of 3,207 habitations, 1,551 had populations of 1,000 or more, and 1,656 of between 500 and 1,000, based on the 2001 census. Similarly, of 1,222 habitations incidentally connected, 563 had populations of between 250 and 500, and 659 of below 250. The number of people connected was estimated using average populations of 2,000 for habitations above 1,000, 750 for those between 500 and 1,000, 375 for those between 250 and 500, and 125 for those below 250. In ADB Results Framework, beneficiaries from rural road projects are defined as entire population living in the direct vicinity of the road, so the number of beneficiaries was estimated by doubling the newly connected population, thus incorporating the number of people living on the starting side of the road. The estimation also incorporated the 18% decadal growth rate of rural populations in both Madhya Pradesh and Chhattisgarh from 2001 to 2011.

[7] The roads in the first batch were selected during project preparation as sample subprojects and the rest (batches II, III, and IV) were selected during implementation.

reduction of scope (para. 28), and also, to some extent, currency fluctuation.[8] However, the unit cost per km for civil works increased by about 12% because of changes in engineering aspects (para. 9) and increases in the price of construction materials. The costs for consulting services were significantly reduced from $3.7 million to $1.5 million for the PMC and from $26.4 million to $15.8 million for the PIC, mainly due to some reduction of scope (paras. 26–27). The costs for project management were estimated and included in the overall cost. Appendix 2 shows the total project cost at appraisal and at completion.

13. Under the financing plan envisaged at appraisal for the project, ADB was to provide a loan of $400.0 million (70.1% of the total project cost) to finance 85.2% of the foreign exchange costs and 56.5% of the local costs. The government was to finance the remaining foreign and local costs. At completion, $366.4 million of the ADB loan was disbursed, which covered 71.8% of the total project costs, including 92.3% of the foreign exchange costs and 53.1% of the local costs. The government financed all financial charges, including the front-end fee, interest during construction, and commitment charges, as anticipated at appraisal. The appraisal and actual financing plans are in Appendix 2.

D. Disbursements

14. The ADB loan was approved on 20 November 2003 and became effective on 25 January 2005. The first disbursement of the loan was on 25 November 2005. The loan disbursement was slow at the beginning because of a delay in the preparation of withdrawal applications. The ADB mission[9] organized trainings on ADB disbursement procedures for the project implementation unit (PIU); the disbursement level increased in the third quarter of 2006 and reached its peak in 2007. Because of the delay in physical and financial progress (para. 15), the government proposed extending the loan closing date by one year, from 30 June 2008, anticipated at appraisal, to 30 June 2009.[10] ADB approved the request[11] on 23 May 2008. The loan was eventually closed on 9 June 2009 and the final disbursement was made on 9 October 2009. In the loan agreement, the ADB loan was only allocated to civil works ($394.4 million) and capacity building ($5.6 million). During implementation, the ADB loan was reallocated according to actual needs and implementation progress (see Basic Data for loan allocation). At loan closing, $33.6 million of the loan was cancelled as an unutilized amount[12] after the last disbursement. The actual ADB loan disbursement for the project is in Appendix 3.

E. Program Schedule

15. It was envisaged at appraisal that the project would be implemented over 5 years, including preconstruction activities, and would be completed by 31 December 2007. However, the project's preparation and procurement activities were substantially delayed, which delayed the awarding of the civil works contracts (para. 25). Despite significant efforts made by SRRDAs, some civil works still could not be implemented due to the contractors' poor response. Because of these difficulties, some civil works packages were dropped; some other contracts

[8] The U.S. dollar–Indian rupee exchange rate was $1.00 = Rs45.34 at appraisal (Oct 2003). During the final year (July 2008–June 2009), when 20% of the total expenditure was disbursed, the Indian rupee was valued less, at $1.00 = Rs47–51. However, one year earlier (July 2007–June 2008), when 30% of the total expenditure was disbursed, the Indian rupee was valued more, at $1.00 = Rs39–42. Although the total contribution of currency fluctuation to the Project cost can be regarded as minimal, the weaker Indian Rupee during the final year of the Project was one factor which made it difficult for the Project to consume all the remaining loan proceeds.

[9] ADB BTOR of the review mission for IND: Rural Roads Sector I Project (12–19 October 2006)

[10] Letter from the Government of India asking to extend the loan closing date. Ministry of Finance, 25 April 2008.

[11] Fax of ADB approving extension of loan closing date. SATC, 23 May 2008.

[12] Fax of Cancellation of Unutilized Loan Balance for Loan 2018-IND. SATC, 23 October 2009.

were split into smaller contracts, permissible under PMGSY guidelines; and some contracts were terminated. All the remaining civil works were completed by June 2009. Overall, completion of the civil works was delayed by 18 months, causing the ADB loan closing date to be extended. The actual implementation schedule is compared with the schedule at appraisal in Appendix 4, and a chronology of the main events is in Appendix 5.

F. Implementation Arrangements

16. As arranged at appraisal, the executing agencies for the project were MORD, at the central level, and respective state governments at the state level. During implementation, a Coordination Committee, composed of leaders from relevant agencies, was established at the central level to monitor the use of the loan and overall implementation. Similar committees were also established at the state level, under PMGSY guidelines, to monitor timely implementation of the project. At the central level, the implementing agency was NRRDA, and, at the state level, MPRRDA and CGRRDA.[13] Each implementing agency at the state level was headed by a CEO responsible for overall coordination of the project implementation, including planning, management, consultant selection, procurement, and execution of work through PIUs. These arrangements were based on PMGSY guidelines and had been used in the states since 2001. The most recent organization diagram of the project implementation, including that of National Rural Roads Development Agency (NRRDA), is in Appendix 6.

17. The PMC was recruited for better implementation. The PMC's major responsibility was to assist the implementing agency at the central level with (i) screening and processing additional subprojects; (ii) procuring training services; (iii) monitoring compliance of safeguard polices; (iv) establishing a road maintenance, planning, and management system; and (v) monitoring project performance and socioeconomic impact. Six PICs were recruited to (i) support the states in preparing subprojects; (ii) supervise and monitor the quality control of civil works; (iii) support implementation of the LAP and mitigate the social impacts; and (iv) implement the environmental management plan. Two NGOs were also recruited to monitor and verify land acquisition for the project.

G. Conditions and Covenants

18. The project implementation complied with most of the loan conditions and covenants. An issue was found with the PMC, who could not implement all the tasks required. Two separate audits were carried out, one at the central level and the other at the state level. The implementing agencies prepared all monthly progress reports and submitted them to NRRDA. NRRDA submitted all quarterly project progress reports in a timely manner to ADB, including the domestic PCR in the ADB-requested format.

19. It was agreed in the loan covenants that Madhya Pradesh and Chhattisgarh would employ contractors to carry out maintenance of all PMGSY and project roads, which was complied with. It was further agreed that SRRDAs would transfer maintenance of the PMGSY roads to designated *Zilla Panchayats* (district councils), consistent with the PMGSY guidelines. However, due to the current lack of capacity in *Zilla Panchayats*, this will be complied with in the future (para. 41).

20. All of the loan covenants covering environmental and social areas were complied with. The implementing agencies prepared an initial environmental examination (IEE) for each

[13] NRRDA was established on 14 January 2002 under the Societies Registration Act XXI of 1860.

subproject under subsequent annual batches. The mitigation measures identified were included in the bidding documents and implemented during construction. Adequate drainage measures were incorporated into the project design and constructed to ensure that drainage is efficient and there is no waterlogging. The additional subprojects were prepared as per the guidelines of the land acquisition framework (LAF) and these were reviewed by the PMC for necessary compliance. Madhya Pradesh and Chhattisgarh disclosed the approved LAP of the additional subproject to the people and communities that would be affected by it before the awarding of work contracts. The implementing agencies recruited NGOs to monitor and verify implementation of the LAPs. The implementing agencies, with help from the PMC, also monitored the socioeconomic impact of the project, conducting a baseline survey and follow-up surveys.

21. The covenant regarding road safety was also complied with. During implementation, the PMCs developed a draft road safety guide and road safety campaign materials and also conducted road safety audits on some sample roads.

H. Related Technical Assistance

22. To respond to the government's request to process funding for PMGSY in an urgent manner, ADB implemented several small-scale TA projects to prepare for the project, including (i) Economic Studies for the Rural Roads Sector Development (TA 3914-IND); (ii) Engineering Studies for the Rural Roads Sector Development (TA 3915-IND); (iii) Environmental Analysis for the Rural Roads Sector Development (TA 3916-IND); (iv) Institutional and Policy Development Studies for the Rural Roads Sector Development (TA 3917-IND); and (v) Social Analysis for the Rural Roads Sector Development (TA 3918-IND). Implementation of these TA projects contributed substantially to the project's preparation.

23. In conjunction with the project, a project preparation TA was provided for the RRSIIP,[14] which focused on preparation and assessment of proposed rural road projects in the states of Assam, Orissa, and West Bengal. The TA project was implemented between November 2004 and August 2005. An international consulting firm[15] and individual consultants were recruited to implement the TA project, focusing on (i) institutional and policy development; (ii) project engineering; (iii) economic evaluation (sample checks); (iv) road safety; (v) social assessment; and (vi) environmental assessment. At completion, a total of 79 person-months of consulting services[16] were provided at the total actual cost of $ 0.85 million.

I. Consultant Recruitment and Procurement

24. Consultants were recruited as envisaged at appraisal and in conformance with ADB's *Guidelines on the Use of Consultants* (2002, as amended from time to time). An international consulting firm was recruited as the PMC based on quality- and cost-based selection. The contract with the selected PMC[17] was signed on 29 April 2005 for 659 person-months, including 120 person-months for international consultants and 539 person-months for national consultants. The contracts with the six selected PICs[18] were signed between May and June

[14] ADB. TA 4220-IND: Rural Roads Sector II Project. Closed.
[15] Scott Wilson Kirkpatrick India Pvt. Ltd.
[16] Final Report on Technical Assistance for Rural Roads Sector Development Project. Scott Wilson Kirkpatrick India Pvt. Ltd. December 2005.
[17] Louis Berger Group Inc., United States, in association with Hifab International AB, Sweden.
[18] LEA Associates South Asia Pvt. Ltd (Package 1), High Point Rendel (India) Pvt. Ltd (Package 2), and Meinhardt (Singapore) Pte. Ltd (Package 3) were positioned as the PICs in Madhya Pradesh. Consulting Engineering

2005 for a total of 24,584 person-months, including 306 person-months for international consultants and 24,278 person-months for national consultants.

25. All procurements for civil works contracts conformed to ADB's *Procurement Guidelines* (1999, as amended from time to time). As all the contracts were below $3 million, a national competitive bidding procedure acceptable to ADB was used. At the beginning, the procurement for civil works packages was much behind the original schedule due to (i) a delay in the preparation of bidding documents; (ii) slow selection and preparation of subprojects; and (iii) inadequate response of contractors. To expedite procurement and implementation, the implementing agencies asked ADB to allow parallel action on procurement while preparing each subproject, which was supported by the ADB review mission.[19] From October 2004 to October 2007, 509 contracts for civil works were awarded in four batches.[20] The summary of the contract packages for civil works, with contracted and actual values, is in Appendix 8.

J. Performance of Consultants and Contractors

26. Although mobilization was slow, the PMC provided substantial consulting services, as required in the TOR, including project management assistance, project appraisal, project performance monitoring, and capacity building of PMGSY stakeholders. However, a delay in the project's implementation made some of the capacity building components redundant.[21] NRRDA, therefore, sought more specific expertise in the fields of road maintenance and safety, where inputs based on international experience would be much needed, and the TOR for the PMC was revised to expand the scope of work to prepare the Road Maintenance Manual and Road Safety Manual; ADB approved this revision in principle. Despite this revision, the PMC could not provide the expertise required for the extended service. As a result, the contract with the PMC was closed on mutually agreed terms and conditions on 23 September 2008. At completion, 318.8 person-months of consulting services had been provided, including 64.1 person-months for international consultants and 254.7 person-months for national consultants. The executing agencies rated the PMC's performance satisfactory, considering its limited experience in rural road projects.

27. The PICs were mobilized very slowly at the beginning due to difficulties in deploying staff, which affected the project's performance. The ADB mission asked the PICs to mobilize the staff that the project urgently needed.[22] MPRRDA also proposed engaging local consultants to cover the districts for which PIC's field-based staffs were not available. Eventually, the PICs provided consulting services in construction supervision, monitoring, quality control, safeguard compliances, and preparation of additional subprojects. During implementation, the service coverage of each PIC was revised according to their availability and expertise. At completion, 24,726 person-months of PIC services had been provided, including 231 person-months for

---

Services (India) Pvt. Ltd (Package 1), Joint Venture of Meinhardt (Singapore) Pte. Ltd and Artefact Projects. Ltd (Package 2), and High Point Rendel (India) Pvt. Ltd (Package 3) were positioned as the PICs in Chhattisgarh.

[19] ADB. BTOR of the review mission for IND: Rural Roads Sector I Project (22–30 August 2005). Parallel action means to carry out civil works procurement simultaneously with subproject appraisal. If ADB does not approve some of the subprojects tendered, the implementing agencies will not finance those under this project.

[20] In Madhya Pradesh, civil works contracts were awarded from October 2004 to February 2005 for Batch I, from October 2005 to November 2006 for Batch II, from December 2005 to June 2006 for Batch III, and from June 2006 to October 2007 for Batch IV. In Chhattisgarh, contracts were awarded in March 2005 for Batch I, from December 2005 to November 2006 for Batch II, and from June 2006 to October 2007 for Batch III.

[21] NRRDA's project implementation capacity had been building up since 2001 through everyday implementation activities of PMGSY projects. Especially in areas specific to implementation in India, and also specific to handling small-scale projects like rural roads, NRRDA became as, or more, capable as the PMC of project implementation.

[22] ADB. BTOR of the review mission for IND: Rural Roads Sector I Project (22–30 August 2005).

international consultants and 24,495 person-months for national consultants. Fewer international consultants and more national consultants were used. The executing agencies rated only two PICs in Chhattisgarh and one PIC in Madhya Pradesh satisfactory, while the others were rated unsatisfactory.

28. Both states engaged NGOs to monitor LAP implementation.[23] Both NGOs verified the sample land acquisition plan in all the batches. No adverse impact on any vulnerable classes or community was identified. The monitoring reports were submitted to ADB in a timely manner and the executing agency generally rated them satisfactory.

29. At completion, 467 contract packages were financed by the ADB loan,[24] including 264 packages in Madhya Pradesh and 203 packages in Chhattisgarh. The performances of the contractors for civil works were mixed in both states. About 10% of the contractors could not complete the work despite extensions, resulting in some contracts being terminated or dropped from the packages financed by ADB, and some works being reallocated to other contractors. The contractors' poor performance was mainly due to the rapidly increasing number of construction projects in India. As a result, contractors were overwhelmed, machinery was unavailable, and road construction materials were in short supply. Unfavorable weather conditions and flooding also affected performance. Taking these limitations into account, the executing agency rated the contractors' performance satisfactory.

K. Performance of the Borrower and the Executing Agency

30. The implementation arrangement was well established and ensured efficient and timely management of project implementation. The government provided the required counterpart funds and all necessary support in a timely manner. During implementation, the executing agencies provided close and regular monitoring and coordination of the construction progress and quality control of the project. The executing agencies, with assistance from the consultants, prepared the required periodic project progress reports. Chartered accountants audited the project's financial accounts and statements and the audit reports[25] were submitted to ADB as required under the loan agreement. The auditors indicated that the ADB loan proceeds were used properly. ADB significantly improved the executing and implementing agencies' capacity through TA projects and other capacity building programs. The executing and implementing agencies also facilitated ADB's regular review and PCR missions as required. Considering that the project was the first such rural road project financed by ADB, the executing and implementing agencies performed creditably. The performance of the borrower and the executing agencies was rated highly satisfactory.

L. Performance of the Asian Development Bank

31. The project was administered and supervised from ADB headquarters. During implementation, ADB was closely involved in identifying potential problems and conducted regular reviews, to resolve issues related to the project's implementation. ADB also conducted 10 review missions (see Basic Data). ADB also conducted regular procurement and disbursement audits, provided advice on incorporating additional items related to road safety,

[23] MPRRDA engaged Asra Samajik Lok Kalyan Samiti. CGRRDA engaged the Bhilai chapter of the society of Madhya Pradesh.

[24] Batch I consisted of 32 contracts (18 contracts in Madhya Pradesh and 14 contracts in Chhattisgarh), Batch II of 125 contracts (22 contracts in Madhya Pradesh and 103 contracts in Chhattisgarh), Batch III of 195 contracts (109 contracts in Madhya Pradesh and 86 contracts in Chhattisgarh), and Batch IV of 115 contracts in Madhya Pradesh.

[25] Audited project accounts and financial statements (2005–06, 2006–07, 2007–08, and 2008–09).

and helped improve the revised TOR of PMC to include tasks for road safety and a road maintenance manual. The approvals of the documents, Request for Proposal (RFP), and reports on the procurement of civil works, and the engagement of consultants were issued quickly. ADB provided regular reviews on compliance with the project's social and environmental safeguards. The executing and implementing agencies recognized the role of the ADB missions in advising on technical issues and contract administration. ADB's overall performance is rated highly satisfactory.

III. EVALUATION OF PERFORMANCE

A. Relevance

32. The project, being part of PMGSY, is highly relevant to the government's Tenth Five-Year Plan 2002–2007, and ADB's CSP for 2003–2006, as well as its objectives at appraisal. Overall, implementation of the project was successful and achieved its objectives as anticipated at appraisal. The project's outputs and outcomes also proved that it was significant, timely, and effective for implementation of PMGSY.

B. Effectiveness in Achieving Outcome

33. The project was rated highly effective in achieving its purposes. Most of the objectives stated in the project framework were achieved through the designed activities (Appendix 1).

34. During the loan preparation, it was found that the total number of unconnected habitations identified for new connectivity investment under PMGSY was 9,502 in Madhya Pradesh and 15,608 in Chhattisgarh, together equivalent to about 15% of the national total. Implementation of the project was expected to improve rural transport and reduce poverty; about 1,900 habitations were targeted for the new connectivity. It was estimated that a substantial portion of the vehicle operation cost savings from rural road improvement would go to motorists and that road safety would be substantially improved.

35. At completion, a greater number of habitations were connected (3,207 habitations, compared with the target of 1,900) despite the fact that a shorter length of rural roads was constructed (9,574.7 km, compared with about 11,000 km planned at appraisal.) The average vehicle operating speed was twice as high on the project roads, and bus fare was reduced by about 11% in real terms. In conjunction with state road development in the project area, a comprehensive rural road network was developed, which substantially boosted local transport service development and brought huge socioeconomic benefits to the local residents, especially the poor (see Appendix 11 for details on socioeconomic impacts). The improved road connectivity will continue to promote economic development and improve socioeconomic standards in rural habitations.

36. During implementation, an effort was made to establish a sustainable asset management system for rural roads. PMC experts developed a concept document on the basis of conditions prevailing in the project states. The current management status was rated satisfactory; the routine and periodical maintenance of the project roads was observed in place, and sufficient maintenance budget has been allocated by the states' governments (para. 41). However, improved efficiency of the asset management is necessary, especially when more roads are to be constructed and maintained (para. 42[v]). To mitigate the risk of road accidents, road safety audit guidelines were prepared and circulated to all the states. A sample road safety audit on more than 10% of the roads was carried out by the PMC and PICs. The audit's

recommendations helped the states mitigate road safety risks on those roads. Additionally, the project's capacity building programs helped the states establish the necessary procedures, financing arrangements, and institutional capacity to ensure the sustainability of road assets created under PMGSY. The TA related to the project enabled the state governments and *Zilla Panchayats* to serve as strategic managers of their PMGSY rural road networks, providing detailed professional and technical studies and supervision. All civil works were outsourced to the private sector.

C. Efficiency in Achieving Outcomes and Outputs

37. During implementation, the PMC surveyed baseline traffic in 2005–2006 on sample project roads (40 roads in Madhya Pradesh and 33 roads in Chhattisgarh) and control roads (unrehabilitated roads).[26] In 2006–2007 and 2008, the PMC conducted follow-up traffic surveys on the same sample roads.[27] In the 2008 monitoring report, traffic changes over the surveys were compared. The survey and analysis results showed that traffic increased sharply. The surveys also showed that the average vehicle speed was about 40–60 km per hour on the project roads and 20–30 km per hour on the control roads. During the PCR mission, a supplementary traffic survey was conducted to collect the latest traffic counts on sample project roads. Based on the latest counts, the traffic forecast was revised to consider the faster socioeconomic development, improvement of road networks, and rapidly increased registration of motorized vehicles in the project area. The revised traffic forecast was also compared with the traffic analysis in the other ADB-financed rural road projects under PMGSY. Traffic on the Project roads was estimated to increase annually by an average 7–10% before 2012, by 6% in 2013–2017, and 3% from 2018. The revised traffic increase rates are slightly higher in the beginning than those anticipated at appraisal to reflect faster socioeconomic development in the Project area.[28] The revised traffic forecast was used in the PCR mission's economic reevaluation. The revised traffic forecast is in Appendix 9.

38. To better measure the project's efficiency, the PCR mission reevaluated the EIRR using both a similar methodology to that adopted at appraisal and the updated data. The economic reevaluation compared the economic costs and benefits for "with" and "without" the project cases. The economic benefits considered in the reevaluation include (i) vehicle operating cost (VOC) savings; (ii) passenger time cost savings; and (iii) other potential benefits. The recalculated EIRR of the project roads was 30.8% for the whole project (28.6% for the Madhya Pradesh component and 32.5% for the Chhattisgarh component).[29] In comparison with the initial EIRR of 26.6% at appraisal, the higher EIRRs were mainly due to much more actual traffic than that estimated at appraisal.[30] The recalculated EIRRs are above the ADB-recommended social discount rate of 12%, and the project can be considered economically viable. The EIRRs were subjected to a sensitivity analysis to test different scenarios. The results of the analysis show that the project continues to be economically viable for all scenarios. In a case with low traffic level (20% lower than normal), the EIRR was 24.2%. In a case with a combination of both a 20% maintenance cost increase and a 20% benefit reduction, the EIRRs would be 25.0% for the

[26] Louis Berger Group, Inc. Monitoring of Socioeconomic Impacts—Baseline & Half Yearly Report for MP. October 2006; Monitoring of Socioeconomic Impacts—Baseline & Half Yearly Report for CG. October 2006.
[27] Louis Berger Group, Inc. Socioeconomic Impacts Assessment for MP. August 2007; Socioeconomic Impacts Assessment for CG. August 2007.
[28] At appraisal, it was estimated that the forecast overall growth rate was approximately 7% for 2003–2010 and 6.3% beyond 2010.
[29] The average amount of traffic per road in Chhattisgarh is much higher than that of Madhya Pradesh.
[30] This is true only for the sample roads in batch I.

whole project. The economic reevaluation is in Appendix 10. Because none of the project roads have tolls and thus lack any source of revenue, no financial reevaluation was made in the PCR.

D. Preliminary Assessment of Sustainability

39. The continuous implementation of PMGSY, with external assistance from development partners, has ensured the sustainability of rural road development and poverty reduction in India. The project is ADB's first loan for rural roads in India. RRSIIP is ongoing and RCIP[31] is being processed. The World Bank's first loan-credit for $400 million was approved in September 2004 to finance road improvement under PMGSY in Himachal Pradesh, Jharkhand, Rajasthan, and Uttar Pradesh. Concurrently, ADB has designed and financed many socioeconomic development projects in the project area in the fields of economic growth, state road improvement, power and energy development, and poverty reduction.

40. To extend support to PMGSY implementation, NRRDA was established in 2002 to focus on technical specifications, project appraisal, quality monitoring, and management of monitoring systems. NRRDA has been conceived as a compact, professional, and multidisciplinary body to provide the requisite technical and management support to MORD and the state governments to effectively implement their programs. In the meantime, state governments are responsible for planning, implementation, and maintenance. The institutional framework, established for the proper project implementation, not only ensured successful implementation of the project but also provided a sound foundation for sustainable implementation of PMGSY.

41. To ensure good maintenance of the rural roads created under the project, the contracts for civil works contained a provision requiring the contractors to provide 5 years of post-construction maintenance. According to the latest arrangements, SRRDAs in both states are still responsible for road maintenance after the first 5-year liability period, due to the *Zilla Panchayats*' inadequate technical expertise and financial capability. With the budget that the state governments have provided, the SRRDAs' regional PIUs employ contractors to carry out routine and periodical maintenance of all PMGSY and project roads. In general, PIUs grant 5-year contracts to contractors for annual routine maintenance and one periodical maintenance for all roads in the contract period. The PIUs are also responsible for monitoring road conditions and developing appropriate maintenance plans. The PMGSY guidelines stipulate that the state governments should take steps to build up capacity in the *Zilla Panchayats* and eventually transfer the maintenance function to them. Currently, *Zilla Panchayats* participate in maintenance planning and provide comments on prioritizing maintenance activities and projects. The ADB PCR mission noticed during site visit that the roads created under the project were well maintained, and that the funds and capacity for road maintenance were generally sufficient.

42. However, special attention should be paid to the following issues for maintaining the project's sustainability:

(i) There were some weaknesses in the design stage, especially with site reconnaissance and considering design alternatives. Strengthening this part would avoid unwanted issues and associated delays in the project's later implementation.
(ii) Accounting for future traffic growth should be systematically strengthened, both in planning methodology and also in broader road network management. Rural roads remain vulnerable with regard to through traffic and excess loads.

[31] The proposed Rural Connectivity Investment Program.

(iii) Research into and development of locally available materials should be increased. Providing specifications and standards will encourage the use of locally available materials as a cost-effective option, one recommended in the PMGSY guidelines.
(iv) Provision of road furniture [32] and safety measures should also be improved. Specifications and standards should be studied and developed, and proper funds should be provided. The villagers have set up random speed bumps, of various sizes and materials, on the project roads. Some consistency in criteria for setting these up and for who can install them should be established, in consultation with the community.
(v) More rural roads will be rehabilitated through PMGSY, while institutional capacity remains the same. The emphasis should shift from construction of roads to the operation and maintenance of road networks. Capacity of the road agencies, training of engineers, and implementation of an effective network management system and supply chain should all be considered accordingly. The PIU should also enhance inspections of road conditions and develop maintenance plans, with special attention to the joints of cement and asphalt sections, to avoid serious damage and interruption during the rainy season. Gaps between maintenance contracts should be avoided. There is, in particular, a discrepancy between the extent of the rural road network (80% of the total road network in India) and the supply of skills. The training of civil engineers, technicians, and site supervisors is oriented toward higher category roads.
(vi) The local governments should formulate and implement proper policies to stimulate rural socioeconomic development, which will generate more traffic and make full use of the project roads.

E. Environmental, Socioeconomic, and Other Impacts

43. **Environmental Safeguards.** The project was categorized as environmental category B. During appraisal, in accordance with ADB's *Environmental Guidelines for Selected Infrastructure Projects*, an IEE was undertaken for the sample subprojects. [33] The results indicated that the subprojects would follow existing road/track alignments and would not pass through or be in the vicinity of any environmentally sensitive areas (e.g., areas with significant ecological functions that are designated as national parks, wildlife sanctuaries, or part of the national/international cultural heritage). Hence, the project did not envisage any major adverse environmental impacts. The IEE identified some potential minor impacts from building temporary project offices and storage areas. An environmental mitigation and monitoring program addressed the risk of accidents during the construction and operation stage, shifting of utility lines, and damage to existing roads from hauling construction materials. The IEE concluded that the mitigation measures are manageable, and therefore a full environmental impact assessment was not needed. Assisted by the PICs, the implementing agencies also prepared an IEE for each subproject under subsequent annual batches, focusing on identifying potential environmental problems and the mitigation required. As per the government's statutory requirements, the project is not subject to its Environmental Impact Assessment Notification and does not require mandatory environmental clearance from the Ministry of Environment and Forests. However, the project authorities obtained clearance from the Ministry of Environment and Forests anyway, and from national and state forest departments in case some forest land had to be diverted. Contractors identified quarry sites in consultation with the mining department. During implementation, adequate drainage measures (bridges, culverts, stabilizing structures, and drains) were incorporated into the project design and constructed to ensure that

[32] Road furniture refers to all fixtures in the road and road reserve, for various purposes, including road safety.
[33] ADB. 1993. *Environmental Guidelines for Selected Infrastructure Projects*. Manila; http://www.adb.org/Documents/Environment/IND/IND_Road_Project.pdf

the drainage is efficient and there is no waterlogging. Wherever required, roadside utility lines were shifted before starting construction work in those sections. Some road signs and barricades were provided.

44. **Social Safeguards.** During project formulation, social assessment and a survey of sample households were conducted, to ensure that the width of the existing roads would be sufficient to accommodate a right-of-way of about 7.5 m. As a result, only a minimal amount of land, for shoulder adjustment and drainage construction, would need to be acquired. Also no people would need to be relocated due to minor realignments. Based on the social assessment, an LAP, guided by the government's laws and ADB's policies, was prepared for the sample subprojects.[34] The LAP included an entitlement matrix for various types of losses. An LAF was prepared for subsequent subprojects requiring land acquisition. The LAF provided options for mitigating impacts that included (i) voluntary land contribution, (ii) land replacement, and (iii) cash compensation. The project, wherever required, benefited extensively from voluntary land contribution by affected households. Documents signed by the affected persons were obtained by the implementing agencies, with the assistance of the PICs, and are kept as records of such donations. In very few cases, revenue land was provided to affected persons as replacement land through an extensive legal procedure, with support from the PIU. Documents detailing such replacements, land exchanges, are kept in the PIUs as records of such exchanges. During implementation, the implementing agencies recruited NGOs to independently monitor and verify implementation of LAPs and indigenous people's development plans; the implementing agencies maintain monitoring reports for all batches of the project at the state level.

45. **Socioeconomic Impact.** The PMGSY program is quickly bringing about a socioeconomic transformation in rural India. A 3-year study was undertaken to gauge the project's socioeconomic impact. The survey monitored a sample of 16% of all habitations that were connected by Batch I. The study found that the presence of all-weather roads has directly or indirectly contributed to improvements in the areas of (i) connectivity, (ii) transportation, (iii) government services, (iv) livelihood, (v) commerce, (vii) education, (viii) health, (ix) land value, (x) infrastructure, (xi) social interactions, and (xii) gender empowerment. However, due to the limitations of the study that was conducted, reduced poverty in the project areas cannot be fully attributed to the project. But still the survey found that overall, the aggregate impact has contributed to poverty alleviation in rural communities of Madhya Pradesh and Chhattisgarh. In project villages in Madhya Pradesh, the number of households living below the poverty line decreased by 5% between 2006 and 2008, and similarly, in Chhattisgarh, the number decreased by 2%. The living conditions in connected villages continue to improve and the number of households living below the poverty line will likely continue to decrease.

46. Connectivity has impacted rural living conditions in two ways: (i) giving the communities more reliable and quicker access to outside products, services, information, and social linkages, and (ii) giving external service and product providers and social contacts improved access to rural communities. Connectivity has enabled communities to fully access existing government services that aid rural areas. A detailed analysis of the socioeconomic impact is in Appendix 11.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

[34] Madhya Pradesh Subproject Resettlement Plan and Chhattisgarh Subproject Resettlement Plan, http://www.adb.org/Documents/Resettlement_Plans/IND/Rural_Roads_Sector1/default.asp

47. The project realized its main objectives of supporting the implementation of PMGSY. The rapid socioeconomic development in the project area, the improved rural road development and maintenance system, the increased traffic on the project roads, and the project's social impacts, particularly on the poor, show that the project's impacts, outcomes, and outputs anticipated at appraisal were realized. The recalculated EIRRs were robust. Overall, the project was rated successful.

48. However, the institutional framework for the rural road network management should be further consolidated and sufficient budget should be provided for road maintenance. To ensure sustainability, the government should continue to deepen institutional reforms, implement PMGSY, strengthen measures for road network management, and implement proper socioeconomic development programs to maximize the project's benefits. In addition, the government should study the lessons learned from the project's design and implementation and apply these experiences in ongoing and future PMGSY projects.

B. Lessons

49. The project was the first of its kind to use an ADB loan to implement a rural roads program in India. The project helped the states identify gaps in various program implementation activities. Some of these lessons learned are listed as in the following paragraphs.

50. **Availability of contractors and appropriate contract management.** The project's implementation was delayed at the start primarily because of inadequate project readiness and also because of the insufficient capacity of India's construction industry. The civil work contracts were expected to be completed within 12 months of the issuance of the work order, but the actual average completion time was between 15 and 18 months in both states. Apart from this, some of the delays were due to scheduling contracts during the monsoon season, a problem that can be avoided in future contracts. During implementation, the size of the contracts was adjusted to meet the capacity of contractors, which also can be referenced in future contracts.

51. **Consultant inputs and performance.** Time gaps in preparing TORs for consultancy and actual implementation need to be minimized. Various project activities were drastically changed and some of the PMC's outputs were not relevant to the project's requirements. The PMC and PICs were unable to provide the required manpower in the early stage of implementation; personnel were deployed at only 50 to 60% of the requirement. This affected proper and timely guidance to the projects. The PICs prepared inaccurate Detailed Project Reports, resulting in contract variations. These variations, in turn, delayed the project's completion. Consultants' qualifications, as being suitable to rural roads, should be emphasized in future projects.

52. **Price escalation.** The prices for some materials, especially cement, steel, and asphalt, substantially increased during implementation, especially in Batch II and Batch III. However, there was no price escalation clause in the contract. The large-scale variation in material prices led the contractors to slow down the work in anticipation of prices coming down. Madhya Pradesh has now introduced an escalation clause in the contracts, a practice that might be adopted in other rural road projects.[35]

[35] However, the central government provides no funds for the price escalation. The increased amount will be borne by the states. Still, with the price escalation clause, MPRRDA can avail itself of a cheaper tender price, because the contractors do not need to include the price escalation risk when calculating their tender price.

53. **Safeguards.** The project employed the same standard documentation requirements for safeguards as for large-scale projects like national highways. As a consequence, LAPs were prepared for the sample subprojects, which required a huge amount of documentation. Drawing upon this experience, a simpler framework of LAF was created for subsequent subproject preparation. Simply applying ADB standard documentation requirement did not work well. Project-specific adjustment would be necessary. Ensuing RRSIIP projects further adjusted this procedure with improved community consultation through a community participation framework, in line with the requirements in PMGSY's operations manual developed in 2005.

C. Recommendations

1. Project Related

54. **Further action or follow-up.** The measures for keeping the project sustainable should be strengthened. ADB's continuous support of PMGSY is essential. In future, ADB's support in logistic and regional development might be incorporated, which might maximize the project's benefits. Also, further strengthening of the capacity of rural road network management should be considered, both in terms of institutional arrangement and technical skills.

55. **Timing of the project performance evaluation report.** The project performance evaluation report might be prepared in 2012 or later. By that time most of the project roads will have been fully operational for more than 5 years, and rehabilitation of the whole road network in the project area might be completed. At that point, the traffic, maintenance and physical condition, benefits attained, and impacts on poverty can be better assessed.

2. General

56. The rural road development project will have significant socioeconomic impacts, especially on poverty alleviation, but it will take time for the impacts to be fully realized. Midterm and long-term follow-up monitoring could be considered, to capture more of the project's impact.

57. The development of India's road network has been robust in recent years, with rapidly expanding rehabilitation and maintenance activities. Various institutions, both public and private, have been established for road construction and maintenance, but the quality of services they provide varies, which causes some functional issues in the network, such as well-paved lower hierarchy roads (such as rural roads) becoming an alternative shortcut for the relatively poorly maintained higher hierarchy roads (such as major district roads or state highways). The available resources and implementation capacity of these various institutions should be continuously monitored and improved, to avoid unplanned diversions of traffic that create functional disturbances in the network.

58. The scale and capacity of the contractors have been inadequate, causing considerable construction delays nationwide. Also, a shortage of engineers has caused delays in implementation of works. Considerable scope exists for improving the management of human resources, equipment and materials in the construction industry for timely implementation of road construction projects.

59. Overall, further attention should be paid to enhancing the capacity of road network management in India, in order to maximize the sustainability of the various investments to the road networks, and fully support further economic development.

PROJECT FRAMEWORK

Design Summary	Project Targets	Project Monitoring Mechanisms	Risks/Assumptions	Results
Goal Reduce poverty and support economic growth	Reduced rural poverty rate Improved social indicators in rural areas, including lower rates of maternal and infant mortality, safe deliveries, immunization, lower rates of postprimary school dropout, primary school teacher attendance Increased incomes for farmers who obtain better prices for produce and who diversify crops Increased employment opportunities Increased rural enterprise development	National/regional socioeconomic data Monitoring study of socio-economic impacts	Other complementary factors needed for poverty reduction and economic growth are in place.	The number of households living below the poverty line in connected villages reduced by 5% in Madhya Pradesh (MP) and 2% in Chhattisgarh (CG). Social indicators in rural areas have improved as a whole. Maternal death has decreased by 11% and infant death by 7%. Un-enrolled school children have decreased by 11%, and teacher attendance has increased by 6%. Farmer incomes have increased mainly due to improved transport of goods to markets, 11% of goods are no longer being spoiled or wasted while being transported. Compared to pre-connectivity, 7% more of the village population is now employed. The number of enterprises in the village has increased about 3% since connectivity.
Purpose 1. Provide rural habitations with all-weather road connectivity and reduce associated vehicle operating costs (VOC) 2. Establish sustainable asset management systems for rural roads 3. Mitigate the risk of road accidents on rural roads	About 1,900 rural habitations with over 500 persons provided with all-weather road connectivity in CG and MP by end-2007 Average VOC on project rural roads reduced by about 50% for cars and jeeps, and 40% for buses and trucks Within 2 years of improvement, bus fares to be reduced on average by 10% and freight rates by 20% on project roads in real terms Reduction in average	PMGSY monitoring reports State government budgets Annual road condition surveys Project completion report Monitoring study of socio-economic impacts	Quality of civil works and supervision is good. States adopt asset management systems. States uphold road maintenance financing commitments. Road safety programs influence drivers, pedestrians, and enforcement agencies.	At completion, a total of 9,574.7 kilometer (km) all-weather rural roads (5,061.8 km in MP, 4,512.9 km in CG) were rehabilitated under the project, which covers a total of 2,175 roads (1,083 in MP and 1,092 in CG) and 3,207 habitations (1,551 in MP and 1,656 in CG) impacted in the project area. The number of beneficiaries is estimated to be more than 5 million people. The average vehicle speed was reduced by about 50% (40–60 km per hour on the project roads and 20–30 km per hour on the control roads) Bus fare reduced by about 11% in

Design Summary	Project Targets	Project Monitoring Mechanisms	Risks/Assumptions	Results
	international roughness index for Pradhan Mantri Gram Sadak Yojana (PMGSY) roads in CG and MP from about 16 before improvement to about 4 after improvement Road maintenance budgeting and planning systems introduced for maintenance of PMGSY roads in CG and MP by 2006 Annual financial allocation for maintenance of rural roads network to increase between 2004/05 and 2007/08 from $1 million to $20 million in CG and from $2 million to $8 million in MP Road safety audits carried out for all PMGSY roads at design stage by end-2005 Reduced vehicle accident rate Road safety campaigns in about 400 rural villages in 2005, 1,000 villages in 2006, and 2,200 villages in 2007			real terms. According to the consultant's report and the project completion review (PCR) mission's observation, the rehabilitated roads were of good quality; the road surface roughness was within the international roughness index (IRI) for a comfortable ride (about IRI 14). The routine and periodical maintenance of the project roads was in place to keep the roads in good condition The implementing agencies noted that sufficient budget was allocated for maintenance by the states' governments. Safety and environmental protection facilities were installed in some roads. The project management consultant (PMC) developed a road safety guide and road safety campaign materials. The PMC and project implementation consultants (PICs) conducted a sample road safety audit. According to the PCR mission's quick survey, there were almost no road accidents.
Components/Outputs 1. Construction of PMGSY roads 2. Asset management and capacity building, including road safety	5,500 km of all-weather rural roads in CG and 5,500 km in MP Design and introduction of rural roads maintenance management system in state headquarters and *Zilla Panchayats*, together with training programs and capacity building Maintenance contracts for all	PMGSY monitoring reports Quarterly progress reports Civil works contracts Project completion report	Required institutional capacity is established in CG through the Chhattisgarh Rural Roads Development Agency. The Madhya Pradesh Rural Roads Development Agency continues to be an effective implementing agency in MP.	A total of 9,574.7 km all-weather rural roads (5,061.8 km in MP, 4,512.9 km in CG) were rehabilitated under the project. Both the PMCs and PICs provided training on road safety audits in both states. The PICs helped the implementing agencies manage the civil work

Design Summary	Project Targets	Project Monitoring Mechanisms	Risks/Assumptions	Results
	PMGSY roads in CG and MP covering the first 5 years and then at least 5 additional years Road safety programs carried out for all roads to be improved under the project		Consultants and contractors have the capacity to carry out works. *Zilla Panchayats* have enough capacity to manage road maintenance at the district level.	contracts and implemented construction supervision and quality controls. The project's PMC developed a road safety guide and road safety campaign materials.
Activities/Inputs 1. Project implementation consulting services 2. Project management consulting services 3. Civil works 4. Road safety consulting services 5. Capacity building	Start quarter Q4 2003, complete Q4 2007 Start Q4 2004, complete Q4 2007 Start Q4 2004, complete Q3 2007 Start Q1 2004, complete Q4 2007 Start Q1 2005, complete Q4 2007	Quarterly progress reports Subproject preparation studies Periodic review missions	Communities participate in road safety activities. Advance action allows the timely start of implementation. Civil works contracts are promptly awarded. Consultants and contractors carry out works on time.	Six consulting firms were recruited as the PICs. One consulting firm was recruited as the PMC. The civil works contracts were awarded and the contracts were implemented in four batches. The PMC developed a draft of a road safety guide and road safety campaign materials and conducted a road safety audit. PMC and PICs provided training and organized workshops.
Inputs 1. Land and civil works 2. Consulting services, training, capacity building, and road safety 3. Interest during construction and front-end fee 4. Project financing	$496.7 million $34.6 million $39.7 million Ordinary capital resources (OCR) loan of $400 million and government financing of $171 million equivalent	Quarterly progress reports Subproject preparatory studies Periodic review missions	Local counterpart funds available on time.	Civil works amount to $459.4 million, including $349.2 million financed by the ADB loan. PMC services of $1.5 million and PIC services of $15.8 million were provided to the project. A $2.0 million front-end fee and a total of $28.73 million IDC and commitment charges were paid. At completion, OCR loan of $366.4 million and government financing of $144.3 million equivalent were provided to the project.

PROJECT COST AND FINANCING PLAN

Table A2.1: Project Costs

($ million)

	Item	Appraisal Estimate			Actual		
		Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
A	**Base Cost**						
	1. Land Acquisition and Resettlement						
	a. Madhya Pradesh	0.00	4.80	4.80	0.00	0.00	0.00
	b. Chhattisgarh	0.00	4.80	4.80	0.00	0.20	0.20
	Subtotal	**0.00**	**9.60**	**9.60**	**0.00**	**0.20**	**0.20**
	2. Civil Works						
	a. Madhya Pradesh	109.60	133.95	243.55	96.89	118.42	215.31
	b. Chhattisgarh	109.60	133.95	243.55	109.84	134.25	244.09
	Subtotal	**219.20**	**267.90**	**487.10**	**206.74**	**252.67**	**459.40**
	3. Consulting Services						
	a. Implementation Consulting Services						
	i. Madhya Pradesh	3.30	10.10	13.40	2.10	6.42	8.52
	ii. Chhattisgarh	3.30	9.70	13.00	1.84	5.41	7.26
	Subtotal	6.60	19.80	26.40	3.94	11.83	15.77
	b. Project Management and Monitoring	2.50	1.20	3.70	1.03	0.49	1.52
	c. Road Safety Consultant	0.00	0.20	0.20	0.00	0.00	0.00
	Subtotal	**9.10**	**21.20**	**30.30**	**4.97**	**12.33**	**17.30**
	4. Capacity Building	**1.10**	**0.80**	**1.90**	**0.00**	**0.00**	**0.00**
	5. Community Road Safety Program						
	a. Madhya Pradesh	0.00	0.70	0.70	0.00	0.00	0.00
	b. Chhattisgarh	0.00	0.70	0.70	0.00	0.00	0.00
	Subtotal	**0.00**	**1.40**	**1.40**	**0.00**	**0.00**	**0.00**
	6. Incremental Administration	0.00	1.00	1.00	**0.00**	**3.06**	**3.06**
	Subtotal (A)	**229.40**	**301.90**	**531.30**	**211.70**	**268.25**	**479.96**
B.	**Financial Charges**						
	1. Front-End Fee	2.00	0.00	2.00	2.00	0.00	2.00
	2. Interest During Construction and Commitment Char	37.70	0.00	37.70	28.73	0.00	28.73
	Subtotal (B)	**39.70**	**0.00**	**39.70**	**30.73**	**0.00**	**30.73**
	Total (A+B)	**269.10**	**301.90**	**571.00**	**242.43**	**268.25**	**510.69**

Numbers may not add precisely due to round offs.

Source: Report and Recommendation of the President, Asian Development Bank loan financial information system, and India National Rural Roads Development Agency.

Table A2.2: Financing Plan

($ million)

Source	At Appraisal				Actual			
	Foreign Exchange	Local Currency	Total Cost	% of Cost	Foreign Exchange	Local Currency	Total Cost	% of Cost
ADB	229.4	170.6	**400.0**	70.1	224.0	142.4	**366.4**	71.8
Government	39.7	131.3	**171.0**	29.9	18.4	125.8	**144.3**	28.2
Total	**269.1**	**301.9**	**571.0**	100.0	**242.4**	**268.3**	**510.7**	100.0
	47.1%	52.9%	100.0%		47.5%	52.5%	100.0%	

Numbers may not add precisely due to round offs.

Source: Report and Recommendation of the President, Asian Development Bank loan financial information system, and India National Rural Roads Development Agency.

DISBURSEMENT OF ADB LOAN PROCEEDS

Table A3: Annual and Cumulative Disbursement of ADB Loan Proceeds

year	Annual Disbursement			Cumulative Disbursement	
	Amount ($ million)		% of Total	Amount ($ million)	% of Total
	Planned	Actual			
2005	10.47	6.67	1.82	6.67	1.82
2006	106.00	94.34	25.74	101.01	27.57
2007	90.00	136.45	37.24	237.47	64.80
2008	110.00	100.46	27.42	337.93	92.22
2009	50.00	28.52	7.78	366.44	100.00
Total	**366.47**	**366.44**	**100.00**	**366.44**	

ADB = Asian Development Bank
Source: Asian Development Bank

Figure 3.1. Annual Disbursement of ADB Loan Proceeds ($ million)

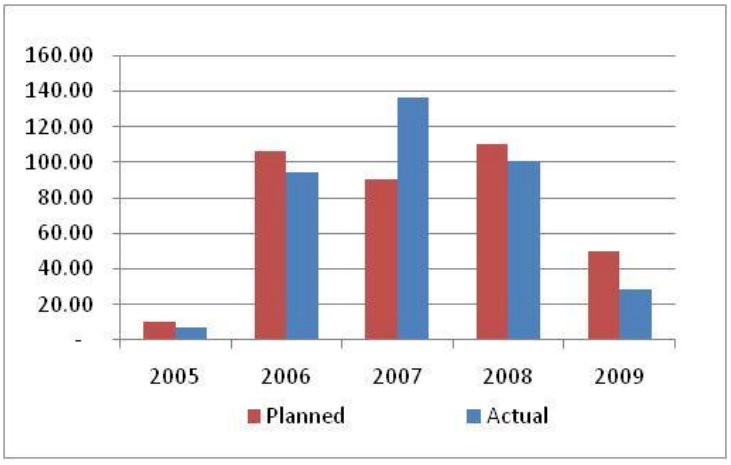
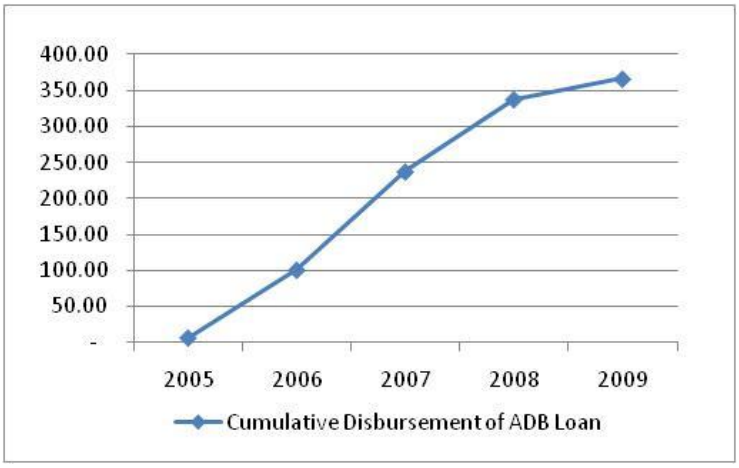
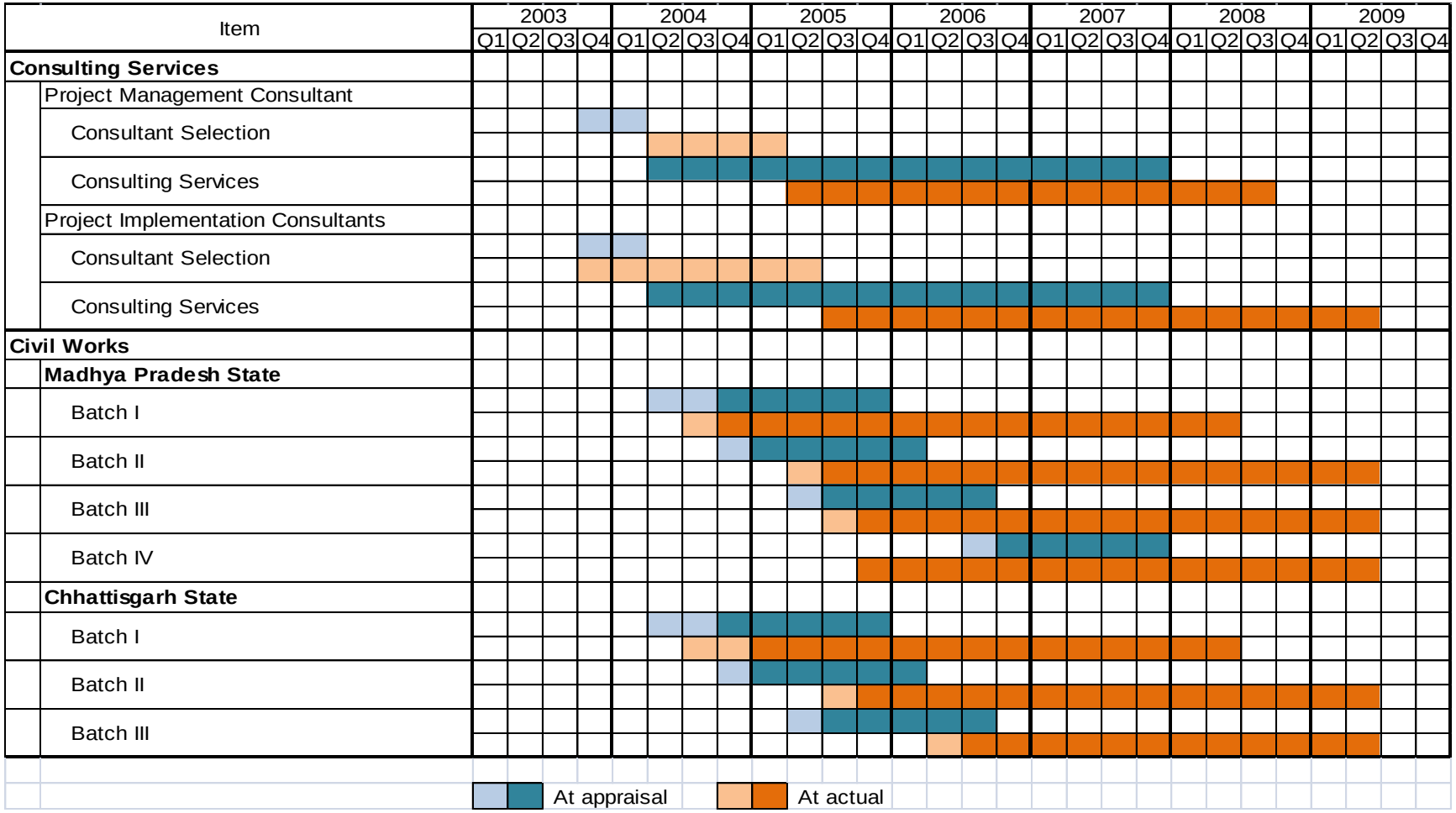


Figure 3.2. Cumulative Disbursement of ADB Loan Proceeds ($ million)



COMPARISION OF APPRAISAL AND ACTUAL PROGRAM IMPLEMENTATION SCHEDULE



Source: Report and Recommendation of the President, India National Rural Roads Development Agency (NRRDA)

CHRONOLOGY OF MAJOR EVENTS

(Note: Recruitment of PMC and PICs, Chhattisgarh Subprojects Approval, and Madhya Pradesh Subprojects Approval, are compiled in respective separate lists.)

Date	Main Event
2002	
3 September	Asian Development Bank (ADB) approved small scale technical assistances (TAs) to prepare the project.
28 October–12 November	Fact-finding mission
2003	
23 May	Receipt of Madhya Pradesh (MP) and Chhattisgarh (CG) 's Land Acquisition and Resettlement Plan—2002 by ADB
3 June	Safeguard policy compliance
3 June	Management review meeting
5–18 June	Appraisal mission
17 July	Staff review committee meeting
13–15 October	Loan negotiations
27 October	Board circulation
20 November	Loan approval
2004	
19 November	Extension of validity of loan approval to 3 December 2004 to allow logistics for loan signing
25 November	Loan signing
21 December	ADB received Draft Operations Manual for comments
2005	
25 January	Loan effectiveness
26 January	ADB provided comments on Draft Operations Manual
10 February	Letter from Joint Secretary, Ministry of Rural Development (MORD), asking that Chhattisgarh Rural Roads Development Agency (CGRRDA) and Madhya Pradesh Rural Roads Development Agency (MPRRDA) be allowed to prepare Detailed Project Report (DPR) for an additional 2000 km road length in each state, with the project management consultant (PMC)'s assistance.
17 February	Follow-up letter from Department of Economic Affairs (DEA) Director(ADB) on the early preparation of DPRs by CGRRDA and MPRRDA by consultants who prepared the first batch of DPRs.
24 February	ADB approval of the request letter of 17 Feb regarding preparation of DPRs.
23 March	National Rural Roads Development Agency (NRRDA)'s email requesting Pradhan Mantri Gram Sadak Yojana (PMGSY) system instead of opening a second generation imprest account to avoid increased supervisory overheads.
4 April	ADB Controller's recommendation not accepting EA request to use PMGSY system in view of accepting responsibility in the loan agreement for maintaining accounts satisfactory to ADB. ADB funds must be maintained in a non–interest-bearing account. The EA may use a reimbursement method and may not make use of imprest.

26 May	For proper monitoring of disbursements, reallocation of loan proceeds was requested for civil works and consulting services for CG and MP, which was approved by controllers on 26 May 2005
5 August	Submission of PMC inception report
22–30 August	Inception mission fielded
14 September and 18 October	DEA letters seeking ADB concurrence for post facto approval of additional subprojects that do not have adverse environmental or social safeguard issues but meet the relevant selection criteria
6 October	ADB letter to Joint Secretary, DEA, advising that a team of ADB staff will be fielded 12–20 October to CG to help prepare subprojects for 2500 km of road length, and to provide hands-on training to PICs (recently mobilized) for the advance preparation of the third batch of projects
12–21 October	Special Loan Administration Mission
18 October	MPRRDA letter advising ADB on non-performance of PIC
26 October	ADB follow-up for recruitment of independent consulting services for procurement audit and road safety program
27 October	Request of MPRRDA for increase in number of PIC staff as a result of an increase in the number or Project Implementation Units (PIUs) from 27 to 38.
8 November	ADB response to the request of MPRRDA dated 27 October 2005 for increase in number of PIC staff, suggesting consulting with NRRDA as it involves cost increase.
9 November	Project officer memo to Office of Auditor General (OAG), ADB, requesting an investigation into non-performance of PIC due to high manpower turnover and to determine whether the consulting firms misled the executing agencies and if this constitutes a misrepresentation
23 November	Draft baseline data on monitoring of socioeconomic and poverty reduction impacts by the PMC
28 November	Based on the DEA letters of 14 September and 18 October, a change in implementation arrangement was requested and approved. Schedule 6 of the loan agreement was amended to insert paragraph 18 (i) based on the DEA's request seeking concurrence for post facto approval of additional subprojects that do not have any adverse environmental or social safeguards issues and otherwise meet the relevant selection criteria.
2006	
9 January	DEA letter seeking ADB approval to change provisions for local procurement to relax the restriction on the use of small contracts.
3 February	Based on the DEA letter of 9 January, a change in implementation arrangement was approved for a minor relaxation of the provisions allowing the use of smaller contract packages that are occasionally required to implement subprojects in remote areas, particularly tribal areas. An amendment was made on the fifth line of Schedule 4 of the loan agreement as follows: delete "$500,000" and insert "$250,000"; and delete "10%" and insert "20%."
19 June	Request to approve appointment of for Package 3 to conduct independent monitoring and verification of the implementation of LAPs and IPDPs (MP)
21 July and 3 October	ADB fax approving NGO for Package 3 (MP)
4 August	MPRRDA letter to NRRDA requesting ADB approval for appointment of NGO for

	packages 1 and 2.
9 August	ADB fax approving appointment of NGO for PIC packages 1 and 2 (CG)
7 September	Contract negotiation with NGO for independent monitoring of implementation of LAPs and IPDPs (MP packages 1 and 2)
2 October	ADB fax on no-objection to negotiated contract with NGO (MP packages 1 and 2)
3 October	MP—Letter of approval for recruitment of NGO to conduct independent monitoring and verification for implementation of LAPs, IPDP for Package 3
6 October	CG—Baseline Report 2005–2006, Monitoring Socioeconomic Impacts, January–June 2006 by PMC
12–19 October	Review mission (1)
24 October	MP—Baseline Report 2005–2006, Monitoring of Socioeconomic Impacts, January–June 2006 by PMC
11 November	CGRRDA complaint filed about PIC Package 3 on irregular deployment of team leaders
21 November	Letter from Joint Secretary, MORD, and DG NRRDA issuance of notice to terminate contract with PIC Package 3 for non-performance under the contract (MP)
15 December	PIC Package 3 letter to the government of MP regarding PIC performance
19 December	CGRRDA request for ADB approval to deploy diploma holders in place of degree holders for PIC
2007	
3 January	Letter from the government of MP copied to ADB on nonperforming PICs and their request to assign works to PMGSY consultants
5 January	MPRRDA letter to PIC Package 3 to hand over complete records after completing all required formalities before leaving the PIU
29 January—2 February	Review Mission (2)
3 March	CGRRDA email request for ADB approval to deploy diploma holders in place of degree holders for PIC and revision of contract
7 March	ADB fax on no objection to deploy diploma holders in place of degree holders for the post of field/materials engineers for PIC Package 2 (CG)
30 May	CGRRDA letter clarifying nonpayment of field staff by PIC
9 Jan, 14 Mar, 21 Mar, and 3 July	PIC Package 3 letter copied to ADB informing it that slow progress of work is due to slow contractors and poor behavior on the part of the engineers (MP)
5–8 June	Procurement review conducted in CG by a staff consultant procurement specialist
20–21 June	Procurement review conducted in MP by a staff consultant procurement specialist
19–22 June	Review mission (3)
2–5 July	MP—Disbursement mission. To review the original supporting documents being maintained by the PAU and different PIUs to substantiate the expenditure claimed under the SOE procedure.

23–27 July	CG—Disbursement mission. Same as above.
29–31 July	Review mission (4) (to CG only)
17 August	Clearance of OAG, ADB on contract variation on terms of reference (TOR) of PMC
31 August	NRRDA letter asking to revise TOR of PMC consultant to reduce specific person-months and to add a road maintenance specialist and road safety specialist for the road safety manual
10 September	NRRDA letter asking to revise TOR of PMC
15–21 September	Midterm review
October	Road safety workshops conducted in MP and CG
22 October	Procurement review for Madhya Pradesh conducted by an ADB staff consultant procurement specialist
27 October	CGRRDA letter to NRRDA copied to ADB—re non-performance of PIC, recommending individual consultants (contractual basis) in place of PIC consultants
2008	
6 March	ADB email supporting CGRRDA, reminding that EA action on termination must be based on clauses of the contract
2 May	CGRRDA requesting termination of the contract with PIC Package 3 and disqualification from all consulting works
20 May	ADB fax to CGRRDA that request of 2 May on PIC Package 3 contract termination has been forwarded to OAG, Integrity Division
23 May	Extension of loan closing date from 30 June 2008 to 30 June 2009
30 June	Email advice from Director, NRRDA, on closing of the contract for PMC and assigning road safety activities and impact assessment to a technical support consultant, to be revised to include MP and CG under RRSIIP, and engaging separate individual consultants to perform these activities.
14–21 July	Review mission (5)
12 August	Memo from ADB on strengthening the environmental monitoring section of CG PICs
2009	
30 March	NRRDA email regarding letter addressed to CGRRDA from General Secretary—Congress Chhattisgarh State Congress Committee regarding complaints under contract packages number 10–22, 23, and 24 that works listed as completed are actually incomplete.
31 March	ADB fax asking NRRDA to take prompt action and to inform ADB about the investigation
17–20 April	Special loan administration mission
May	Road safety audits were conducted on 29 ADB-financed roads in Madhya Pradesh
30 June	Road safety audits were conducted on selected ADB-financed roads in Chhattisgarh
13–14 August	Training program provided by ADB on environmental monitoring report
9 October	Cancellation of unutilized loan balance in the amount of US$33,557,808.43

Recruitment of PMC and PICs

2004	
2 April	First CSC meeting on short list for PMC
2 August	CSC meeting to review revised RFP and shortlists for PIC and PMC
4 August	ADB fax seeking resubmission of short list (MP and CG PIC)
11 August	EA resubmission of short list (CG PIC)
27 August	EA resubmission of short list (MP PIC)
27 August	ADB fax conditionally approving RFP, short list, and narrative evaluation criteria (MP and CG PIC)
1 September	RFP issuance (CG PIC)
2 September	EA email on revised short list (MP PIC)
7 September	ADB fax approving revised short list (MP PIC)
8 September	RFP issuance (PMC)
16 September	RFP issuance (MP PIC)
4 November	Deadline for submission of proposal (CG PIC)
18 November	Deadline for submission of proposal (MP PIC)
23 November	Deadline for submission of proposal (PMC)
15 December	Submission of technical evaluation (CG PIC)
24 December	Submission of technical evaluation (MP PIC)
2005	
13 January	CSC meeting to review technical evaluation (MP PIC)
28 January	Re-submission of technical evaluation (CG PIC)
4 February	Submission of technical evaluation (PMC)
15 February	CSC meeting to review and approve EA's technical evaluation (CG PIC)
16 February	ADB approval of technical evaluation based on EA's revised evaluation (MP PIC)
17 February	ADB approval of technical evaluation (CG PIC)
22 February	Opening of financial proposal (MP PIC)
2 March	Resubmission of technical evaluation of proposals (PMC)
4 March	Opening of financial proposal (CG PIC)
9 March	CSC meeting to review and approve EA's technical evaluation report (PMC)
11 March	ADB approval of EA's technical evaluation (PMC)
14 March	Submission of financial evaluation (MP PIC)

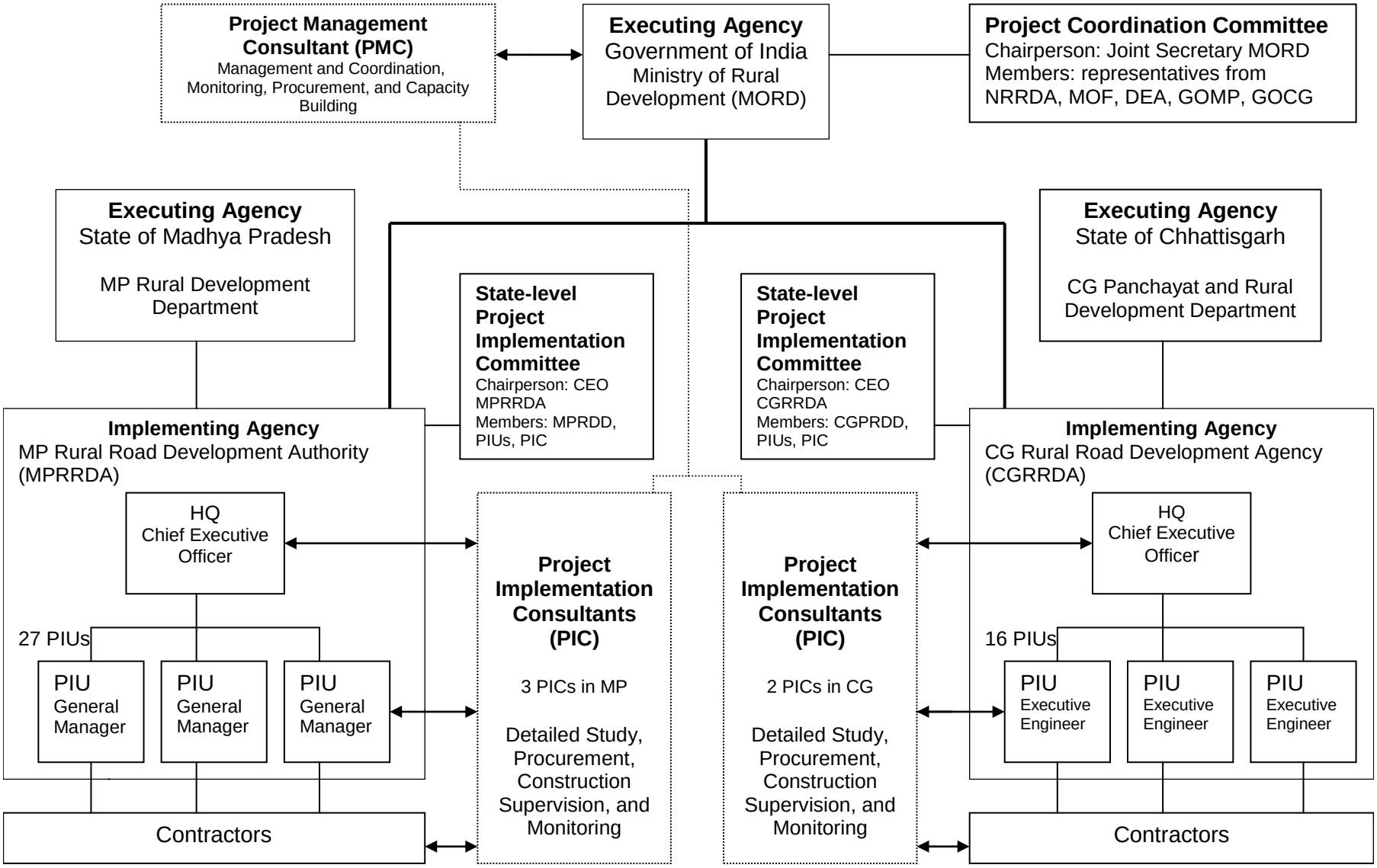
15 March	Opening of financial proposal (PMC)
17 March and 1 April	Submission of financial evaluation (CG PIC)
31 March	EA submission of final ranking (PMC)
5 April	ADB approval of financial evaluation (MP PIC)
7 April	CSC meeting to review and approve evaluation of financial proposal (PMC)
12 April	ADB approval on final ranking and evaluation of financial proposals (PMC)
12 April	ADB approval of financial evaluation (CG PIC)
19 April	Contract negotiations with the first-ranked firm (PMC)
21 April	EA letter requesting clearance of minutes of contract negotiations (PMC)
22 April	ADB approval of minutes of contract negotiations with the first-ranked firm (PMC)
29 April	Contract signed (PMC)
12 & 18 May	Submission of draft minutes of contract negotiations (CG PIC)
29 May	Approval of minutes and clearance to sign contract (CG PIC)
31 May	Contract signed for Package 1 (Bastar) (CG PIC)
10 June	Contracts signed for Packages 2 (Indore) and 3 (Jabalpur) (CG PIC)
13 June	Submission of draft minutes of contract negotiations (MP PIC)
14 June	Approval of minutes and clearance to sign contract (MP PIC)
15 June	Contracts signed for Packages 1, 2 and 3 (MP PIC)
	Chhattisgarh Subprojects Approval
2004	
26 July	Issuance of Notice Inviting Tender (NIT) (Batch I)
15 September	Proposals received for First Tender—(districts Bilaspur, Janjgir-Champa, Mahasamund Sarguja, Korba, and Koriya)
11 October	CGRRDA's email requesting approval of technical evaluation for Batch I—five contract packages
15 October	ADB fax approving technical evaluation for Batch I—five contract packages
19 October	CGRRDA email approval of technical evaluation subject to submission of required documents for Batch I
21 October	ADB approval on CGRRDA email on the conditional approval of technical evaluation subject to submission of required documents for Batch I
3 November	EA financial bid opening for Batch I
7 and 14 December	EA's email requesting approval of financial evaluation for the first civil works packages
7 and 15 December	ADB approval of financial evaluation of Batch I—five contract packages
2005	
4 January	CGRRDA through letter to MORD requests to approve revised list of Batch I (due to

		non-availability of land width, naxalite problems, passing through thick forest) Approximately 563.22 km road length is requested for approval so that DPRs can be prepared.
	18 January	ADB email on CGRRDA's 4 January letter to MORD. Roads should be treated as new subprojects to be approved by ADB following procedures established at the time of loan processing.
	31 August	CGRRDA request for approval to proceed with procurement of Batch II
	8 September	ADB reply to CGRRDA's letter of 31 August, saying to proceed with procurement, but to ensure that subprojects are not awarded unless all requirements per Schedule 4 and Schedule 6 paras. 20–22 are complied with.
	20 October	CGRRDA letter requesting approval of additional subprojects for Batch II, comprising 2,505.6 km of road length
	24 October	ADB approval of additional subprojects for Batch II
	2 November	ADB requesting CGRRDA submission of summary list of contracts awarded for Batch II, and requesting submission of Batch III subprojects
2007		
	6 February	CGRRDA email seeking ADB approval of partial clearance of subprojects under Batch III.
	7 February	ADB fax approving subprojects under Batch III, totaling 262.68 km road length
	10 March	CGRRDA email seeking approval of subprojects under Batch III
	19 March	CGRRDA email letter seeking approval of subprojects under Batch III, as submitted by PIC Package 2, totaling 1,112.64 km of road length.
	22 March	ADB approval of subprojects under Batch III (10 and 19 March 2007) as cleared by PMC but excluding those requiring data for Initial Environment Examination
	29 March	CGRRDA email seeking approval of remaining subprojects under Batch III
	2 April	ADB approval of remaining subprojects under Batch III, as cleared by PMC.
		Madhya Pradesh Subprojects Approval
2004		
	24 July	Issuance of NIT (Batch I)
	28 August	Technical bid opening
	25 September	MPRRDA submission of technical evaluation to ADB
	6 October	ADB reply, finding inconsistencies in the technical evaluation and requesting resubmission for further review.
	12 October	Resubmission of MPRRDA on revised technical evaluation
	15 October	ADB approval of revised technical evaluation and request for submission of financial evaluation of the same
	21 October	Financial opening of Batch I
	2 November	MPRRDA submission of financial evaluation for Batch I
	9 November	ADB approval of financial evaluation for Batch I

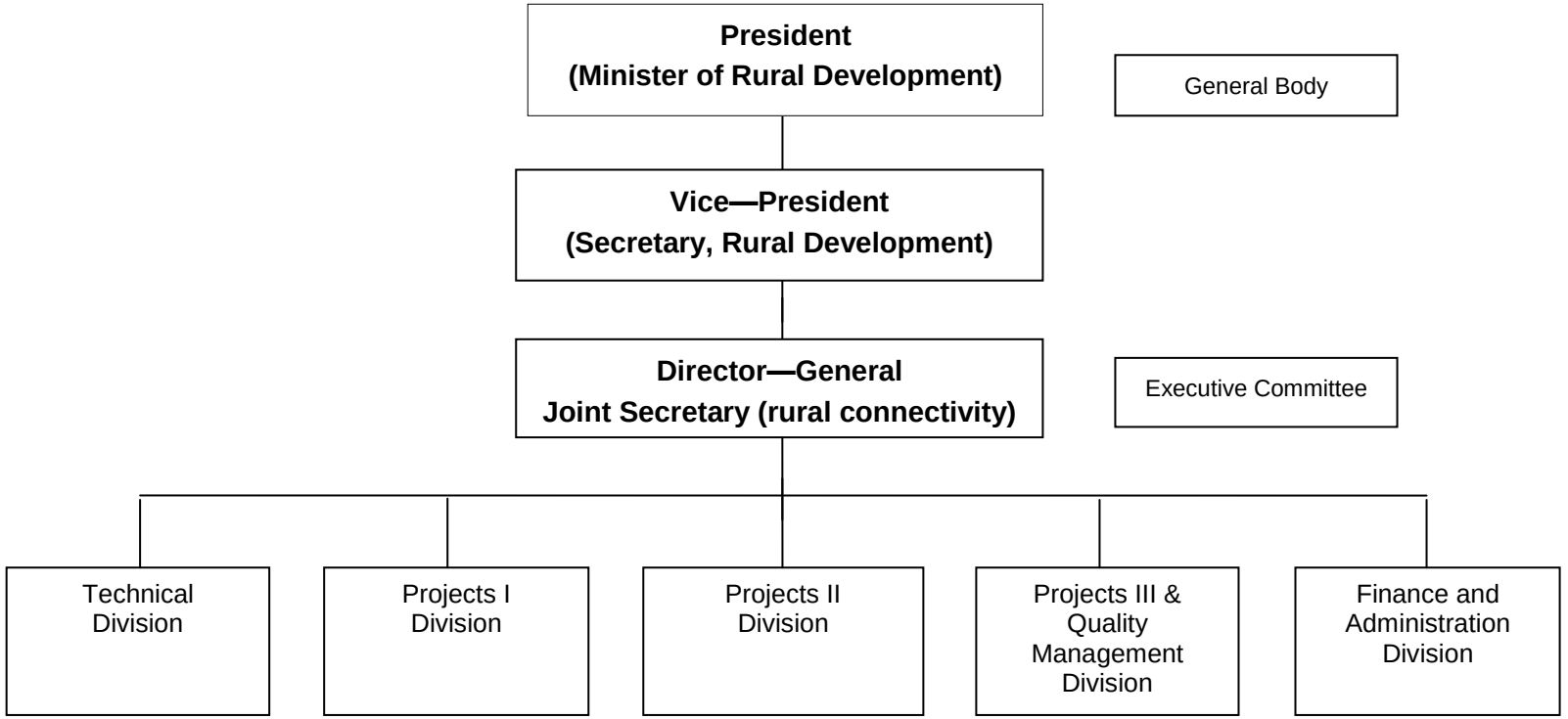
18 November	MPRRDA submission of financial evaluation for balance of Batch I contracts
2 December	ADB approval on financial evaluation for balance of Batch I contracts
2005	
30 September	NRRDA letter requesting subproject approval of Batch II for 604.39 km road length
4 October	ADB approval of additional subprojects for Batch II per NRRDA letter of 30 September 2005
26 October	MPRRDA submission of balance of additional subprojects for Batch II Damoh and Pana districts, comprising 35.15 km road length
27 October	ADB approval of balance of additional subprojects for Batch II, comprising 35.15 km road length
28 October	ADB approval of balance of additional subprojects for Batch II Datia, Gwalior, Hoshagabad, Shivpuri, and Vidisha districts, comprising 81.92 km road length
31 October	ADB approval of balance additional subprojects for Batch II Harda District, comprising 28.85 km road length
21 November	MPRRDA requesting approval of additional subprojects under Batch III for 2,322.63 km roads
28 November	ADB fax in reply to MPRRDA's letter of 21 November 2005, requesting submission of environmental, social safeguard, and economic analysis of related roads for approval, which the PMC should cleared
2 December	ADB approval of balance of additional subprojects under Batch II for Dewas, Mandsour, and Shajapur districts, equivalent to 44.493 km of roads
28 December and 6 January 2006	MPRRDA submission of reports on approval of subprojects under Batch III
2006	
10 January	ADB approval of subprojects under Batch III, covering the districts of Betul, Datia, Guna, Hosangabad, Rajgarh, Riasen, Sagar, Sehore, Sheopur, Shivpuri, and Vidisha for a total of 634.6 km road length, and for the districts of Barwani, Dewas, Dhar, Jhabua, Khargone, Mandsaur, Ratlam, Shajapur, and Ujjain for 639.3 km road length (reports submitted 28 December 2005 and 6 January 2006), with pending approval of 17.45 and 23.14 km road lengths, respectively)
30 January	Submission of NRRDA subproject for approval under Batch III, with a total of 131.02 km road length
8 February	ADB fax approval of subproject under Batch III, for 131.02 km requested on 30 January 2006
26 February	NRRDA submission of subproject under Batch III for the districts of Balaghat, Chhatapur, Chhindwara, Jabalpur, Narsinghpur, Satna, Seoni Shahdol, Tikamgarh, and Umariya for approval of 571.7 km road length (with pending approval of 9.49 km road length)
27 February	ADB approval of Batch III subproject approval for 571.7 km of road length.
10 March	Submission of NRRDA subproject for approval under Batch III, with a total of 227.4 km road length
14 March	ADB approval of Batch III subproject approval for 227.4 km of road length (with pending approval of 47.40 km road length)

21 March	NRRDA email requesting approval of earlier unapproved roads under Batch III
22 March	ADB fax approving of earlier unapproved roads under Batch III with the exception of two roads
13 July	NRRDA request for approval of subprojects for Batch IV, comprising 2,501.29 km road length
1 August	ADB approval of Batch IV subprojects for 2501.29 km of road length. Also mentioned that loan amount for MP may not be sufficient and may therefore require close monitoring and submit to ADB for post facto approval those contracts for financing under the loan

IMPLEMENTATION ARRANGEMENTS



ORGANIZATION CHART OF NATIONAL RURAL ROADS DEVELOPMENT AGENCY (NRRDA)



In addition, the National Informatics Centre (Smt. Anubha Goyal, Technical Director) provides IT support.

Source: India National Rural Roads Development Agency

Status of Compliance with Major Loan Covenants

Project Specific Covenants	Reference in Loan/Project Agreement	Status of Compliance
Sector		
All maintenance works including routine and renewal, for completed PMGSY roads in CG and MP shall be carried out through outsourcing to private contractors.	Schedule 6, para 33(a)	**Being complied with.** According to current arrangement, all maintenance is being carried out by private contractors.
MP and CG shall employ contractors under the construction contracts to carry out maintenance of all PMGSY and Project roads during the first five years (the initial five year maintenance period).	Schedule 6, para 33(b)	**Complied or being complied with.** The maintenance in the first 5 year after completion is implemented by construction contractors as part of the contract.
MP and CG shall provide adequate funding for proper maintenance of PMGSY roads, in accordance with the estimates provided to ADB under the Commitment Letters. Increases, if any, in the actual amounts to be provided shall be met by MP and CG through additional budget allocations or other alternative sources of financing such as the Mandi Cess in case of MP (that means cess as levied under Madhya Pradesh Krishi Upaj Mandi Adhiniyan, 1972).	Schedule 6, para 34(a)	**Being complied with.** Madyha Pradesh (MP) and Chhattisgarh (CG) have been allocating adequate financing for rural road maintenance as per Pradhan Mantri Gram Sadak Yojana (PMGSY) guidelines. All of the maintenance funds are provided by state fiscal expenditure.
MP and CG shall ensure that the financing for maintenance of the PMGSY roads as provided under the clause above shall not involve reduction of budgets for maintenance of roads under the responsibility of MP and CG that are not included in the PMGSY roads.	Schedule 6, para 34(b)	**Being complied with.**
As also required under the PMGSY Guidelines, except as ADB may otherwise agree, MP and CG shall require the IAs (through the PIUs) to transfer maintenance of the PMGSY roads to designated Zilla Panchayats, before the end of the initial five year maintenance period for each such road. MP and CG shall also allocate requisite funds to the Zilla Panchayats for purposes of such maintenance in accordance with para 34 of this Schedule.	Schedule 6, para 35(a)	**Being complied with.** PMGSY Guidelines state that the State Governments transfer funds and functionaries to Zilla Panchayats (ZP) so that ZP can take over maintenance functions, and until ZPs takeover, Project Implementation Units (PIUs) will continue to be responsible for maintenance works. In the latest arrangement, maintenance after the first 5 year liability period is not transferred to ZP as envisaged in the covenant, but State Rural Roads Development Agencies (SRRDAs) in both states are still in responsible for the road maintenance with sufficient fund. This is due to insufficient capacity in the ZPs to take over the maintenance works. However, ZPs participate in maintenance planning and provide comments on prioritizing maintenance activities and projects. This is in accordance with the PMGSY guidelines, and Asian Development Bank (ADB) understands this situation and has

Project Specific Covenants	Reference in Loan/Project Agreement	Status of Compliance
		continued to follow up this maintenance issue through subsequent projects.
MP and CG shall ensure that the Zilla Panchayats enter into further maintenance contracts (as prepared under the standard performance based contracts for roads maintenance) with competitively procured contractors. The contracts shall commence upon completion of the initial five-year maintenance periods under the related construction contracts and shall cover routine maintenance and renewal of all PMGSY roads for further periods of not less than five years.	Schedule 6, para 35(b)	**Partially complied with.** Further maintenance contracts are competitively procured, although through SRRDAs, not through ZPs. Also, some gaps between initial five-year maintenance period and the further maintenance contract are observed in some cases. However, in general, the proper maintenance contract is in place, and ZPs participate in the process within their current capacity.
Within three years of Effective Date, MP and CG shall introduce a simple planning, costing and expenditure control system for routine and periodic maintenance of PMGSY roads by the designated Zilla Panchayats.	Schedule 6, para 36	**Partially complied with.** SRRDAs have developed standard bidding documents for maintenance contracts.
Road Safety		
As part of the midterm review, MORD, MP, CG and ADB shall review the outcomes of the start up phase of the community road safety program to be carried out by MP and CG under the Project, with a view to consolidating the institutional mechanism, financing modalities and detailed implementing arrangements to ensure sustainable road safety programs for the roads to be developed under the PMGSY and the Project at the national and state levels.	Schedule 6, para 37	**Complied with.** The project management consultant (PMC) developed Road Safety Guide and Road Safety Campaign Materials.
Environmental		
MP and CG shall ensure that all environmental mitigation measures identified in the IEEs for all Subprojects are incorporated into the Subproject designs and followed during Project construction, operation and maintenance, and in accordance with requirements as set forth in the ADB's Environmental Assessment Guidelines (2003) including as amended from time to time.	Schedule 6, para 26	**Complied with.** The mitigation measures identified are included in the bidding documents and being taken care of during construction. Adequate drainage measures were incorporated in the project design and constructed to ensure that the drainage is efficient and there is no water logging.
The IAs assisted by the PICs, shall similarly prepare IEEs including environmental management plans and mitigation measures if any for all Additional Subprojects, with detailed assessments for Subprojects that will pass through forest land or forested areas, in accordance with ADB's Environmental Assessment Guidelines (2003), including as amended from time to time.	Schedule 6, para 27	**Complied with.** The implementing agencies (IAs) with assistance by the project implementation consultants (PICs) prepared the Initial Environmental Examinations (IEEs) for all subprojects.
MP and CG shall require the IAs to implement the Project in accordance with all applicable laws and regulations in relation to wildlife and protected areas/forest areas for Subprojects that involve roads passing through forest areas and address these under the relevant IEE study for such Subprojects. No construction work shall be undertaken on sections of Subprojects that pass through forest reserve unless the forest clearance has been granted by the Borrower's Ministry of Environment and Forest, and no Subproject shall be located within an environmentally sensitive area such as a wildlife sanctuary, national parks, or other area having significant ecological functions, that are declared as national parks, sanctuaries, or national/international cultural heritage.	Schedule 6, para 28	**Complied with.** The IAs also prepared IEE for each subproject under subsequent annual batches. As per Government of India (GOI) statutory requirements, the project is not subject to the Government's Environmental Impact Assessment Notification and does not require mandatory environmental clearance from the Ministry of Environment and

Project Specific Covenants	Reference in Loan/Project Agreement	Status of Compliance
		Forest. However, the project authorities still obtained clearance from the Ministry of Environment and Forest, GOI and State forest departments in case of diversion of some forest land and for the implementation of the Project.
Social		
MP and CG shall ensure that the IAs shall implement the provisions of the LAP for all Subprojects as agreed with ADB, including compensation and entitlements for affected households, in accordance with the framework set out in the LAP, and in conformity with all applicable laws and regulations, and ADB's Policy on Involuntary Resettlement, 1995, including as amended from time to time.	Schedule 6, para 20(a)	**Complied with.** For additional subprojects requiring land acquisition, a land acquisition framework (LAF) was prepared in accordance with ADB's policy on involuntary resettlement.
MP and CG shall ensure that, during implementation of the Project, the respective IA prepares and implements the LAPs for Additional Subprojects in accordance with the principles and procedures set out in the LAP as agreed with ADB. These shall be submitted for approval to ADB before the award of civil works contracts. In case any changes are required to an agreed LAP, the IAs shall seek ADB approval for such changes prior to awarding any civil works contracts for the Subprojects included in the LAP.	Schedule 6, para 20(b)	**Complied with.** The additional sub projects were prepared as per the guidelines of Land Acquisition Plan (LAP) and these were reviewed by PMC for necessary compliance. After review the proposals were submitted by PMC for approval to ADB before the award of work.
MP and CG shall ensure that the IAs shall not allow commencement of construction activities with respect to civil works contract financed under the loan unless they have, subject to clause (b) of this paragraph, and paragraphs 22 and 26–28 of this Schedule acquired or made available the land and rights in land, free from any encumbrances, and cleared the utilities, trees and any other obstruction from such land, required for commencement of construction activities in accordance with the schedule as agreed under the related civil works contract.	Schedule 6, para 21(a)	**Complied with.** MP and CG have disclosed the approved LAP of the additional sub project to the affected people and the communities before the award of work. Land was made available free from all encumbrances. The provisions of clause 26–28 of schedule 6 of the loan agreement were also complied.
MP and CG shall carry out settlement of issues as applicable, relating to land acquisition and resettlement compensation payments for the Project that shall include (i) payments of full compensation/replacement land or value for land/structure (residential/commercial) to legal titleholders, (ii) payment of full replacement value of structure (residential/commercial) to affected informal settlers/roadside squatters, and (iii) payments of all other additional benefits and provision of assistance in accordance with the LAP provisions, including income restoration assistance during implementation of the Project and additional assistance to vulnerable groups such as Scheduled Castes, Scheduled Tribes, and households headed by women.	Schedule 6, para 21(b)	**Complied with.** The PICs were instructed to prepare LAPs as per guidelines issued by ADB. The best efforts are being taken not to align / propose the roads through reserved forests / wild life sanctuaries. After preparation of LAPs, they shall be disclosed to the affected people & communities prior to award of civil works. Nongovernment organizations (NGOs) were recruited by the IAs to independently monitor and verify implementation of LAPs and Indigenous People's Development Plans (IPDPs) and monitoring reports for all batches of the project are being maintained at the state level by the IAs.
MP and CG shall ensure that the IAs disclose the approved LAPS for Additional Subprojects, make the information available to the affected	Schedule 6, para 22	**Complied with.** NGOs recruited by the IAs carried

Project Specific Covenants	Reference in Loan/Project Agreement	Status of Compliance
people and communities prior to commencement of construction works, and confirm that summary LAPs shall be posted in the ADB website.		out independently monitor and verify implementation of LAPs.
MP and CG shall ensure that the IAs shall recruit PICs with expertise in social development, land acquisition and resettlement to assist them to prepare, implement and supervise the LAPs for all subprojects.	Schedule 6, para 23	**Complied with**. Both international and domestic socio-economic impact assessment specialist were recruited in the PIC team.
Wherever applicable, MP and CG shall ensure that the IAs implement the subprojects in accordance with the ADB's Policy on Indigenous People, 1998, as amended from time to time.	Schedule 6, para 29	**Complied with**. The NGOs in both states carried out independent monitoring on indigenous people in accordance with ADB's policy.
Within three months of the Effective Date, MP and CG shall through the IAs, recruit non-government organizations to conduct independent monitoring and verification of the implementation of the LAPs and IPDPs, and any voluntary contributions of land under the Project.	Schedule 6, para 30	**Complied with**. Two NGOs were engaged, one each project state to conduct independent monitoring.
MP and CG shall ensure through specific provisions in the bid documents and the civil works contracts financed under the Project that the contractors shall (i) disseminate information at worksites on the risks of sexually transmitted diseases and HIV/AIDS as part of the health and safety measures for those employed during construction; (ii) follow legally mandated provisions on health, sanitation, and appropriate working conditions, including accommodation, where appropriate, for construction workers at campsites during the construction period; (iii) comply with all applicable labor laws, do not employ child labor for construction and maintenance activities, and provide appropriate facilities for children of labor in construction campsites; (iv) provide equal opportunity for women for road construction activities, as well as not differentiate on wages between men and women for work of equal value.	Schedule 6, para 31(a)	**Complied with**. The bidding documents used for all subprojects include these provisions. Monitories were undertaken to the implementation of such provisions.
MP and CG shall ensure that compliance of provisions under clause (a) are monitored during project implementation by IAs. The civil works contracts shall also provide for termination of the contract by employer in case of breach of any stated provision in the contract.	Schedule 6, para 31(b)	**Complied with**. The IAs with assistance by the PMC and PICs implemented monitories of the project implementation.
MP and CG shall ensure community acceptance of the Project through effective community participation in Subproject selection and implementation in accordance with PMGSY Guidelines	Schedule 6, para 32	**Complied with**. The subproject selection was in accordance with PMGSY guidelines with participation of impacted communities.
Others		
MORD shall be responsible for overall execution of the Project, particularly at the central level, and MP and CG through their respective rural development departments (the MPPRDD and CGPRDD) shall be responsible for execution of the Project at State levels.	Schedule 6, para 1	**Complied with**. National Rural Roads Development Agency (NRRDA) assisted Ministry of Rural Development (MORD) in the overall execution of the Project. Madhya Pradesh Rural Roads Development Agency (MPRRDA) and Chhattisgarh Rural Roads Development Agency (CGRRDA) were the IAs at state level.
Within six months of Effective Date, the Borrower shall cause MORD to establish a Project Coordination Committee, chaired by the Joint Secretary, MORD that shall be responsible for monitoring the use of loan proceeds and overall project implementation and performance.	Schedule 6, para 2	**Complied with**. Coordination Committee at the central level was established for monitoring use of the loan and

Project Specific Covenants	Reference in Loan/Project Agreement	Status of Compliance
The members of the Project Coordination Committee shall meet on a quarterly basis and shall comprise senior officials of MORD, DEA, NRRDA, MP and CG.		overall implementation performance, which was composed of leaders from relevant government agencies. At state level, similar committees were also established under PMGSY guidelines
In MP and CG, the State-level Standing Committees existing under the PMGSY Guidelines shall meet on a quarterly basis and shall be responsible for effective monitoring of the Project and overseeing timely completion report.	Schedule 6, para 3	**Complied with**.
The Borrower shall cause MP and CG each to establish a State level Project Implementation Committee within six months of effective date. Each of these committees shall be responsible to monitor Project performance and use of funds at State levels and to ensure coordination among key agencies involved in the implementation of the Project. These Committees shall meet on a monthly basis, shall be chaired by the Chief Executive Officer of the related IA, with other representations from respective State level rural development departments (the MPPRDD for MP and the CGPRDD for CG), PIUs, and consultants. As required for the Project implementation, other State level agencies including in the areas of forestry and land acquisition shall be invited from time to time to participate in the Committee meetings.	Schedule 6, para 4	**Complied with**. A state level project implementation committee has been constituted under the chairmanship of Chief Executive Officer (CEO) (Issued 02 August 2005).
Project Implementation Central Level-PMC Except as otherwise acceptable to ADB, MORD with the assistance of the PMC through NRRDA, shall be responsible for (i) overall Project management and coordination at central level; (ii) developing and implementing support for training and capacity building for PMGSY and related agencies at the central level and the IAs, Zilla Panchayats, Village Panchayats at State Levels; (iii) establishing sustainable asset management systems for the PMGSY roads network in MP and CG.	Schedule 6, para 5	**Partially complied with**. PMC was recruited at the central level to assist NRRDA for overall project management and coordination. However, the PMC could not implement all tasks required.
State Levels - IAs The MPRRDA in MP and the CGRRDA in CG shall be the IAs for the Project in the respective States. Each IA shall be headed by a Chief Executive Officer who shall be the State Level Project Director responsible for overall coordination of project implementation including planning, management, consultant selection and procurement. The chief Executive officer shall be supported by experienced personnel at headquarters and in the PIUs already established under the PMGSY Guidelines in both MP and CG.	Schedule 6, para 7	**Complied with**. MPRRDA and CGRRDA were the IAs at the state level to implement the Project, which was headed by a CEO responsible for overall coordination of the project implementation, including planning, management, consultant selection, procurement and execution of work through PIUs under his administration.
PIUs and PICs The PIUs existing in MP and CG under the IAs in accordance with PMGSY Guidelines shall be responsible for selecting, in consultation with local stakeholders, the roads to be included in the annual batches of subprojects, procurement and implementation of the subprojects, and supervision of PICs engaged to assist in these activities.	Schedule 6, para 8	**Complied with**. PIUs under the IAs were in responsible for the Project implementation and maintenance within their districts. PICs engaged assisted the activities during Project implementation.
Within two (2) months of Effective Date, the Borrower shall cause (i) MP to establish three PICs in the State, and (ii) CG to establish three PICs in the State. Each PIC shall cover about nine PIUs in MP and about six PIUs in CG. Each PIC shall report to the PIUs and shall maintain a main office in the State that they are responsible for and site offices in each PIU in which construction contracts are underway.	Schedule 6, para 9	**Complied with**. Three PICs in each state were recruited. The PICs established main office and site offices as required.
Each PIC shall be responsible for implementation of the subprojects and to assist the relevant IA in (i) preparation of the Additional	Schedule 6, para 10	**Complied with**. The PICs, three in each state,

Project Specific Covenants	Reference in Loan/Project Agreement	Status of Compliance
Subprojects, (ii) supervision of civil works, (iii) providing support for implementation of land acquisition plans and mitigation of social impacts in accordance with the provision of this Loan Agreement, (iv) grievance redress for resolution of any disputes in respect of land acquisition or any social impacts; and (v) implementation and monitoring of environmental management plans under the related IEE.		were recruited to assist the IAs on project supervision, LAP implementation, Environmental Management Planning (EMP) monitoring, and trainings.
PMC The PMC shall assist MP and CG in screening and processing of additional subprojects for submission to ADB; (i) procurement of training services; (iii) monitoring and overseeing compliance with safeguard policies (in relation to land acquisition and resettlement, environment, gender, social impacts, HIV/AIDs, and child labor) (iv) establishing road maintenance budgeting, planning and management systems for use by Zilla Panchayats, developing standard performance based contracts for road maintenance and providing capacity building support for Zilla Panchayats and on-the-job training to the PIU personnel and Zilla Panchayats; (v) developing proposals for collecting community contribution and user-pay approaches to road maintenance; (vi) Project performance monitoring; and (vi) monitoring socio-economic impacts under the Project.	Schedule 6, para 11	**Complied with**. One PMC was recruited at the central level to assist NRRDA on overall project implementation, including subproject screening and procession, progress report preparation, training provision, socioeconomic impact monitoring, etc.
RSC MORD with the assistance of RSC (to be appointed by MORD from its own funds) shall be responsible for development of road safety audits under PMGSY.	Schedule 6, para 6	**Complied with**. PMC assisted NRRDA to prepare a draft guideline on road safety audit. PICs in the State of CG and MP have conducted Road Safety Audit on the roads with the high speed traffic and vulnerable users. The road safety audit reports for batch I, II, III and IV were submitted to ADB on 24th June 2009.
RSC MP and CG shall undertake, with the assistance of RSC and participation of local community, a community based Rural Roads safety program to be developed to accompany Project road connectivity in their respective States.	Schedule 6, para 12	**Partially complied with**. PMC prepared a draft safety awareness campaign material. However, PMC could not do any substantial work on preparation of road safety manual.
The Borrower , MORD, MP & CG shall provide all assistance to the IAs required, in obtaining approvals and clearances required for the timely execution of the Project under the PMGSY Guidelines and other applicable laws and regulations of the Borrower, MP and CG as the case may require.	Schedule 6, para 13	**Complied with**. The governments at both central and state levels provided sufficient assistance to the IAs required.
The Project shall be carried out in accordance with the PMGSY Guidelines as supplemented by Project specific requirements provided under this Loan Agreement	Schedule 6, para 14 (a)	**Complied with**.
The Borrower shall ensure that within 18 months of Effective Date, MORD shall have progressed in its dialogue with the States participating in PMGSY with regard to making adequate plans and financing arrangements and commitments to properly maintain the PMGSY roads network over its useful economic life.	Schedule 6, para 14(b)	**Complied with**. Sufficient road maintenance is in place. According to the latest arrangement, MPRRDA and CGRRDA are in responsible for rural road maintenance with budget allocation from state government.
Without limiting the generality of Section 4.02 of this LA, the Borrower shall provide or cause MP and CG to provide as necessary the counterpart staff, land, facilities, and funding required for the Project in accordance with the financing plan, including the cost of the land	Schedule 6, para 15	**Complied with**. MPRRDA and CGRRDA are the IAs for the Project with financial support from the state

Project Specific Covenants	Reference in Loan/Project Agreement	Status of Compliance
acquisition and compensation thereof, implementation and monitoring under the LAPs, and IPDPs (including any unforeseen additional expenses in excess of estimates) utility relocation, and general project management expenses, in a timely manner through annual budget allocations		governments. For the project implementation, the state government also financed the cost for LAP, project management, and the packaged completed after the ADB loan closing.
Except as otherwise acceptable to ADB, Subproject shall be presented in four annual batches for each of MP and CG, with the first annual batch of subproject of 500 kms each for MP and CG, presented as per documents dated 9 September 2003. Each annual batch of Additional Subproject shall comprise of about 1,670 kms of roads each for MP and CG. MORD shall ensure that the Subprojects selected under the Project follow the eligibility criteria and are submitted by MP and CG for approval by ADB in a timely manner.	Schedule 6, para 16	**Complied with**. The subprojects were selected under the guideline of PMGSY and implemented by four batches, including 834.68 km for Batch I, 2,758.57 km for Batch II, 3,906.27 km for Batch III, and 2,075 km for Batch IV.
Selection of subprojects by MORD shall be subject to approval by ADB as per the criteria for the selection of subprojects.	Schedule 6, para 17	**Complied with**.
At least 30 days prior to commencement of construction works for the subprojects for inclusion in the additional subprojects, the IAs through MORD shall submit to ADB for approval a report providing details of the compliance of each additional subproject in the annual batch with the selection criteria.	Schedule 6, para 18	**Complied with**.
Performance Audit		
Without limiting the generality of Section 2.09 of the Project Agreements, MORD shall cause MP and CG to (i) have project procurement performance audits conducted annually by independent consultants financed under the Loan; and (ii) allow ADB to carry out procurement audits during project implementation as part of its regular review process	Schedule 6, para 38	**Complied with**. Two separate audits were carried out, one by the state level and the other by the Office of the Comptroller and Auditor General of India. ADB consultant has carried out procurement audits in both the states.
Within six months of Effective Date, MORD through MP and CG, shall cause each IA to implement systematic Project Performance Monitoring (PPM) and analysis throughout the life of the Project, integrated with their management information system. This shall be developed in accordance with ADB/s Project Performance Management System Handbook, as amended from time to time. Initially the PPM shall develop and conduct a "quick and easy" rapid sample survey to establish a baseline for subsequent performance monitoring, followed by surveys that be conducted annually.	Schedule 6, para 39	**Complied with**. PMC conducted the three semi-annual socio-economic surveys (baseline in 2005–06, following surveys in 2006–2007). A summary of the changes in indicators from the baseline was presented in monitoring reports. The contract of the PMC was closed 23rd September 2008. The monitoring activity of the socio-economic survey was further assigned to the Technical Support Consultant who has prepared the final annual report of 2008 and submitted to ADB.
Progress Reports and Review		
Without limiting the generality of Section 2.08 of the Project Agreements, each of the IAs in MP and CG shall submit to MORD through MP and CG respectively, monthly progress reports of Subprojects implementation under Parts A(1) and A(2) respectively, in such forms and detail as required. Likewise, MP and CG shall submit to MORD with their respective quarterly progress reports on Parts B(1)(2) and (4) respectively of the Project. MORD shall submit to ADB the consolidated overall Project performance reports on a quarterly basis. The quarterly reports shall include progress report on Part B of the Project and summarize the information in the detailed reports provided under clause (a) of this	Schedule 6, paras 40(a) and (b)	**Complied with**. The IAs prepared all monthly progress reports and submitted to NRRDA. **Complied with**. NRRDA submitted to ADB all the quarterly project progress reports timely with the information

Project Specific Covenants	Reference in Loan/Project Agreement	Status of Compliance
paragraph, including basic data, utilization of funds, achievement of immediate development objectives, compliance with Loan covenants, implementation progress, and major issues and problems. The report shall also include a baseline for performance monitoring as established in accordance with ADB's Project Performance management System Handbook, based on the key indicators and targets outlined in the Project framework.		required.
In addition to regular reviews by ADB, there shall be a mid-term review of the Project around June 2005 to be conducted by ADB, the Borrower, MORD, MP and CG. The review shall identify any problems or weaknesses in implementation arrangements, and agree on any changes needed to achieve the Project objectives. Two months prior to the midterm review the Borrower shall submit to ADB a detailed progress report on the Project implementation.	Schedule 6, para 41	**Complied with**. ADB Midterm review mission was conducted on 15–21 September 2007.
Promptly after physical completion of the Project, but in any event not later than three (3) months thereafter or such later date as ADB may agree for this purpose, MORD shall prepare and furnish to ADB a report, in such form and in such detail as ADB shall reasonably request, on the execution and initial operation of the Project, including its costs, the performance by MORD, MP and CG of its obligations under the Project Agreement and the accomplishment of the purposes of the Loan.	PA, Section 2.08(c)	**Complied with**. NRRDA prepared a Domestic Project Completion Report (PCR) , which is the ADB requested format and submitted to ADB before the ADB PCR mission.
Financial		
MORD, MP and CG shall (i) maintain separate accounts for the Project and Subprojects; (ii) have such accounts and related financial 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 not later than nine (9) months after the close of the fiscal year to which they relate, certified copies of such audited Project accounts and financial statements and the report of the auditors relating thereto, all in the English language.	PA, Section 2.09(a)	**Complied with**. IAs' financial accounts and statements for the Project were audited by charted accountants, and the audit reports were submitted to ADB as required under the loan agreement. The auditor's opinions indicated that the ADB loan proceeds were used properly and there was no serious problem.

IA = Implementing agency, MP= Madhya Pradesh, CG = Chhattisgarh, RSC = Road safety consultant

SUMMARY OF CONTRACT PACKAGES

State	Batch	No. of Roads	Length of Roads (km)	No. of Contracts	Cost Sanction (Rs crore)	Roads Completed	Length Completed (km)	No. of Habitation Benefited
Madhya Pradesh								
	I	97	515.1	18	99.4	91	474.4	152
	II	123	604.3	22	119.3	107	491.5	154
	III	488	2,322.6	109	456.8	436	2,020.7	631
	IV	546	2,501.2	115	560.7	449	2,075.2	614
Subtotal		**1,254**	**5,943.2**	**264**	**1,236.2**	**1,083**	**5,061.8**	**1,551**
Chhattisgarh								
	I	70	513.4	14	98.2	56	360.3	137
	II	561	2,516.1	103	587.1	522	2,267.1	794
	III	567	2,145.1	86	598.8	514	1,885.6	725
Subtotal		**1,198**	**5,174.6**	**203**	**1,284.1**	**1,092**	**4,512.9**	**1,656**
Total		**2,452**	**11,117.9**	**467**	**2,520.3**	**2,175**	**9,574.7**	**3,207**

Note: Numbers may not add precisely due to round offs.

"Roads Completed" indicates the total number of roads that were completed before the Asian Development Bank loan closing.

Crore = 10 million

Source: Executing agencies' project completion report: Draft Project Completion Report, India — Rural Roads Sector I Project, National Rural Roads Development Agency

SUMMARY OF EXISTING TRAFFIC AND FORECAST

A. Traffic Survey

1. During implementation, the project management consultants (PMC) and other consultants conducted traffic surveys for the baseline (2005–06) and subsequent years of 2006–07 and 2007–08.[1] The surveys were taken on sample project roads (40 roads in Madhya Pradesh and 33 roads in Chhattisgarh) and control roads (unrehabilitated roads, 15 roads in Madhya Pradesh and 10 in Chhattisgarh). The surveys collected the traffic count data for motorized vehicles and non-motorized vehicles. Transport-related data were also collected, such as average traveling speeds and freight characteristics. For the baseline survey, the traffic volume in Chhattisgarh was about double that in Madhya Pradesh. In the subsequent surveys, the same approach was used to collect traffic data on the same sample roads, and traffic changes were compared. The results (comparing the 2006-07 survey with the baseline survey) showed a significant increase in traffic, especially of passenger vehicles, on the project roads. Due to replacement of the survey consultants, the data of the subsequent surveys were not as consistent or as reliable as those of the baseline survey.

B. Supplementary Traffic Survey

2. To validate the data of the traffic surveys and obtain the latest traffic data, a due-diligence traffic survey was designed and implemented during the project completion review (PCR) mission. A consultant team was recruited to conduct a 24-hour traffic count survey on 10 selected project roads (5 roads in Madhya Pradesh and 5 in Chhattisgarh), which were part of the previous surveys. The survey was conducted on 18–23 May 2011. Hourly traffic data by 12 vehicle types (9 for motorized vehicles and 3 for non-motorized vehicles) were collected. The following is the summary of the supplementary traffic survey.

Table 9.1. Summary of Supplementary Traffic Survey

Name of Road	Motorized Vehicles									Grand Total	Grand Total VEH'S
	Two Wheeler	Cars, Jeeps, Van	Three Wheeler	Small Bus	Large Buse	Small Truck	Large Truck	Tractor / Trailer	Others		
Madhya Pradesh											
Hamidganj to Piplayi	275	11	-	5	1	8	-	43	-	343	529
Ujjain—Barnagar to Jhalariya	864	34	15	-	-	32	8	120	-	1,073	1,178
Pipalaya to Kalyanpur	570	43	78	2	-	4	2	16	-	715	854
NH 59 to Jhiri	208	19	-	-	-	6	1	18	-	252	323
Bakud Jod to Khairwada	469	54	-	12	13	37	13	42	-	640	739
Chhattisgarh											
Balasamunt to Ghatoli	219	15	-	-	-	7	-	165	-	406	870
Amodi to Manakoni	684	66	2	1	-	30	4	75	5	867	1,490
Kalmi to Navagaon	601	32	1	-	-	3	1	100	-	738	1,414
Lormi to Lachhapur	1,337	107	11	-	-	32	17	138	-	1,642	3,082
Devri to Saldih	590	78	-	2	1	9	-	82	2	764	1,286
MP Average (per road)*	438	36	26	6	5	16	5	34	-	566	707
CG Average (per road)	686	60	3	1	0	16	4	112	1	883	1,628

* Two roads are control roads, which are excluded from the average.
VEH'S = Number of Vehicles
Source: Asian Development Bank (ADB) Project Completion Review (PCR) mission

[1] Louis Berger Group, Inc. Monitoring of Socioeconomic Impacts—Baseline & Half Yearly Report for MP. October 2006; Monitoring of Socioeconomic Impacts—Baseline & Half Yearly Report for CG. October 2006; Socioeconomic Impacts Assessment for MP. August 2007; Socioeconomic Impacts Assessment for CG. August 2007; Operation Research Group Pvt. Ltd. Socioeconomic Impact Assessment Report—Madhya Pradesh. April 2009; Socioeconomic Impact Assessment Report—Chhattisgarh. April 2009;

C. Traffic Analysis

3. In comparison with the traffic forecast in the report and recommendation of the President (RRP), the actual traffic volume of the supplementary survey is much higher. At appraisal the average motorized traffic was forecast to be about 109 units per road in Madhya Pradesh and 68 in Chhattisgarh in 2010 for the sample roads. However, the actual average traffic in 2011 is about 566 units per road for Madhya Pradesh and 833 for Chhattisgarh. In the supplementary survey, the average vehicle speeds by road were also collected, which were around 30–40 km per hour.

4. During the PCR mission, changes in the traffic on the project roads were compared. It was found that (i) traffic increased significantly after completion of the project roads; (ii) the number of passenger vehicles (small passenger vehicles and buses) increased still more; and (iii) the actual traffic volume in the supplementary traffic survey is much higher than that of the RRP. Between 2006 (baseline survey) and 2011 (PCR supplementary survey), the traffic increased by about 41% per annum for Madhya Pradesh and 26% for Chhattisgarh. The number of small passenger vehicles increased still more, by 46% for Madhya Pradesh and 35% for Chhattisgarh. According to the site visits and consultation interviews with villagers during the PCR mission, it was confirmed that (i) socioeconomic development was rapid in the project area, which generated substantial traffic demands; (ii) the rehabilitation of the project roads completely changed the transport conditions in the project area, which significantly reduced vehicle operating costs and travel time; (iii) the ownership of vehicles, especially motorcycles, in the project area increased sharply, creating more traffic; and (iv) public transport services developed rapidly in the project area, making travel for the villagers, especially the women, much more convenient. The comparison of the traffic counts is in Table 9.2.

Table 9.2. Comparison of Average Traffic Counts per Project Road

		Two/Three Wheeler	Car, Jeep, Van	Bus	Truck	Tractor	**Total**
Madhya Pradesh State							
	Control Road	63	3	1	1	5	**73**
	2005—06 (PR)	85	4	2	3	17	**111**
	2006—07 (PR)	118	8	5	5	21	**157**
	PCR mission (PR)	464	36	11	21	34	**566**
	Baseline (PR/CR)	35%	40%	95%	188%	228%	52%
	2006—07/2005—06	39%	116%	163%	72%	24%	42%
	PCR/Baseline (annual)	**33%**	**46%**	**33%**	**40%**	**12%**	**41%**
Chhattisgarh State							
	Control Road	185	3	1	4	11	**204**
	2005—06 (PR)	184	10	0	2	20	**216**
	2006—07 (PR)	347	27	4	6	31	**415**
	PCR mission	689	60	1	21	113	**884**
	Baseline (PR/CR)	-1%	198%	-9%	-43%	92%	6%
	2006—07/2005—06	89%	175%	780%	179%	52%	**92%**
	PCR/Baseline (annual)	**25%**	**35%**	**10%**	**46%**	**33%**	**26%**

PR = project roads, CR = control roads
Source: ADB PCR mission

D. Adjusted Traffic Forecast

5. The projected increase rates of future traffic on the project roads were adjusted according to the existing traffic and analysis. It was assumed that (i) socioeconomic development would be robust and generate more traffic; (ii) passenger traffic, especially public transport services, would increased more rapidly; and (iii) the increase rates would slow down after 2013. The adjusted traffic increase rates by vehicle types is in Table 9.3. In comparison with traffic increase rates in the RRP, these are little higher to reflect the actual traffic and faster socioeconomic development in the project area.

Table 9.3. Traffic Annual Increase Rates on the Project Roads

		Two/Three Wheeler	Car, Jeep, Van	Bus	Truck	Tractor	**Total**
Madhya Pradesh State							
	2011—2012	12%	15%	11%	9%	6%	11.7%
	2013—2017	9%	11%	9%	6%	4%	8.8%
	2018—	3%	4%	4%	3%	3%	3.1%
Chhattisgarh State							
	2011—2012	12%	13%	12%	9%	7%	11.4%
	2013—2017	7%	9%	8%	6%	3%	6.7%
	2018—	3%	4%	4%	3%	2%	3.0%

Source: ADB PCR mission

ECONOMIC REEVALUATION

A. General

1. The project completion review (PCR) mission conducted an economic reevaluation of the project by comparing "with" and "without" project cases, using similar methodology as that at appraisal and updated data. In the "without" case, it was assumed that the original state of the road, without rehabilitation, would be retained. In the "with" case, the roads were rehabilitated. Vehicles could drive at faster speeds with lower operating costs and less travel time. Also, the project was expected to generate more traffic. Through comparison, economic benefits were estimated, the economic internal rate of return (EIRR) was calculated and sensitivity was tested. The methodology and parameters used were also coordinated with other recent Asian Development Bank (ADB) road projects in India. The reevaluation was carried out separately for the two states (Madhya Pradesh and Chhattisgarh).

B. Costs

2. The project costs consisted of capital and maintenance costs. The actual capital cost for the whole project was about 11% lower than that estimated at appraisal, mainly because some contract packages were removed from the project due to substantial delays. However, the unit cost per kilometer (km) was about 20% higher than that at appraisal.[1] Actual annual investment costs for the components in Madhya Pradesh and Chhattisgarh were used in the economic reevaluation. In considering the existing road conditions and future traffic levels, it was assumed that the routine maintenance cost would be Rs 23,500 per year per km.[2] It was also assumed that periodical maintenance would constitute about 30% of the capital cost and would take place every 5 years, according to Pradhan Mantri Gram Sadak Yojana (PMGSY) guidelines. As a general practice, the periodical maintenance is implemented over a 4-year period per contract. The financial costs for both capital and maintenance were converted into economic costs with the use of a standard conversion factor of 0.85 in the project area. All economic costs were estimated in constant 2011 prices.

C. Benefits

3. Using the same methodology as at appraisal, the main sources of economic benefits considered include (i) vehicle operating cost (VOC) savings; (ii) passenger travel time costs savings; and (iii) other non-quantified benefits. The benefit calculation only considered normal and converted traffic. The induced traffic was excluded in the benefit calculation.

4. The VOC savings were recalculated using unit VOC data for different road roughness which were adopted from the Reports and Recommendation of the President (RRP) but adjusted for inflation. The VOC savings in Rs per vehicle-kilometer were estimated at 2.4 for two/three wheelers, 7.3 for small passenger vehicles, 7.8 for buses, 10.1 for trucks, and 7.4 for agricultural vehicles. Average passenger vehicle speeds were assumed to be 40–50 km per hour for the "with" cases and 25 km per hour for the "without" cases. The passengers' travel time cost savings were recalculated for different types of passenger vehicles. The passenger time cost was derived from the Gross Domestic Product (GDP) per capita of the project states

[1] In the economic evaluation of the RRP, the total financial cost for the sample roads was Rs1,694 million and the total length was 794 km.

[2] The PCR mission was told that the average routine maintenance cost was about Rs12,000–35,000 per km for the project roads.

in 2009–10 and was estimated to increase 6%–4% each year[3] to reflect increased incomes in near future. Other factors taken into account in the calculation of time cost savings include average vehicle loads, the percentage of work-related trips, time costs for different road users, and travel speeds for different types of passenger vehicles. Due to the unavailability of data, 10% was added to the VOC and time cost savings to reflect other benefits such as socioeconomic development in the project area, poverty reduction, less accident cost, savings in maintenance costs for the "without" case. The benefit calculation results showed that the VOC savings constituted a major portion of the total benefits, about 76–61%,[4] but passenger time cost benefits are projected to increase rapidly, along with socioeconomic development and incomes, from 15% in 2010 to 30% in 2027.

D. EIRR Reevaluation

5. The recalculated EIRR of the project roads was 30.8% for the whole project (28.6% for the Madhya Pradesh component and 32.5% for the Chhattisgarh component).[5] In comparison with 26.6% at appraisal,[6] the higher EIRRs were mainly caused by much higher rates of actual traffic in comparison with those estimated at appraisal. The recalculated EIRRs are above the ADB-recommended social discount rate of 12% and the project can be considered economically viable. The EIRRs were subjected to a sensitivity analysis to test different scenarios. The sensitivity analysis results showed that the project continues to be economically viable for all scenarios. For the low traffic case (20% lower than normal traffic), the EIRR was 24.2%. For a case with a combination of both a 20% maintenance cost increase and a 20% benefit reduction, the EIRRs would be 25.0% for the whole project. The sensitivity test shows that the EIRR is more sensitive to changes in benefits. This is because the return from the project is highly dependent on how much it is used, rather than how much it costs to maintain the road. So the government should pay more attention to socioeconomic development in the project area and implement policies to stimulate transport services and increase incomes of the villagers, which may maximize the project's benefits. The results of the sensitivity tests are in Table A10.1.

Table A10.1: Sensitivity Analysis

Scenarios		EIRR (%)
Base Case		**30.8%**
Sensitivity Tests		
1	Maintenance Cost 10% Higher	30.6%
2	Maintenance Cost 20% Higher	30.4%
3	Traffic 20% Lower	24.2%
4	Traffic 20% Higher	37.1%
5	Benefits 10% Lower	28.2%
6	Benefits 20% Lower	25.5%
7	Benefits 10% Higher	33.4%
8	Benefits 20% Higher	35.9%
9	Maint. Cost 10% Higher & Benefits 10% Lower	28.0%
10	Maint. Cost 20% Higher & Benefits 20% Lower	25.0%

Source: ADB PCR mission

6. The EIRRs for the whole project as well as for each state are in Table A10.2–4.

[3] The order of the number represents a development trend (from high to low)
[4] The order of the number represents a development trend (from high to low)
[5] The average amount of traffic per road in Chhattisgarh is much higher than in Madhya Pradesh.
[6] Only for the sample roads in Batch I.

Table A10.2: Economic Reevaluation for the Whole Project

(Rs million)

	Cost			Benefit				Net	NPV
	Capital	Maintain	Total	VOC	Time Cost	Others	Total	Benefit	
2004	59.3		59.3					-59.3	-117.1
2005	1,625.8		1,625.8	137.2	72.7	21.0	230.9	-1,394.9	-2,458.3
2006	7,968.7		7,968.7	453.4	145.4	59.9	658.7	-7,310.0	-11,502.4
2007	7,334.9		7,334.9	1,459.5	334.5	179.4	1,973.3	-5,361.6	-7,532.7
2008	2,715.6		2,715.6	2,452.5	471.9	292.4	3,216.8	501.2	628.7
2009	1,177.1	0.6	1,177.8	3,372.3	650.8	402.3	4,425.4	3,247.6	3,637.3
2010		15.1	15.1	4,382.7	890.2	527.3	5,800.1	5,785.1	5,785.1
2011		1,340.0	1,340.0	5,716.4	1,220.9	693.7	7,631.0	6,291.0	5,617.0
2012		1,409.5	1,409.5	6,338.6	1,445.1	778.4	8,562.1	7,152.6	5,702.0
2013		1,434.1	1,434.1	6,787.2	1,647.6	843.5	9,278.3	7,844.2	5,583.3
2014		1,444.1	1,444.1	7,270.9	1,878.8	915.0	10,064.7	8,620.5	5,478.5
2015		1,444.1	1,444.1	7,792.5	2,143.0	993.6	10,929.1	9,485.0	5,382.0
2016		1,444.1	1,444.1	8,355.3	2,444.9	1,080.0	11,880.3	10,436.1	5,287.3
2017		1,444.1	1,444.1	8,962.7	2,790.0	1,175.3	12,928.0	11,483.8	5,194.7
2018		1,444.1	1,444.1	9,236.6	3,037.5	1,227.4	13,501.5	12,057.4	4,869.8
2019		1,444.1	1,444.1	9,519.1	3,265.6	1,278.5	14,063.1	12,619.0	4,550.5
2020		1,444.1	1,444.1	9,810.6	3,510.8	1,332.1	14,653.5	13,209.4	4,253.1
2021		1,444.1	1,444.1	10,111.3	3,774.5	1,388.6	15,274.3	13,830.2	3,975.9
2022		1,444.1	1,444.1	10,421.4	4,058.1	1,448.0	15,927.5	14,483.4	3,717.5
2023		1,444.1	1,444.1	10,741.4	4,363.2	1,510.5	16,615.1	15,170.9	3,476.8
2024		1,444.1	1,444.1	11,071.6	4,691.2	1,576.3	17,339.1	15,894.9	3,252.4
2025		1,444.1	1,444.1	11,412.2	5,044.1	1,645.6	18,101.9	16,657.7	3,043.3
2026		1,444.1	1,444.1	11,763.6	5,423.6	1,718.7	18,905.9	17,461.8	2,848.4
2027	-10,440.8	1,444.1	-8,996.6	12,126.2	5,831.8	1,795.8	19,753.7	28,750.4	4,187.3
							Net Present Value (NPV):		64,860.3
							Economic Internal Rate of Return (EIRR):		30.8%
							Discount Rate:		12%

Source: ADB PCR mission

Table A10.3: Economic Reevaluation for Madhya Pradesh

(Rs million)

	Cost			Benefit				Net	NPV
	Capital	Maintain	Total	VOC	Time Cost	Others	Total	Benefit	
2004	59.3		59.3					-59.3	-117.1
2005	574.1		574.1	101.4	19.9	12.1	133.5	-440.7	-776.6
2006	3,233.1		3,233.1	202.8	39.8	24.3	266.9	-2,966.2	-4,667.4
2007	3,967.3		3,967.3	642.9	106.1	74.9	823.9	-3,143.4	-4,416.2
2008	1,110.1		1,110.1	998.8	141.9	114.1	1,254.7	144.6	181.3
2009	298.5	0.6	299.1	1,346.2	204.4	155.1	1,705.7	1,406.6	1,575.4
2010		6.9	6.9	1,766.8	291.8	205.9	2,264.5	2,257.5	2,257.5
2011		596.8	596.8	2,331.9	417.3	274.9	3,024.1	2,427.3	2,167.2
2012		640.2	640.2	2,594.5	494.7	308.9	3,398.2	2,758.0	2,198.6
2013		652.4	652.4	2,811.1	570.3	338.1	3,719.6	3,067.2	2,183.2
2014		655.7	655.7	3,046.8	657.6	370.4	4,074.8	3,419.1	2,172.9
2015		655.7	655.7	3,303.4	758.3	406.2	4,467.8	3,812.2	2,163.1
2016		655.7	655.7	3,582.8	874.5	445.7	4,903.1	4,247.4	2,151.9
2017		655.7	655.7	3,887.2	1,008.7	489.6	5,385.5	4,729.9	2,139.6
2018		655.7	655.7	4,011.7	1,098.2	511.0	5,620.9	4,965.3	2,005.4
2019		655.7	655.7	4,140.2	1,181.0	532.1	5,853.4	5,197.8	1,874.4
2020		655.7	655.7	4,273.0	1,270.2	554.3	6,097.5	5,441.8	1,752.1
2021		655.7	655.7	4,410.0	1,366.0	577.6	6,353.7	5,698.0	1,638.0
2022		655.7	655.7	4,551.6	1,469.2	602.1	6,622.8	5,967.1	1,531.6
2023		655.7	655.7	4,697.7	1,580.1	627.8	6,905.6	6,249.9	1,432.3
2024		655.7	655.7	4,848.6	1,699.5	654.8	7,202.9	6,547.2	1,339.7
2025		655.7	655.7	5,004.4	1,827.9	683.2	7,515.6	6,859.9	1,253.3
2026		655.7	655.7	5,165.3	1,966.1	713.1	7,844.6	7,188.9	1,172.7
2027	-4,621.2	655.7	-3,965.6	5,331.5	2,114.8	744.6	8,190.9	12,156.5	1,770.5
							Net Present Value (NPV):		24,983.4
							Economic Internal Rate of Return (EIRR):		28.6%
							Discount Rate:		12%

Source: ADB PCR mission

Table A10.4: Economic Reevaluation for Chhattisgarh

(Rs million)

	Cost			Benefit				Net	NPV
	Capital	Maintain	Total	VOC	Time Cost	Others	Total	Benefit	
2004									
2005	1,051.7		1,051.7	35.8	52.8	8.9	97.5	-954.3	-1,681.7
2006	4,735.6		4,735.6	250.6	105.6	35.6	391.8	-4,343.8	-6,835.0
2007	3,367.7		3,367.7	816.6	228.4	104.5	1,149.4	-2,218.2	-3,116.5
2008	1,605.5		1,605.5	1,453.7	330.0	178.4	1,962.1	356.6	447.3
2009	878.7		878.7	2,026.1	446.4	247.2	2,719.7	1,841.0	2,061.9
2010		8.1	8.1	2,615.9	598.4	321.4	3,535.7	3,527.5	3,527.5
2011		743.2	743.2	3,384.5	803.6	418.8	4,606.9	3,863.8	3,449.8
2012		769.3	769.3	3,744.0	950.4	469.4	5,163.9	4,394.6	3,503.4
2013		781.7	781.7	3,976.1	1,077.2	505.3	5,558.7	4,777.0	3,400.2
2014		788.5	788.5	4,224.1	1,221.3	544.5	5,989.9	5,201.4	3,305.6
2015		788.5	788.5	4,489.1	1,384.8	587.4	6,461.3	5,672.8	3,218.9
2016		788.5	788.5	4,772.5	1,570.4	634.3	6,977.2	6,188.7	3,135.4
2017		788.5	788.5	5,075.5	1,781.3	685.7	7,542.4	6,753.9	3,055.1
2018		788.5	788.5	5,224.9	1,939.3	716.4	7,880.6	7,092.1	2,864.4
2019		788.5	788.5	5,378.9	2,084.5	746.3	8,209.7	7,421.2	2,676.2
2020		788.5	788.5	5,537.6	2,240.6	777.8	8,556.1	7,767.6	2,500.9
2021		788.5	788.5	5,701.2	2,408.5	811.0	8,920.7	8,132.2	2,337.8
2022		788.5	788.5	5,869.9	2,589.0	845.9	9,304.7	8,516.3	2,185.9
2023		788.5	788.5	6,043.8	2,783.1	882.7	9,709.5	8,921.0	2,044.5
2024		788.5	788.5	6,223.0	2,991.7	921.5	10,136.2	9,347.7	1,912.7
2025		788.5	788.5	6,407.8	3,216.1	962.4	10,586.3	9,797.8	1,790.0
2026		788.5	788.5	6,598.3	3,457.4	1,005.6	11,061.3	10,272.8	1,675.7
2027	-5,819.6	788.5	-5,031.1	6,794.7	3,716.9	1,051.2	11,562.8	16,593.9	2,416.8
							Net Present Value (NPV):		39,876.9
							Economic Internal Rate of Return (EIRR):		32.5%
							Discount Rate:		12%

Source: ADB PCR mission

SOCIOECONOMIC IMPACT
RURAL ROADS SECTOR I PROJECT (IND-2018)

I. BACKGROUND

1. Lack of road connectivity has been among the main underlying causes of poverty and deprivation in rural India, and has been a roadblock to realizing socioeconomic growth potential in these areas. To address this issue, the Government of India established a national rural roads program known as Pradhan Mantri Gram Sadak Yojana (PMGSY—Prime Minister's Rural Roads Program) in 2000. PMGSY identified more than 160,000 habitations requiring road connectivity investments, and the total cost for 2002–2007 was estimated at $11 billion, of which 32% was funded by the government and the balance by development partners.[43] The Asian Development Bank (ADB) has provided a series of loans to the government beginning with the Rural Roads Sector I Project (IND-2018) in the states of Madhya Pradesh and Chhattisgarh. A loan of $400 million was approved by the ADB's Board of Directors on 20 November 2003 and became effective on 25 January 2005. The executing agency was the Ministry of Rural Development (MORD) and the implementing agencies were the National Rural Roads Development Agency (NRRDA) at the central level and the Madhya Pradesh Rural Roads Development Agency (MPRRDA) and the Chhattisgarh Rural Roads Development Agency (CGRRDA) at the state level. A total of 9,575 kilometers (km) of all-weather rural roads with 7.5 meters (m) roadway width and 3.75 m carriageway were rehabilitated under the project, with a total of 2,175 roads that provided connectivity to 3,207 habitations.[44] Table 1 provides the detailed breakdown of construction output. The loan closed on 9 June 2009.

Table A11.1: Project Output

	Madhya Pradesh	Chhattisgarh	Total
Total length of roads rehabilitated (km)	5,062	4,513	9,575
Number of roads rehabilitated	1,083	1,092	2,175
Number of habitations connected	1,551	1,656	3,207

2. In the states of Madhya Pradesh and Chhattisgarh, about three-quarters of the people live in rural areas, and the majority of rural habitations did not have all-weather road connections. The poverty headcount rate in the two states was among the highest in India. According to Planning Commission and National Sample Survey Organization (NSSO) data for 2004–2005 and calculations based on Uniform Reference Period, the percentage of people living below the poverty line was 38% for Madhya Pradesh and 41% for Chhattisgarh. The percentages are higher than the all-India value of 28%.

[43] A habitation is the unit used by PMGSY. A habitation is a cluster of population, living in an area, the location of which does not change over time. It is not a revenue village or a *Panchayat*. Commonly used terms to describe a habitation are *Desam, Dhanis, Tolas, Majras,* and hamlet. An unconnected habitation is one with a population of a designated size located at a distance of at least 500 m or more (1.5 km of path distance in case of hills) from an all-weather road or a connected habitation.

[44] The rehabilitations consisted of (i) strengthening and widening roads; (ii) adding blacktop to the existing roads; and (iii) adding structures to enhance road protection.

3. The project, being part of the PMGSY initiative, strategically focused providing connectivity to the poor. In line with the government's priorities for the Tenth Five-Year Plan 2002–2007,[45] this was to be addressed primarily by supporting economic growth, including both high growth and equitable, pro-poor growth. In addition, the theme of ADB's country strategy and program (CSP) for 2003–2006 was mainstreaming poverty reduction. Specifically, the CSP focused on the importance of infrastructure in poverty reduction, through both its indirect impact on growth leading to higher incomes and increased rates of employment, and its direct contributions to incomes and employment, as well as on reducing poverty by improving access to social services. After implementation, the project was rated highly relevant for the government's and ADB's objectives, policies, and strategies; the project had a positive socioeconomic impact on the 3,207 habitations that became connected.

II. SCOPE AND METHODOLOGY

4. **Scope.** A multi-year study was undertaken to gauge the project's socioeconomic impact. The survey monitored a sample of 45 habitations located in 20 districts in Madhya Pradesh and Chhattisgarh, or 16% of all habitations that were connected by Batch I of the project over a 3-year period.[46] Batch I roads totaled 1,029 km, with 97 roads totaling 515 km in Madhya Pradesh and 70 roads totaling 513 km in Chhattisgarh. A total of 289 habitations were directly connected, with 152 connected in Madhya Pradesh and 137 in Chhattisgarh. The all-weather roads also benefited habitations that are connected by unpaved roads that branch off of the PMGSY roads. Unless otherwise noted, all data from this appendix are derived from the socioeconomic impact assessment reports for Madhya Pradesh and Chhattisgarh prepared by the technical support consultants engaged by the NRRDA.[47]

5. **Study Approach.** The approach involved multi-year surveys to assess the impact of the project on road users and people living along the road over a 3-year period between January 2006 and December 2008. The NRRDA used the "before-after-with-and-without" approach, meaning that a control sample of roads and habitations was selected to match the socioeconomic conditions of the roads and habitations to be improved and connected. Before civil works were initiated, a baseline survey for the selected project and control roads and habitations was conducted. After rehabilitation, a final survey was conducted to assess the same sample and control roads and habitations. The project management consultant (PMC) appointed by the NRRDA completed the baseline and two subsequent monitoring surveys between January 2006 and June 2007. The technical support consultants completed the final survey in December 2008. The surveys used a systemic approach based on pre-improved (ex-ante) baseline data for project habitations and control habitations and updating the data in predefined intervals over the study period of three years.

6. **Survey Instruments.** The survey instruments used to assess socioeconomic impacts were (i) sample inhabitants' perceptions obtained through focus group discussions; (ii) habitation primary data collected through key informant interviews; (iii) habitation primary data collected through community self monitoring; and (iv) a household tracer study of 10 households of varying economic conditions conducted throughout the study. Table 2 provides additional detail regarding the survey instruments and their scope in the two states.

[45] http://planningcommission.nic.in/plans/planrel/fiveyr/welcome.html
[46] Due to the large number of roads rehabilitated, civil works were implemented in four batches.
[47] Operations Research Group Pvt. Ltd. Socioeconomic Impact Assessment Report, Rural Roads Project—I: Madhya Pradesh (ADB Loan No. 2018-IND).. April 2009; Socioeconomic Impact Assessment Report, Rural Roads Project—I: Chhattisgarh (ADB Loan No. 2018-IND). April 2009.

Table A11.2: Survey Instruments and Scope

			Scope	
Survey	**Source**	**Frequency**	**Madhya Pradesh**	**Chhattisgarh**
Habitation perception	Focus group discussion	Annual	25 SHs; 9 CHs	20 SHs; 6 CHs
Habitation primary data	Key informant interview	Annual	25 SHs; 9 CHs	20 SHs; 6 CHs
Habitation primary data	Community self-monitoring	Semi-annual	5 SHs	5 SHs
Change process	HH tracer study	Semi-annual	50 HHs from 5 SHs	50 HHs from 5 SHs

CH = control habitation, HH = household, and SH = sample habitation.

7. **Selection Process.** Of the 167 roads under Batch I, 75 project roads were selected to be surveyed for traffic count and transportation data. All project roads were first sorted by location and number of inhabitants in the habitations that were to be connected. The sample roads were then selected at random within each grouping in order to represent the spectrum of population and geographical locations. After the sample roads were selected, a to-be-connected habitation with a higher level of socioeconomic activity along the road was selected as the sample habitation to be surveyed for the socioeconomic baseline and impact. From the two states 45 habitations were surveyed.

8. For the control roads and habitations, 21 roads and habitations with comparable socioeconomic environments were selected. The control roads were not candidates for improvement under the project and were similar to the sample habitations in population range and distance from the nearest all-weather road. The control habitations were located in the same district but in a neighboring block.

9. **Data Validation.** In April 2011, ADB fielded a mission to both Madhya Pradesh and Chhattisgarh to validate the data collected during the study and to gather anecdotal information that would deepen the analysis of the data. Focus group discussions were held in six sample habitations and six control habitations in the two states with a cross section of the community represented, including women and youth.[48]

10. **Limitations of Method.** Several limitations were observed during the assessment. First, the sample size of the study was fairly limited, encompassing 45 habitations in the two states. The sample size represented 16% of the total number of habitations that were connected under Batch I of the project and only 1.4% of the total number of habitations connected under the entire project (Batches I through IV). Second, the completion date of the roads varied between late 2006 and late 2008, while the final surveys were all conducted during December 2008. Therefore, the amount of time for socioeconomic impacts to be realized varied between villages. Habitations that had been connected for a longer period had higher overall socioeconomic indicators than those habitations that had only recently been connected. Third, self-estimating was difficult for some informants, leading to potential biases. For example, farmers had difficulty estimating their income or expenditures because they varied greatly from one season to another, depending on the crop produced or the weather. The frequency of certain services may have been over- or underestimated due to the weather and seasonal nature of certain tasks. The number of motorized and non-motorized vehicles was also hard to verify especially in larger habitations. Fourth, during the final survey, some of the control habitations were either connected, or the earthen road had been improved. This led

[48] The villages visited were located in Guna, Jhabua, and Sehore, districts in Madhya Pradesh; and in Bilaspur, Kawardha, and Korba districts in Chhattisgarh.

to a smaller variance in socioeconomic improvement between sample habitations and control habitations. Last, socioeconomic improvements cannot be solely attributed to the connectivity, as there were other rural development programs and schemes being implemented in the habitations. For example, in some habitations the increase in land value can be attributed to both better connectivity and an improved irrigation system implemented by the Department of Irrigation.

III. BRIEF SOCIOECONOMIC PROFILE OF PROJECT AREA

A. Madhya Pradesh

11. Madhya Pradesh is the second-largest state in India (in terms of area) and is located in the central part of the country. According to the census for 2001, the state's population was 60.4 million, with a compounded annual growth rate of 2.2%. About 74% of the total population lives in rural areas and about 70% of the total workforce is engaged in agriculture. The main agriculture outputs are cereal products and cash crops, including soybeans, mustard, and corn. The average yield levels are low due to underdeveloped irrigation systems, lack of knowledge and access to farming techniques, and a lengthy dry season. According to government estimates, the per-capita income for Madhya Pradesh was Rs15,647 in 2005–2006, an increase of about 23% from the 2001–2002 level of Rs12,697, based on current 1999–2000 prices.[49] About 38% of the Madhya Pradesh population lived below the poverty line (BPL) according to government estimates for 2004–2005.[50]

12. **Distance to General Facilities.** Based on the National Sample Survey's 58th round of data involving the survey of 1,000 villages in Madhya Pradesh, it found that 45% of the villages had all-weather roads, of which 22% were serviced by bus. Block and district headquarters were typically located 10 or more km away and post offices were usually 2–5 km away. Most villages were located between 2 and 5 km away from a bank, veterinary hospital, fertilizer or pesticide shop, and daily or weekly markets.

13. **Education and Health.** According to the state's human development report (2002), there are 82,219 primary schools in the two states, or about one school per 10 square kilometer. The ratio of boys to girls enrolled in elementary school is 1.19 to 1 and in secondary school is 1.52 to 1. Health service in rural areas is lacking due to a shortage of qualified personnel and facilities. The ratio of hospital beds to the total population in Madhya Pradesh is 1 to 956, as compared to the state of Kerala where it is 1 to 802. Rural areas depend on sub-health centers for provision of basic health care include maternal and child services. More serious medical cases are taken to primary health centers, community health centers, or district hospitals.

B. Chhattisgarh

14. Chhattisgarh was established in 2000 when Madhya Pradesh was reorganized and split into two states. According to the 2001 census, 20.8 million people lived in the state of Chhattisgarh. Of that amount, 80% of the population resides in rural areas. About one-third of Chhattisgarh's population is tribal and 12% of the population belongs to a scheduled caste. Similar to Madhya Pradesh, approximately 70% of the workforce is involved in the agriculture

[49] Sl. No. 1–32: Directorate of Economics and Statistics of Respective State Governments, and for All-India. Central Statistical Organisation.
[50] Government of India Planning Commission and National Sample Survey Organization Data, 61st round.

sector. However, mining and manufacturing sectors in Chhattisgarh have been steadily growing, leading to a substantial increase in the state's per capita income from Rs12,443 in 2001–2002 to Rs20,151 in 2005–2006 based on current 1999–2000 prices.[5] About 41% of Chhattisgarh's population lived below the poverty line according to government estimates for 2004–2005.[6]

15. **Distance to General Facilities.** Based on the National Sample Survey's 58th round of data involving the survey of 1,000 villages in Chhattisgarh, 55% of the villages had all-weather roads, of which 23% were serviced by bus. Block and district headquarters were typically located 10 or more km away. Most villages were located between 2 and 5 km away from a bank, post office, and daily or weekly market. Veterinary hospitals and fertilizer or pesticide shops were usually located 5–10 km away.

16. **Education and Health.** There were 31,236 primary schools and 10,206 secondary schools per 2006 data. The literacy rate of the state is 65.1%, similar to the all-India level of 65.3%. However, the literacy rate, especially for women, is lower in the tribal districts. The government implements several schemes to boost the quality of education in rural and tribal areas. For example, the Rajiv Gandhi Education Mission and the District Primary Education Program focus on increasing the reach of primary education services in rural and poverty stricken areas, with a specific focus on improving female literacy.

C. Characteristics of Unconnected Habitations

17. Lack of connectivity and remoteness of habitations are major hurdles for the rural population in securing productive employment and income opportunities, accessing healthcare facilities and educational institutions, and participating in governance. Habitations without all-weather connectivity were generally characterized by (i) isolation or minimal interaction with outside communities for socioeconomic purposes; (ii) few options for transport, mainly relying on walking or non-motorized vehicles; (iii) long travel times, especially during the rainy season; (iv) a low level of commerce; (v) difficulties accessing health care or higher levels of education; (vi) infrequent and short visits from government workers; and (vii) residential dwellings constructed out of non-permanent materials.

IV. Socioeconomic Impact

18. The studies indicate that connectivity has impacted rural living conditions in two ways: (i) giving the communities more reliable and quicker access to outside products, services, information, and social linkages; and (ii) allowing external service and product providers and social contacts to have improved access to rural communities. The connectivity has allowed communities to better access existing government schemes and services aiding rural areas.

19. The presence of all-weather roads has directly or indirectly contributed to improvements in (i) connectivity, (ii) transportation, (iii) access to government services, (iv) livelihood, (v) commercial activities, (vii) education, (viii) health, (ix) land value, (x) building materials, (xi) social interactions, and (xii) gender empowerment. Overall, the aggregate impact has contributed to poverty alleviation in rural communities in Madhya Pradesh and Chhattisgarh. In sample project habitations in Madhya Pradesh, the number of households living below the poverty line decreased by 4.7% between December 2006 and December 2008, and in Chhattisgarh by 1.7%. Over the same period, the number of BPL households in sample control villages decreased by 2.9% in Madhya Pradesh, but increased by 0.2% in Chhattisgarh. Due to the limitations of this study, as mentioned in paragraph 10, it is difficult to compare the sample project habitations and sample control habitations over time and be confident that any

differences in development are due to the project rather than general socioeconomic developments or other interventions. However, it is evident that the living conditions in connected habitations continue to improve and the number of households living BPL will likely continue to decrease over time.

A. Connectivity

20. PMGSY roads have improved connectivity to and from rural habitations. For rural communities, the roads provide better access to government offices, markets, financial institutions, employment opportunities, hospitals, education institutions, information, and family and friends living further away. The average travel time to the nearest town decreased by 36 minutes in Madhya Pradesh and 14 minutes in Chhattisgarh. For example, in the village of Chhantajha in Kawardha District of Chhattisgarh, villagers reported that the travel time to the nearest town 7 km away was 1–3 hours by bicycle (during the rainy season) prior to connectivity. After connectivity, the same trip now takes 15–20 minutes by motorcycle, or 30 minutes by bicycle. Over the same time period, travel time increased by an average of 16 minutes in control habitations in Madhya Pradesh and 1 minute in Chhattisgarh.

21. In Madhya Pradesh, there was a savings of 152 minutes in travel time from habitation to district headquarters, 116 minutes to block headquarters, 93 minutes to the hospital, 86 minutes to the main bank, and 79 minutes to the market.[51] For people outside of the village, PMGSY roads allow government workers, including health workers, teachers, and agriculture extension workers, easier access to the habitations in order to provide services and information to rural communities. The roads also promote a higher level of social interactions between villagers and external residents, most evidently by an increase in the number of marriages that have taken place in communities since connectivity, especially with partners who are a non-residents.

B. Transportation

22. **Public Transportation.** Buses, jeeps, vans, and 3-wheelers now provide reliable public transportation for newly connected villages to and from nearby towns and cities. In sample habitations in the two states, on average, a 60% increase in buses, 175% increase in jeeps, and 150% increase in taxis served habitations daily. During the same period, control habitations saw a decrease in public transportation service. Women utilize public transport but some preferred to use it with a group or with male family members. However, when needed, women were comfortable using public transportation by themselves.

23. **Private Transportation.** The study observed an overall increase in private ownership of motorized and non-motorized vehicles in project habitations. Most notably, there has been a large increase in the number of motorcycles—35% in Madhya Pradesh and 17% in Chhattisgarh. Motorcycles are nearly always operated by men. However, in a few of the sample habitations, women were using automatic scooters (mopeds). Some women health workers were using scooters to travel between habitations. For non-motorized vehicles, there has been a decrease in the number of bicycles; however, bicycles were the main mode of transportation for students to reach school. The number of bullock carts is still increasing, although at a slower

[51] Data obtained from a separate ADB-funded study in Madhya Pradesh that included 36 habitations located on 32 roads in four districts. The methodology for calculating savings in travel time took the time difference between pre-connectivity and post-connectivity by using the best available mode of transport between habitation and destination. The best available mode is the best combination of various modes of transport available and may involve transition time and waiting time.

rate. With time, the number of motorized vehicles will likely continue to increase, while the number of non-motorized vehicles will decrease. Table 3 details the percent change of private vehicle ownership before and after connectivity.

Table A11.3: Private Vehicle Ownership
(Percent change before versus after connectivity)

	Non-motorized		Motorized		
	Bullock cart	**Bicycle**	**Motorcycle**	**Tractor**	**Jeep/Car**
Madhya Pradesh	3.0%	−15.4%	35.2%	8.9%	350.4%
Chhattisgarh	37.1%	−74.0%	17.0%	21.4%	…
Average	**20.1%**	**−44.7%**	**26.1%**	**15.1%**	**…**

… = data not collected during study.

C. Access to Government Services

24. **Government Programs and Schemes.** The government and the state governments operate a variety of schemes and programs to deliver basic social infrastructure to rural areas. The government has identified several elements that are key to the quality of rural life, including infrastructure, livelihood, education, health, training and employment, welfare, and governance.

25. The data validation focus group discussions revealed that, prior to connectivity, most rural inhabitants had difficulty obtaining information about the different schemes and even more difficulty accessing them. Due to the improved connectivity, the rural population now has better access to all government schemes, by being able to obtain information at government offices at the block and district level as well as through a variety of media. Specific government schemes operating in the habitations are discussed in subsequent sections.

26. **Security.** In areas of unrest with frequent attacks by insurgency groups, better roads have allowed the government security forces better access to remote habitations in order to provide security. For example, in the insurgency-affected Shivpuri area in Madhya Pradesh and western Chhattisgarh, communities noted that the security situation has improved since the rural road network was improved.

D. Livelihood

27. Improved connectivity has boosted the overall levels of livelihood opportunities for rural inhabitants. Easier access to the marketplace has led to an increase in income levels. Better linkage has also increased overall per capita expenditure levels. As demonstrated in Table 4, villagers are purchasing private vehicles to maximize the benefits from the rehabilitated roads. Data validation focus group discussions revealed a high level of mobile phone usage as well as some computer and Internet usage. This indicated that the purchase of personal electronics is also contributing to the increase in spending. As seen in Table 4, the increase in per capita spending has increased by as much as 56% in the two states. Savings have increased dramatically in some socioeconomic groups, but have declined somewhat in the non-poor and ultra-poor groups of Madhya Pradesh. The focus group discussions found that for those villagers who reported a decline in savings, they indicated that the expenditures were mostly for one-time, big-ticket items. For the non-poor in Madhya Pradesh, the big-ticket items were typically motorcycles or upgraded mobile phones. For the ultra poor, they were typically for household goods or agricultural inputs. Villagers believed that in the long run, savings would increase due to better connectivity. Large increases in per capita income in Chhattisgarh were

mostly due to the expansion in mining operations around some sample habitations. Mining operations provide both direct and indirect employment opportunities for nearby rural inhabitants.

Table A11.4: Income, Spending, and Savings Levels of Sample Villages
(Annual per capita, in rupees)

	January 2006			December 2008			% Change in	% Change in	% Change in
	Income	Spending	Savings	Income	Spending	Savings	Income	Spending	Savings
Madhya Pradesh									
Non-poor	10,981	8,735	2,246	11,921	9,983	1,938	8.6%	14.3%	−13.7%
Poor	4,263	3,601	662	6,700	5,150	1,550	57.2%	43.0%	134.1%
Ultra-poor	3,318	2,642	676	4,530	3,995	535	36.5%	51.2%	−20.9%
Chhattisgarh									
Non-poor	4,374	3,328	1,046	13,750	5,150	8,600	214.4%	54.7%	722.2%
Poor	3,950	2,999	951	9,750	4,675	5,075	146.8%	55.9%	433.6%
Ultra-poor	3,069	2,462	607	6,450	3,650	2,800	110.2%	48.3%	361.3%

Note: Non-poor are those households that live above the poverty line. Poor households are defined as those living below the poverty line. Ultra-poor households are living at subsistence level.

1. Agriculture

28. Agriculture is the main source of livelihood for project-affected areas. Transport improvements have helped farmers by (i) providing better access to inputs like knowledge, equipment, and materials, which improves yield and reduces risk; and (ii) reducing the transport cost to markets.

29. In Madhya Pradesh, government agricultural extension officers and *Gram Sewaks*[52] offered increased extension services to the habitations. There was a 400% increase in the number of visits by *Gram Sewaks* and a 200% increase in that of agriculture extension officers. The resulting access to knowledge has led to more farmers using scientific approaches to farming such as crop diversification and incorporating fertilizers and pesticides. Better connectivity has also helped farmers to be informed of existing and new government schemes, including ongoing schemes like the Promotion of Integrated Pest Management that started in 1991 and the Campaign for Seed Treatment in 2007.[53] In Madhya Pradesh, there has been about a 5% increase in the number of farmers diversifying their crop since connectivity and that number will continue to increase. Mechanization of farming has also been observed in some habitations. Tractors and threshing machines have led to more efficient and profitable cultivation. Farmers also indicated that there has been a change in cropping pattern. With the increased efficiency and inputs, farmers are now switching from food crops to cash crops such as wheat, soybean, maize, jute, and sugarcane. There has also been an increase in cropping intensity as a result of improved agricultural trade.

30. The roads have allowed more farmers to visit *haats*, or nearby markets. For example, in Chhattisgarh, 20% more farmers are now visiting *haats* on a regular basis. Connectivity has also reduced transport costs to markets by decreasing the amount of produce being spoiled or damaged during transit and increasing the amount of products able to be transported.

[52] Gram Sewaks are appointed people in rural areas for the implementation of The (Mahatma Gandhi) National Rural Employment Guarantee Act (NREGA). This act aims at enhancing the livelihood security of people in rural areas by guaranteeing hundred days of wage-employment in a financial year to a rural household whose adult members volunteer to do unskilled manual work.

[53] http://india.gov.in/citizen/agriculture/viewscheme.php?schemeid=1816
http://ppqs.gov.in/Seedtreatment.htm

Previously, farmers and women would utilize bullock carts to transport larger loads or carry smaller loads like vegetables either on the back of a bicycle or on foot. After connectivity, farmers use tractors or motorcycles to quickly and efficiently bring products to the *haats*. Farmers reported that the amount of produce being spoiled, wasted, or damaged while in transit in was reduced by 10% in Madhya Pradesh and 13% in Chhattisgarh. Farmers also noted that many more products were able to reach the market. Farmers in Madhya Pradesh reported an increase of 25% and Chhattisgarh farmers reported an increase of 5% in additional products now able to reach the marketplace.

2. Dairy Farming

31. Dairy farmers have said that the improved road has helped them increase their incomes dramatically. Dairy cooperatives now have reliable daily access to the communities and can quickly bring fresh dairy products to the markets. The road has also helped to ensure that dairy and other agriculture machinery is regularly serviced and inspected, and is quickly repaired when broken. In the control habitation of Viccholi in Sehore District in Madhya Pradesh, dairy farmers told surveyors that the level of diary production declined in the previous year due to inconsistent visits by the dairy cooperative. This has led to products spoiling before reaching the market.

32. After connectivity, dairy farmers have better access to government schemes such as the Intensive Dairy Development Program, started in 1993, which helps create the necessary infrastructure the production cycle of quality milk, from the farmers' level up to the points of consumption, by improving milking procedures and providing training to create mass awareness about the importance of clean milk production.[54]

3. Government Employment Programs

33. Connectivity has improved the delivery and implementation of different types of schemes operated by the government and the state governments. Qualified villagers subscribe to employment programs under the National Rural Employment Guarantee Act (NREGA), which was established in 2005. The objective of the act is to enhance livelihood security in rural areas by providing at least 100 days of wage employment in a financial year to every household whose adult members undertake unskilled manual work. Work includes the construction of non-PMGSY roads within the habitation, flood control projects, and irrigation projects.[55] In nearly all habitations, officials noted that all qualified persons in the habitation subscribed to the NREGA scheme.

34. Most habitations operated multiple self help groups (SHGs) for women. These groups were started either by the government's Swarnjayanti Gram Swarozgar Yojana (SGSY) scheme or by NGOs. The program's objective is to raise poor families above the poverty line by providing training and assistance to set up income-generating enterprises for themselves. The scheme is based on the local requirements. The groups are most often involved in sewing or providing midday meals for local schools. The surveyors also encountered a few women-owned or -operated microenterprises in the habitations.

4. Female Employment

[54] http://dahd.nic.in/intensive_dairy_development_prog.htm

[55] NREGA Operating Guidelines, 2008.

35. Women have benefited tremendously from improved connectivity. Road connectivity has increased the mobility of women as they can now travel alone on buses or bicycles to and from nearby towns and cities. Focus group discussions during the data validation process revealed that since connectivity, there were more SHGs, as well as more women working outside of the home in positions such as government worker, shop keeper, and daily wage laborer.

36. There has also been an increased role for women in local governance. Focus group discussions revealed that throughout Madhya Pradesh and Chhattisgarh at least 50% of the habitations had a woman as the *Sarpanchni*—the democratically elected head of a village-level statutory institution of local self-government. This phenomenon is mostly driven by legislated reservation of seats for women. However, improved connectivity has allowed female and male public servants to perform their jobs more effectively by having improved access to higher levels of government and to information.

E. Commercial Activities

37. The general level of commerce in rural habitations is low. The number of microenterprises at the habitation level has been slowly increasing. In Madhya Pradesh, the survey estimates an increase of about 1.5% in the number of new micro-enterprises at the habitation level, mainly in the form of small general stores. It was observed that villagers preferred to visit commercial clusters in nearby towns and cities to obtain goods and services. However, some shops have been established in larger habitations or in more congested areas, where there is a critical mass of customers. Examples of such shops include tailors, motorcycle and bicycle repair, blacksmiths, seed and fertilizer shops, DVD shops, jewelers, barbers, and shoe repair.

38. Villagers have reliable access to financial services. Most villagers said that they use their own savings to buy such items as motorcycles, but some villagers took out loans for the purchase. For larger vehicles such as a tractor, farmers are able to access financing plans through the dealer.

F. Education

39. Prior to connectivity, the majority of habitations had good access to primary and middle schools; secondary schools, however, were on average 10 km away, posing transportation problems particularly during the monsoon season. Children walked on average 10–15 km to access higher education facilities. Connectivity has affected education by (i) reducing the travel time to education facilities outside of the habitation, (ii) improving teacher attendance and the number of teachers in habitations, and (iii) improving school enrollment through safer travel and more consistent provision of a government-sponsored midday meal program.

40. Travel time to education facilities outside of the habitation has decreased post-connectivity and more youths are taking advantage of higher education opportunities in nearby towns and major cities. For example, in the habitation of Telegaon in Guna District in Madhya Pradesh, prior to connectivity, 3 youths pursued secondary education outside of the habitation. Now there are 19 youths studying outside the habitation, with 5 enrolled in university. Table 5 illustrates the decline in the post-primary dropout rate of youths in the two states after connectivity.

Table A11. 5: Post-Primary Dropout Rate
(Percent change before versus after connectivity)

	Madhya Pradesh	Chhattisgarh
Boys	−8.7%	−11.1%
Girls	−0.1%	−9.7%

41. The connectivity has improved teacher attendance by about 6% and increased the amount of time teachers spend in school. Villagers reported that prior to road construction teachers would show up to school during the rainy season but would be tardy and leave early. Therefore, the increase in the teacher attendance rate of 6% may underestimate the actual impact of connectivity on the teacher attendance rate. The number of teachers at the primary school level has also increased since the rehabilitation of the roads. In sample habitations in Madhya Pradesh there was an increase of 22% in the number of teachers, while Chhattisgarh saw an increase of 15%.

42. Improved transport has improved school attendance rates because of safer travel and the implementation of government schemes. In Madhya Pradesh the percentage of non-enrolled children at the primary school level dropped by 14% and in Chhattisgarh by 8%. Parents reported that improved connectivity has led to an increase in girls' attendance. Most parents mentioned that they were now more confident about sending their daughters to schools unescorted. The government-sponsored midday meal program for children up to grade 8 was established in 1995.[56] However, prior to connectivity, villagers reported that although the program was in place, it could not be implemented effectively due to a shortage in the supply of rice and pulses, especially during the rainy season. After connectivity, the program is now fully implemented. The program has helped to improve the student attendance rate and has contributed to increased employment for rural women, who typically are involved in organizing and cooking the midday meals.

G. Health

43. Prior to connectivity, the availability of health services was reported to be poor in the habitations, even though many habitations had a multipurpose health worker (MPHW) whose job was to provide basic health care, including immunization, to villagers. The attendance rate of MPHWs varied greatly and some were spending very limited time in each habitation due to long travel times. Transportation options for carrying the sick or pregnant women to healthcare institutions included using bullock carts, hiring a tractor, or being carried by an adult male. The safe delivery rate was above 94% in both states partly due to the traditional midwifery system.

44. Connectivity has dramatically improved access to health care for rural communities. Travel time to health care facilities has decreased on average by 36 minutes for the entire year and, in some habitations, by as much as 120 minutes during the rainy season. MPHWs reported that they were spending more time in each community thanks to shortened travel times. Many MPHWs now travel by motorcycle, moped, or bicycle in between the habitations they service.

[56] http://education.nic.in/Elementary/mdm/index.htm

Connectivity has also helped the implementation and delivery of the National Rural Health Mission (NRHM) aimed at strengthening the *Panchayati Raj* institutions (lowest units of administration) and promoting access to improved health care through the Accredited Female Health Activities (ASHA). The program also strengthens existing primary health care centers and community health centers.

45. Neonatal and maternal health has improved due to all-weather connectivity. Difficult pregnancies and deliveries have benefited the most. The government implemented the *Janani Suraksha Yojana* scheme and *Sukhibhava* schemes in 2003 but, without good connectivity, service delivery was reported to be non-existent.[57] Communities now report that the schemes are fully utilized; nearly 100% of all births take place in government healthcare facilities and most take full advantage of ambulatory service provided under the scheme. Ambulatory care was rated quick and dependable.

46. There was an 18% decrease in maternal death in Madhya Pradesh and a 4% decrease in Chhattisgarh when comparing pre- and post-connectivity. The greater decrease in Madhya Pradesh could be due to (i) the roads in Batch I being completed, in general, earlier in Madhya Pradesh than in Chhattisgarh, providing more time for socioeconomic benefits to be realized; and (ii) the difference in quality of the healthcare provision for the two states at the initial stage. Table 6 provides more details regarding gains made in health indicators.

Table A11.6: Health Indicators
(Percent change before versus after connectivity)

	Madhya Pradesh	Chhattisgarh
Maternal death	−18.3%	−4%
Pre-natal death	−8.6%	−5.7%
Mortality under age of 5	−10.3%	−2.7%

H. Land Value

47. In sample habitations, the land price per acre increased on average by about 14.4% in Madhya Pradesh and 21.4% in Chhattisgarh. Table 7 details the percent change in price per acre in sample habitations by type of land.

48. The increase in price can be partially attributed to better connectivity but is also affected by (i) habitations receiving new or improved irrigation schemes during road construction, (ii) an increase in habitation population, normally at about 1% per annum, and (iii) villagers choosing to stay in the community after better connectivity instead of seeking employment further afield. The demand for land increased dramatically in some habitations. In a separate study done in four districts in Madhya Pradesh, villages such as Bhatasa in Dewas District experienced an increase in the price prime land of as much as 900% from Rs50,000 per acre to Rs500,000 per acre.[58] These cases are extreme; however, as additional time elapses, the land value in

[57] The two schemes are implemented in a combined manner. A total cash incentive is paid to rural pregnant women below the poverty line for antenatal care, institutional care during delivery, as well as postpartum care. Women deliver in government healthcare institutions such as teaching hospitals, district headquarters hospitals, area hospitals, community health centers, and other government hospitals. http://india.gov.in/citizen/health/janani_suraksha.php

[58] The study included 22 communities in four districts in Madhya Pradesh. The districts were Dewas, Mandla, Shivpuri, and Vidisha.

connected rural habitations will likely continue to climb with improved access coupled with increased demand.

Table A11.7: Land Value
(Percent change before versus after connectivity)

	Madhya Pradesh	Chhattisgarh
Agricultural land	6.30%	14.00%
Commercial land	18.00%	23.60%
Residential land	19.00%	26.50%

49. A separate study conducted in four districts in Madhya Pradesh provides an indicative example of the increase in land value. Along project-funded roads 22 habitations in four districts experienced, without exception, an increase in the price of land. Two types of land were taken into account. Tier I land represented the prime land in the habitation (i.e., land closer to the new road or irrigated land). Tier II land included the remaining land, which was less desirable. The study observed that land prices increased from 20% up to 900%.

I. Building Materials

50. A clear distinction can be seen between the construction materials used for homes and public buildings in connected habitations versus those for unconnected habitations. Buildings in habitations with all-weather roads are more likely to be constructed out of more permanent materials such as bricks, concrete, and corrugated tin. The inhabitants in the village of Sinhali in Korba District in Chhattisgarh started a brick-making facility to provide building materials to Sinhali and neighboring habitations. Buildings in unconnected areas are mostly constructed out of non- or semi-permanent building materials such as mud, thatch, straw, and other natural materials.

J. Social Interactions

51. Unconnected habitations are characterized by not only economic but also social isolation. Communities had limited interactions with relatives from outside the habitation. Women who were married into the village of Mohanpu in Bilaspur District in Chhattisgarh said that prior to all-weather connectivity, they averaged one visit per year to their families. After connectivity, they visit their families more frequently for festivals and other major events.

52. One common grievance that was seen in unconnected habitations in both states was that parents found it difficult to marry their children due to lack of accessibility. Families from connected habitations or towns were unwilling to marry their children to potential spouses who resided in an unconnected habitation. In the connected the village of Khedi Kala in Guna District in Madhya Pradesh, community members noted that prior to connectivity, many young men and women were unable to find spouses and remained unwed. The road connecting Khedi Kala was completed in May 2006 and in the year after connectivity there were 12 more marriages than in the year prior to connectivity.

K. Gender Empowerment

53. Women have benefited tremendously from improved connectivity. Road connectivity has increased the mobility of women and most women feel comfortable traveling alone on buses and bicycles. In habitations where data validation was conducted, women were observed to be

operating motorized vehicles such as mopeds. Focus group discussions revealed that since connectivity, more women are working outside of the home in positions such as government worker, shopkeeper, and daily wage laborer.

54. There has been an overall improvement in access to health and educational facilities for women. As indicated in the previous sections regarding health, there has been a dramatic decrease in the travel time between habitation and government health facilities, leading to a reduction in maternal and neonatal deaths. In education, parents are now more confident and willing to send their daughters to schools and colleges, as the transportation to school, especially higher levels of education, is more reliable. Children now bicycle or take the bus to school or college instead of walking.

55. As mentioned in paragraph 35, there has also been an increased role for women in local governance. Data validation focus group discussions revealed that throughout Madhya Pradesh and Chhattisgarh at least 50% of the habitations had a woman as the *Sarpanchni*.

V. NEGATIVE IMPACT

A. Road Safety

56. Several negative impacts were observed or envisioned after the completion of project roads. The foremost is an increase in traffic. In the Sinhali in Korba District in Chhattisgarh, because of nearby coal mine operations, the project road now acts as a main access to the mines. Large dump trucks travel the PMGSY roads, often at high speed. Communities raised the issue of safety, especially for children who use the roads mostly to bike to school. Villagers suggested the installation of prominent signage and speed bumps near community infrastructures. In the surveyed habitations, there have not been any major accidents causing serious injury or death on project roads.

B. Potential Degradation of Natural Resources

57. It is envisaged that improved roads will be a catalyst for urbanization and commercialization. Forests and natural resources that were earlier inaccessible to outsiders will become more accessible. If not properly managed, this could cause depletion and illegal extraction of natural resources. Because of improved access and easy transportation of materials, mining activity has already seen an increase in certain areas of Chhattisgarh.

C. Outward Migration

58. Improved connectivity and transportation has led to rural inhabitants seeking job opportunities outside of the community. In the short run, this is seen as a positive impact, providing additional livelihood opportunities to a previously isolated population. However, in focus group discussions, some inhabitants voiced that in the medium and long run, outward migration may negatively impact rural communities by draining the community of its productive workforce, especially those who have obtained higher education. Small- and medium-sized towns and cities will need to be prepared to receive additional inward migration. This will also have an impact on the village social structure, as mostly women, children, and older people will likely remain in the rural areas.

D. Loss of Livelihood

59. In cases were households donated land for the PMGSY project, a temporary loss in production of agricultural products was observed during project implementation. However, an entitlement matrix was in place to compensate those who lost land. Livelihood regeneration was ensured by guaranteeing employment under the NREGA to affected persons.

E. HIV/AIDS and Trafficking

60. During the study and focus group discussions, no negative impacts of the road related to HIV/AIDS transmission or human trafficking were identified in project-affected habitations in Madhya Pradesh and Chhattisgarh.

VI. CONCLUSION

61. Connectivity has impacted rural living conditions by giving communities more reliable and quicker access to outside products, services, information, and social linkages; and allowing external service and product providers and social contacts to have improved access to rural communities. The presence of all-weather roads has directly or indirectly contributed to improvements in (i) connectivity, (ii) transportation, (iii) access to government services, (iv) livelihood, (v) commercial activities, (vii) education, (viii) health, (ix) land value, (x) building materials, (xi) social interactions, and (xii) gender empowerment. The roads have acted as a catalyst for sustained improvements in living conditions and will be a conduit to continual development in rural India.

62. Overall, the aggregate impact has contributed to poverty alleviation in the rural communities of Madhya Pradesh and Chhattisgarh. In sample project habitations in Madhya Pradesh, the number of households living below the poverty line decreased by 5% between December 2006 and December 2008, and in Chhattisgarh the number decreased by 2%. The living conditions in connected habitations continue to improve and the number of households living below poverty line will likely continue to decrease.

63. The project, being ADB's first on rural roads in India, has provided valuable lessons for the design and implementation of subsequent rural roads projects in how to maximize socioeconomic gains. Most importantly, the project has provided important lessons in how to evaluate subsequent rural roads projects. The Rural Roads Sector III Investment Program that is currently being prepared will incorporate a more robust impact evaluation arrangement to better yield quantitative measurements of ADB's efforts in supporting the Government of India's PMGSY program.

64. With more time for socioeconomic benefits to be realized, further evaluations of impact will be useful. In addition, ADB and the Government of India should also closely monitor any negative impacts that may be developing, especially in the areas of road safety, illegal access and extraction of natural resources, outward migration, and the increase in incidents of HIV/AIDS and human trafficking.