ADB

Completion Report

Project Number: 37066
Loan Number: 2248
March 2012

Multitranche Financing Facility
India: Rural Road Sector II Investment Program (Project I)

Asian Development Bank

CURRENCY EQUIVALENTS

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

		At Appraisal (31 October 2005)	At Project Completion (30 June 2009)
Re1.00	=	$0.022	$0.021
$1.00	=	Rs44.995	Rs48.105

ABBREVIATIONS

ADB	–	Asian Development Bank
CPF	–	community participation framework
EAF	–	environmental assessment and review framework
ECOP	–	environment code of practice
EIRR	–	economic internal rate of return
km	–	kilometer
m	–	meter
MFF	–	Multitranche Financing Facility
MORD	–	Ministry of Rural Development
NRRDA	–	National Rural Roads Development Agency
PCR	–	project completion review
PIC	–	project implementation consultant
PIU	–	project implementation unit
PMGSY	–	Pradhan Mantri Gram Sadak Yojana (Prime Minister's Rural Roads Program)
SRRDA	–	state rural roads development agency
TA	–	technical assistance
TSC	–	technical support consultant
VOC	–	vehicle operation 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 ends, e.g., FY2011 ends on 31 March 2012.

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

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BASIC DATA

A. Loan Identification

1.	Country	India
2.	Loan Number	2248-IND
3.	Project Title	Rural Road Sector II Investment Program (Project I)
4.	Borrower	Government of India
5.	Executing Agency	Ministry of Rural Development at the central government level; governments of Assam, Orissa, and West Bengal at the state level
6.	Amount of Loan	$180 million
7.	Project Completion Report Number	IND 1318

B. Loan Data

1.	Appraisal	
	– Date Started	1 August 2005
	– Date Completed	5 August 2005
2.	Loan Negotiations	
	– Date Started	25 July 2006
	– Date Completed	25 July 2006
3.	Date of President Approval	31 July 2006
4.	Date of Loan Agreement	29 August 2006
5.	Date of Loan Effectiveness	
	– In Loan Agreement	90 days from the Loan Agreement
	– Actual	18 October 2006
	– Number of Extensions	
6.	Closing Date	
	– In Loan Agreement	31 December 2008
	– Actual	30 June 2009
	– Number of Extensions	1
7.	Terms of Loan	
	– Interest Rate	London interbank offered rate-based
	– Commitment charges	0.75% per annum
	– Maturity (number of years)	25
	– Grace Period (number of years)	5
8.	Terms of Relending (if any)	
	– Interest Rate	
	– Maturity (number of years)	
	– Grace Period (number of years)	
	– Second-Step Borrower	

9. Disbursements

a. Dates

Initial Disbursement	Final Disbursement	Time Interval
16 November 2006	9 October 2009	35 months
Effective Date	**Original Closing Date**	**Time Interval**
18 October 2006	21 December 2008	26 months

b. Amount ($ million)

Category	Original Allocation	Last Revised Allocation	Amount Disbursed	Undisbursed Balance
Road Connectivity	**179.6**	**179.6**	**173.717**	**5.884**
(a) Civil Works Assam		87.4	77.525	
(b) Civil Works Orissa		54.7	57.183	
(c) Civil Works West Bengal		37.5	39.009	
Capacity Building	**0.4**	**0.4**	**0.193**	**0.207**
Total	**180.0**	**180.0**	**173.910**	**6.091**

Note: The undisbursed amount of $6,090,561.90 was cancelled after the last disbursement on 9 October 2009.

10. Local Costs (Financed)
- Amount ($) 0
- Percent of Local Costs 0
- Percent of Total Cost 0

C. Project Data

1. Project Cost ($ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	194.2	173.9
Local Currency Cost	56.0	59.5
Total	**250.2**	**233.4**

2. Financing Plan ($ million)

Cost	Appraisal Estimate	Actual
Implementation Costs		
Borrower Financed	56.0	49.0
ADB Financed	180.0	173.9
Other External Financing		
Implementation Total	**236.0**	**222.9**
Financial Charges		
Borrower Financed	14.2	10.5
ADB Financed		
Other External Financing		
Project Total	**250.2**	**233.4**

ADB = Asian Development Bank,
Financial charges include interest during construction and commitment fee.

3. Cost Breakdown by Project Component ($ million)

Component	Appraisal Estimate	Actual
1. Road Connectivity Component	**224.5**	**216.9**
(a) Assam	109.2	99.4
(b) Orissa	68.4	73.3
(c) West Bengal	46.6	50.0
Project Implementation Consultant	11.2	0.0
2. Capacity Building Component	**0.4**	**0.2**
Technical Support Consultant	0.4	0.2
3. IDC and Commitment Charge	**14.2**	**10.5**
Total	**250.2**	**233.4**

IDC = interest during construction.

4. Project Schedule

Item	Appraisal Estimate	Actual
Award of civil work contracts		
(a) Assam	Q3 2005	Q4 2005
(d) Orissa	Q3 2005	Q4 2005
(e) West Bengal	Q4 2005	Q1–Q2 2006
Commence of civil works		
(a) Assam	Q4 2005	Q1 2006
(b) Orissa	Q4 2005	Q1 2006
(c) West Bengal	Q1 2006	Q2 2006
Completion of civil works		
(a) Assam	Q4 2006	Q2 2009
(b) Orissa	Q4 2007	Q2 2009
(c) West Bengal	Q4 2007	Q2 2009
Technical Support Consultant		
Procurement	Q3–Q4 2005	Q4 2005–Q1 2008
Service	Q1 2006–Q4 2007	Q2 2007–Q1 2009

Q = quarter.

5. Project Performance Report Ratings

	Ratings	
Implementation Period	**Development Objectives**	**Implementation Progress**
From 1 Jul 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

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members[a]
Consultation/Contact Mission	18–28 March 2005	3	21	e, s, t
Fact-Finding Mission	18 April–6 May 2005	9	135	c, f, I (2), p, r, s, t (2)
Appraisal Mission	1–5 August 2005	4	20	c, e, n, t
Specific Consultation Mission	12–16 September 2005	3	15	c, i, t
Specific Consultation Mission	10–16 January 2006	3	15	c, i, t
Specific Consultation Mission	13–20 February 2006	2	12	s, t
Inception Mission	17 November–1 December 2006	2	34	a, t
Review Mission	29 January–2 February 2007	1	4	t
Review Mission	15 March–2 April 2007	6	28	e, p, s (3), t
Review Mission	2–11 May and 23–24 May 2007	2	8	e, p, t
Disbursement Review Mission	24–28 September 2007	2	12	d, f
Review Mission	8–13 October 2007	2	7	e, t
Review Mission	8–16 April 2008	5	40	p, s (2), t(2)
Midterm Review Mission	10–18 November 2008	6	40	a, p, s (2), t (2)
Review Mission	4–13 February 2009	5	40	e, p, s, t (2)
Review Mission	27 July–26 August 2009	6	30	e, p, s (2), t (2)
Completion Review Mission	23–27 May 2011	2	10	s, t
Completion Review Mission	28 June–7 July 2011	2	13	s, t

[a] a = analyst, c = counsel, d = disbursement assistant, e = environment specialist, f = financial management specialist, i = project implementation officer, p= procurement consultant or specialist, r = director, s = social specialist, t = transport specialist.

I. PROJECT DESCRIPTION

1. Lack of road connectivity was an obstacle to realizing the growth potential of rural India. To address this issue, the Government of India established a national program—the Prime Minister's Rural Roads Program (PMGSY)—in 2000. The program identified more than 170,000 habitations[1] eligible under its criteria, improving about 738,000 kilometers (km) of rural roads,[2] and the total cost was estimated at about $30 billion.[3] From 2006 to 2010, the estimated budget required for the PMGSY was $11 billion, 40% of which would be from the government's own funding[4] and 7% from the committed assistance from the Asian Development Bank (ADB) and the World Bank; funding sources for the balance of 53% had not been identified.

2. Hence, further assistance for the PMGSY, following the first ADB loan,[5] was requested by the government, using a new lending instrument—the multitranche financing facility (MFF).[6] Pursuant to the provisions of the framework financing agreement[7] for the Rural Roads Sector II Investment Program MFF, ADB received a periodic financing request[8] for a loan of $180 million on 19 June 2006. This was to finance the first batch of subprojects (project 1) under the MFF. ADB reviewed and processed the periodic financing request, and approved a corresponding loan agreement on 31 July 2006, which became effective on 18 October 2006.[9] The total cost of project 1 was estimated at $250.2 million, which would be financed by the ADB loan of $180.0 million and a counterpart fund of $70.2 million equivalent from the government. At appraisal,[10] the project would provide (i) about 3,200 km of rural road improvement (about 1,000 km in Assam, about 1,200 km in Orissa, and about 1,000 km in West Bengal); and (ii) capacity building for preparing and implementing rural road development in an efficient and sustainable manner, with proper address of policy issues such as safeguards and road safety through the project cycle. The executing agency of the project was the Ministry of Rural Development (MORD) at the central level and the respective state governments[11] at the state level. The implementing agencies were respective state rural roads development agencies (SRRDAs).[12] The civil works were expected to be completed by the end of 2007.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

3. At appraisal, the PMGSY was in its fifth year of implementation and under it 66,000 km[13] of rural roads had successfully been improved, connecting 34,000 habitations nationwide (20%

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[1] A habitation is a unit used in the PMGSY. A habitation is a distinct cluster of population with houses, occupying an area, having a local name. In rural areas, a village (revenue village) may include one or more habitations.
[2] This comprises 370,000 km of rural road building and another 368,000 km of rural road upgrading.
[3] Government of India. Ministry of Rural Development (RC Division). 2006. *PMGSY Briefing Book*. Delhi
[4] This comes from a special excise duty (called 'cess') on high-speed diesel oil, which is about $0.9 billion annually.
[5] ADB. 2003. *Rural Roads Sector I Project*, Manila. (Loan 2018-IND, $400 million, approved on 20 November.)
[6] For the details of the MFF, see Appendix 12.
[7] Framework Financing Agreement on Rural Road Sector II Investment Program, signed between India and ADB on 25 November 2005.
[8] This periodic financing request was a revised request. The original request, in the indicative amount of $100 million, was submitted by the government on 25 November 2005, prior to ADB's approval of the MFF.
[9] ADB. 2006. *Rural Roads II Investment Program-Project I.* Manila. (Loan 2248-IND, $180 million.)
[10] ADB. 2006. *Project Administration Memorandum: India: Rural Roads II Investment Program-Project I.* Manila.
[11] Assam State Public Works Department, Orissa State Department of Rural Development, and West Bengal State Department of Panchayat and Rural Development.
[12] Assam State Road Board, Orissa State Rural Roads Agency, and West Bengal State Rural Development Agency.
[13] An additional 47,000 km was nearing completion.

of the eligible habitations under the PMGSY) to a greater transportation network. With 5 years of implementation experience, the PMGSY had developed into a well-defined program with clear goals and well-structured standard operating procedures based on an annual implementation cycle. Sustainability of the program was increased through capacity strengthening of state agencies in the areas of project planning and design, management oversight for construction activities, safeguards, procurement, and fiduciary arrangements. This made a lighter project implementation approach more appropriate, compared to the arrangements for the Rural Roads Sector I Investment Program. No project management consultant was introduced. Safeguard provisions were modified, from project-specific separate arrangements to additional frameworks supporting the existing PMGSY arrangements (para.18).

4. Under the umbrella of the MFF, project 1 was prepared as a sector loan, not a project loan. Involvement of multiple state agencies with different levels of absorption capacity required flexible financing arrangements that allowed for fund allocation on the basis of progress achieved and readiness for new investment in each participating state.

5. The project strategically focused on assisting the poor by providing connectivity. In line with the government's priorities for the Tenth Five-Year Plan, 2002–2007,[14] 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, 2003–2006[15] was mainstreaming poverty reduction, specifically pointing to the importance of infrastructure in poverty reduction. The country strategy and program also identified the need for infrastructure projects to incorporate institutional reforms to improve sustainability, particularly by establishing sound approaches to maintenance. The project financed three of the most poorly connected states—Assam, Orissa, and West Bengal. The MFF was designed to fund any other states meeting the MFF requirements; however, these three states had large rural populations that lacked adequate coverage in terms of all-weather road connectivity. The poverty head-count rates in these states were amongst the highest in India.

6. During and after implementation, the project was deemed highly relevant to the government's objectives and policies, as well as ADB's country strategy. At completion, 2,927.13 km of rural roads were constructed and/or upgraded, which significantly improved connectivity in the project area, brought remarkable socioeconomic impacts, and directly benefited about 4 million people. Consulting services were used to assist in successful implementation and capacity building of rural road development and maintenance. Despite some changes in implementation arrangements (paras. 21–22), the project scope was generally within the original designed at appraisal. The design and monitoring framework is in Appendix 1.

B. Project Outputs

1. Civil Work

7. A total of 2,927.13 km of all-weather rural roads (941.86 km in Assam, 1,199.35 km[16] in Orissa, and 785.92 km in West Bengal) were constructed and/or upgraded under the project, which connected 1,503 habitations (527 in Assam, 276 in Orissa, and 700 in West Bengal) and

[14] Government of India. Planning Commission.2002. *Tenth Five Year Plan 2002–07*. Delhi. http://www.planningcommission.nic.in/plans/planrel/fiveyr/10th/default.htm

[15] ADB. 2006. *Country Strategy and Program; India, 2003–2006.* Manila.

[16] 736.80 km was for the completed part of the initial 99 packages, and 462.55 km was for the additional 62 packages.

benefitted about 4 million people in total.[17] Delayed work packages were either moved to later tranches of the MFF or to the government's own funding, resulting in reduction of 1% in cost and 9% in completed road length. However, the number of beneficiaries was 40% more than the original estimate due to a greater number of larger habitations being connected and some inaccuracy in the original estimate. The civil works included (i) constructing and/or upgrading rural roads to a full single-lane cross-section of 3.75 meter (m) carriageway width and 7.50 m formation width, (ii) strengthening culverts and bridges, (iii) realignments as necessary, (iv) constructing new bridges and cross-draining structures, and (v) providing road furniture.[18] Most of the sections were paved using asphalt concrete but cement concrete was used in the village sections. During implementation, some revisions to work packages were needed, mainly (i) adjusting ADB-financed amounts for individual contracts,[19] and (ii) shifting 62 subproject packages of batch 2[20] in Orissa to batch 1 (para 22). In addition, there were also some minor engineering changes: (i) strengthening drainages, (ii) adding more cement concrete to top of water crossing sections and in residential areas, and (iii) enhancing road protection and safety.

8. Quality control of civil works, which was in the contract requirements, was done by the state quality monitor and national quality monitor, on top of in-house construction supervision. No serious quality problem has been reported in the defect liability period[21] of the contracts. ADB's project completion review mission observed that (i) the completed roads were of good quality, (ii) the road surface roughness was within the international roughness index for a comfortable ride, (iii) safety and environment protection facilities were installed on some roads, and (iv) routine maintenance of the project roads was generally in place.

2. Consulting Services

9. A technical support consultant (TSC) was engaged by the National Rural Roads Development Agency (NRRDA) to assist the implementing agencies with road safety, safeguards, and impact monitoring (para. 18). Upon completion, 92.8 person-months of services were provided by the TSC (para. 21). However, the project implementation consultants (PICs), planned at appraisal, were not engaged in a timely manner for the project (para. 21).

C. Project Costs

10. The actual project cost was $233.4 million, against $250.2 million estimated at appraisal (7% lower). The actual cost of civil works was $222.7 million, against $224.4 million at appraisal

[17] Out of 1,503 habitations, 750 had populations of 1,000 or more, 395 had populations of 500–1,000, 266 had populations of 250–500, and 92 had population of below 250, based on the 2001 census. The number of people connected was estimated using average populations of 2,000 for habitations of more than 1,000 people, 750 for those of 500–1,000, 375 for those of 250–500, and 125 for those below 250. In the ADB results framework, beneficiaries from rural road projects are defined as the entire population living in the direct vicinity of the road, so the number of beneficiaries was estimated by doubling the newly connected population, thus conservatively incorporating the number of people living around the beginning end of the road. The estimation also incorporated the 10.4% decadal rural population growth rate in all three states (Assam, Orissa, and West Bengal) from 2001 to 2011. The original estimate was roughly calculated to be 2.85 million people.

[18] Road furniture refers to all fixtures in the road and road reserve, for various purposes, including safety.

[19] The adjustment was on (i) termination of contracts due to nonperformance and retendering, (ii) contract variations, or (iii) reduction in ADB financing ceiling amounts in slow-moving contracts to free up the committed loan proceeds.

[20] Up to the PCR mission, five loans under the MFF were approved by ADB to implement five batches of subprojects (projects 1–5) as loans 2248, 2414, 2445, 2535, and 2651. At the state level, groups of subproject packages corresponding to projects 1–5 were labeled as batch 1, 2, etc. The second loan was approved on 17 March 2008 and became effective on 9 July 2008 with total loan amount of $53.55 million, which was used for batch 2 subprojects in Orissa.

[21] Five years after the completion of civil works

(1% lower). The actual 9% reduction in scope of the work was countered by a 12% increase in unit cost per km and a 10% rise in the currency fluctuation. The increase in actual unit cost was mainly caused by engineering revisions and material price escalation. The cost for consulting services was reduced by 52%, mainly because the PIC was not engaged. The interest during construction and commitment charge for the ADB loan was also reduced by $3.7 million, mainly due to a lower London interbank offered rate. Details of the project cost are in Appendix 2.

11. Under the financing plan envisaged at appraisal for the project, ADB was to provide a loan of $180.0 million (71.9% of the total project cost) to project 1; the government was to finance the remaining cost. At completion, $173.9 million of the ADB loan was disbursed, which covered 74.5% of the total project cost, including 94.3% of the foreign exchange cost. No local cost was financed by ADB. The government financed all financial charges, including interest during construction and commitment charge, as anticipated at appraisal. The appraisal and actual financing plans are in Appendix 2.

D. Disbursements

12. The loan became effective on 18 October 2006, prior to which 321 civil works contracts amounting to $167.8 million (in ADB financing amount) were awarded under the retroactive financing provision of the loan. The loan disbursement was smooth and more than planned in the first 2 years. The first disbursement was on 17 November 2006 and loan disbursement reached $41.9 million by the end of 2006 and peaked in 2007. However, disbursement started to slow down in 2008. To catch up with loan disbursement and utilize the committed (but not disbursed) loan proceeds available,[22] 62 subprojects in batch 2 in Orissa were shifted from project 2 to project 1. In the meantime, the borrower, in its letter dated 3 September 2008, requested ADB to extend the loan closing date, which was based on the understanding reached at a tripartite portfolio review meeting[23] held in July 2008. ADB approved this request[24] on 6 November 2008 and the loan closing date was extended by 6 months, from 31 December 2008 to 30 June 2009. The loan account was closed on 9 October 2009 after the final disbursement was made on the same day. At the loan account closing, $173.909 million of the ADB loan was disbursed and the undisbursed balance of $6.091 million was cancelled.[25] The annual disbursement of the loan proceeds for the project is in Appendix 3. Project 1, being part of an MFF, provided sufficient flexibility for the borrower to cancel the loan amount without affecting the total ADB financing amount to the overall investment program. This flexibility also allowed the borrower to shift the ADB financing from slow-moving packages to faster ones, enabling faster disbursement and earlier closure of the loan account.

13. During implementation, an ADB disbursement mission[26] visited the project states in 2007 to review the original supporting documents being maintained by the project implementation units (PIUs). The probability-proportional-to-size method was used to review 24 selected statement of expenditure transactions in each of the project states. The mission was of the view that adequate supporting documents were being maintained by all PIUs. However, the mission

[22] This was about $25 million, because of adjustment in financing requirements and depreciation of the Indian rupee.
[23] Organized quarterly by the Department of Economic Affairs, Ministry of Finance, Government of India, and the India Resident Mission, and attended by officials of executing and implementing agencies of ADB-financed projects and ADB staff administering such projects.
[24] ADB. South Asia Transportation and Communications Division (SATC). 2008. Fax of ADB's Approval of Extension of Loan Closing Date for Rural Roads Sector II Investment Program, Project 1. 6 November.
[25] ADB. SATC. 2009. Fax of ADB's Cancellation of Unutilized Loan Balance for Rural Roads Sector II Investment Program, Project 1. 28 October.
[26] Back to office report of disbursement mission for Rural Roads Sector II Investment Program. 7 November 2007.

also found that the internal control system was weak and the chartered accountant firms were not able to deliver desired results due to lack of enforcement by respective PIUs. The mission instructed the respective board or authority to take proper measures.

E. Program Schedule

14. It was envisaged at appraisal that each civil works contract would have a stipulated completion period of a maximum of 12 months, with some exceptions for those involving large structures. The overall civil work was expected to be completed by the end of 2007. By using retroactive financing, 321 civil works contracts were awarded prior to loan effectiveness. The civil work was actually commenced in the first quarter of 2006 in Assam and Orissa, and in the second quarter of 2006 in West Bengal. The progress of the civil work was satisfactory at the beginning, but later delayed due to monsoon rain in Assam from March to mid-2007 and February to mid-2008, and in 12 districts of West Bengal in until November of that year. In addition, insurgency problems in many parts of Assam and West Bengal led to delays in project implementation.

15. During ADB missions in 2008 it was observed that the financial closing of the contracts was delayed in all three states, though civil works were substantially completed. Of the remaining loan proceeds to be disbursed then, the majority was for the Assam subprojects. The missions requested that close monitoring be carried out by both central and state governments on the progress of works and processing of contractors' bills in Assam.

16. In considering the civil work progress and the loan disbursement status, ADB approved the extension of the loan closing date (para. 12). Most of the civil work and contract packages were completed before the loan closing date of 30 June 2009, however further delay in completion of the remaining works in Assam resulted in about $6 million of the loan remaining undisbursed at the loan closing, and it was therefore cancelled. The actual completion date was about 18 months later than scheduled at appraisal. For the capacity building component, the TSC was mobilized in April 2007, compared with January 2006 envisaged at appraisal, and completed service on 31 March 2009. The actual implementation schedule as compared with the schedule at appraisal is in Appendix 4, and a chronology of major events is in Appendix 5.

F. Implementation Arrangements

17. As arranged at appraisal, the executing agencies for the project were the MORD at the central level, with technical support from the National Rural Roads Development Agency (NRRDA), and respective state governments at the state level. During implementation, a coordination committee, comprising representatives from relevant agencies, was established at the central level to monitor the use of the loan and overall implementation. Similar committees were established at the state level under PMGSY guidelines,[27] to monitor timely implementation of the project. The implementation agencies at the state level were SRRDAs, which were headed by chief executive officers responsible for overall coordination of project implementation, including planning, management, consultant selection, and procurement. The execution of the technical work was through district PIUs of the implementing agencies. The organizational structure diagram for project implementation is in Appendix 6.

[27] Government of India. Ministry of Rural Development. *2004. Program Guidelines of PMGSY*. Delhi: (November http://pmgsy.nic.in/pmg31.asp).

18. The TSC was recruited by the NRRDA to (i) check detailed project reports, conduct random checks of roads under construction, and provide technical support to the PIUs to ensure that road safety measures were properly incorporated; (ii) check compliance of the subprojects with provisions of the community participation framework (CPF), environmental assessment and review framework (EAF) and/or environment code of practice (ECOP); and (iii) conduct socioeconomic impact monitoring. PICs were to be recruited by SRRDAs to assist with project implementation.[28]

G. Conditions and Covenants

19. The project implementation complied with most of the loan conditions and covenants, including all of them regarding environment and social areas. A completed institutional framework for implementing the PMGSY has been well established and is functional. The executing agencies and implementation agencies at both the central and state levels implemented the project efficiently with due diligence in all aspects as well as in accordance with the PMGSY guidelines. Status of compliance with major loan covenants is in Appendix 7. Only one covenant not complied was the engagement of the PICs, due to delay in recruitment (para. 21). Also non-achievement in timely shifting of utilities before the start of construction made one covenant partially complied with.

20. The loan covenants also required the project roads to be properly maintained with sufficient funds. This is being complied. During implementation, the civil works contracts had a provision for 5-year post-construction maintenance by the contractors, as per the PMGSY guidelines. Currently, the SRRDAs in all project states are responsible for road maintenance after the first 5-year liability period. As requested in the PMGSY guidelines, the state governments are taking steps to build capacity in the designated *zilla panchayats* (district governments) and, until such time as the zilla panchayats take over maintenance functions, PIUs will continue to be responsible for maintenance. Currently, the zilla panchayats in the project states participate in maintenance planning and provide comments on prioritizing maintenance activities and projects (para. 34).

H. Consultant Recruitment and Procurement

21. Consultants were recruited in conformance with ADB's Guidelines on the Use of Consultants (2002, as amended from time to time). The recruitment of the TSC was delayed due to the government's internal process. The ADB review mission in February 2007 expressed concern about the delay.[29] After efforts made by the NRRDA, a domestic consulting firm[30] was engaged based on quality and cost-based selection. The contract[31] with the selected TSC was signed on 9 April 2007, with a total contract amount of Rs15.7 million and 72 person-months of services. During implementation, the contract with the TSC was extended to 31 March 2010. At completion, 92.8 person-months of TSC services had been provided to the project. Originally, the PIC was to be recruited to help PIUs implement the provisions of the CPF, EAF and ECOP

[28] Each SRRDA was to recruit a PIC to (i) prepare additional subprojects; (ii) supervise civil works; (iii) implement the CPF to mitigate social impacts; (iv) monitor and implement the EAF and the relevant provisions of the ECOP; and (v) support social and environmental safeguards, and road safety.

[29] Back to office report of review/consultation mission to Proposed North Eastern State Roads Investment Program, Rural Road Sector I Project, and Rural Roads Sector II Investment Program. 6 February 2007.

[30] Operation Research Group

[31] Contract agreement between National Rural Roads Development Agency and Operation Research Group for technical support consultancy services for the states of Assam, Orissa, and West Bengal under the Rural Road Sector II Project, April 2007.

for all subprojects. However, the recruitment of PICs was delayed due to slow decision on the template request for proposal by the MORD and NRRDA, and the contracts were not awarded in time for project implementation. The works originally assigned to PICs at appraisal were mostly done by PIUs with assistance from the project preparatory technical assistance (TA) consultants.

22. All the subprojects of the project were prepared under ADB-financed project preparatory TA.[33] Procurement for civil work contracts conformed to ADB's Procurement Guidelines (1999, as amended from time to time). As envisaged at appraisal, the method of national competitive bidding acceptable to ADB was used, with an upper limit of $10 million for civil work contracts. A total of 330 civil work contracts were awarded in 2006, with total procured cost of Rs11.05 billion. During implementation, it was found that some loan proceeds were available due to adjustments in financing requirements and to depreciation of the Indian rupee. To quickly utilize the uncommitted loan proceeds, the executing agency, through its letter dated 5 September 2008, proposed to shift some subprojects originally prepared for batch 2 of Orissa to project 1. Upon approval by ADB, the scope of project 1 was changed to include 62 fast-moving contract packages[34] from batch 2 subprojects in Orissa. In the meantime, 99 slow-moving contract packages of batch 1 in Orissa were removed from further ADB financing on 31 July 2008, so that the undisbursed loan amount could be used for other fast-moving subprojects. At completion, 392 civil work contracts (139 contracts in Assam, 161 contracts in Orissa, and 92 contracts in West Bengal) were awarded and implemented under project 1, with a total road length of 2,927.13 km and total cost of Rs9.98 billion. The summary of the contract packages, with contracted and actual values, is in Appendix 8.

I. Performance of Consultants and Contractors

23. As anticipated at appraisal, the NRRDA engaged the loan-financed TSC to support the SRRDAs in implementing the project. The scope of the TSC service was modified according to the requirement of the Rural Roads Sector II Project by adding the preparation of batch 3 of Assam, Orissa, and West Bengal; a new batch in Madhya Pradesh and Chhattisgarh; and residual impact monitoring in Madhya Pradesh and Chhattisgarh. The TSC was a team of experts comprising social development experts, environment specialists, and road safety experts. The TSC checked the compliance of the subprojects of batch 1 in Assam, Orissa, and West Bengal with reference to CPF, EAF, and/or ECOP provisions. The TSC also provided technical support to the PIUs to implement road safety awareness programs and conducted road safety workshops in Assam, Orissa, and West Bengal. The TSC conducted impact monitoring and provided training to PIUs and the contractors in complying with social and environment safeguard requirements. The performance of the TSC with respect to scope of services assigned was highly satisfactory and the quantity of reporting was appreciable.

24. Altogether, 392 civil works contracts were awarded under project 1 (including the 62 contracts from batch 2). The performance of the contractors with respect to deployment of personnel, supervision, checking quality of work, and field inspections of the subprojects was satisfactory. It was observed that contractor personnel were self-motivated, dedicated, results-oriented, and understood the requirement of the subprojects. During implementation, the capacity of the contractors was also improved through frequent contract management workshops. The ADB missions noticed that relocation of electricity poles and telecommunication

[33] ADB. 2003. *Rural Roads Sector II Project* (TA 4220-IND. $1.0 million. financed by the Government of the United Kingdom, approved on 20 November.)

[34] 62 subprojects for about 400 km worth Rs1.13 billion ($23.6 million equivalent).

lines was a common problem faced by almost all contractors. The state implementation agencies pointed out other factors affecting the performance of contractors, including (i) sudden increase in prices of asphalt and other key materials, (ii) security concerns in some districts, and (iii) lack of qualified engineering personnel employed by contractors. The overall performance of the civil work contractors in the states of Assam, Orissa, and West Bengal was *satisfactory*.

J. Performance of the Borrower and the Executing Agency

25. Organizational arrangements were well established and ensured efficient and timely management of project implementation. The government provided 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 agency, with assistance from the consultants, prepared the required periodic project progress reports. Chartered accountants audited the financial accounts and statements and indicated that the ADB loan proceeds were used properly. ADB significantly improved the capacity of the executing and implementing agencies through project preparatory TA and other capacity building programs. The executing and implementation agencies also facilitated ADB's review missions for the project. Considering that the project was the first one under the MFF, the executing and implementation agencies performed creditably. The performance of the borrower and the executing agencies was rated *highly satisfactory*.

K. Performance of the Asian Development Bank

26. The project was administered and supervised from ADB headquarters. During implementation, ADB was closely involved in identifying potential problems and conducted critical activities through regular reviews to resolve issues related to implementation. ADB conducted 10 review missions[35] (see Basic Data). ADB conducted regular procurement and disbursement audits and provided substantial advice for consultant recruitment, implementation progress, and loan disbursement. ADB also carried out substantial project site visits to many subprojects and provided regular reviews of compliance with social and environmental safeguards. The executing and implementation 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

27. The project is highly relevant to the government's Tenth Five-Year Plan 2002–2007 and its succeeding plans,[36] and ADB's country strategy and program for India,[37] as well as the objectives of the MFF at appraisal. Overall, implementation of project 1 was successful and achieved its objective anticipated at appraisal. The project's outputs and outcomes also proved that the project was significant, timely, and effective for implementation of the PMGSY.

B. Effectiveness in Achieving Outcome

[35] Some of the ADB review missions were combined with other loans under the investment program.
[36] Government of India. Planning Commission. 2002. *Tenth Five Year Plan 2002–2007.* Delhi: http://www.planningcommission.nic.in/plans/planrel/fiveyr/10th/default.htm
[37] ADB. 2009. *Country Partnership Strategy: India, 2009–2012.* Manila. Abridged version.

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

29. At completion, 2,927.13 km of all-weather rural roads were constructed and/or upgraded under the project, which benefited 1,503 habitations. The PCR mission observed that the roads constructed and/or upgraded were of good quality with sufficient safety and environment protection arrangements. Even after 2–4 years of operation (most of the project roads were completed in 2007–2009), the roads were still in good condition. In conjunction with state road development in the project area, a comprehensive rural road network is being completed, substantially boosting local transport service development and bringing significant socioeconomic benefits to the local residents, especially the poor (Appendix 11). The improved road connectivity will continue to promote economic development and improve socioeconomic standards in rural habitations.

C. Efficiency in Achieving Outcomes and Outputs

30. Project implementation was rated *efficient*. During preparation of the MFF it was found that the states of Assam, Orissa, and West Bengal had large rural populations with the majority of people depending on agriculture for their livelihood. Poverty was particularly acute in the rural areas, with large numbers of people living below the poverty line; Orissa ranked at the top of Indian states with 48%, Assam was third with 40%, and West Bengal was 12th with 32%. The provision of all-weather roads in rural areas would definitely lead to increased access to rural markets and rapid economic diversification, increasing the incomes of farmers. It was expected that implementation of the project would efficiently improve rural transport conditions and thus reduce poverty in the project area. It was estimated that a substantial proportion of the vehicle operation cost savings would go to road users after rural road improvement, and road transport safety would be substantially improved by the road safety measures designed under the project.

31. During implementation, the TSC carried out a traffic survey (baseline survey) in June 2008 on selected sample roads of project 1 subprojects, including 30 project roads and 10 control roads. The TSC conducted a follow-up traffic survey in January 2009 on the same sample roads. In the monitoring reports,[38] changes in the vehicle composition over the surveys were analyzed. Motorized vehicle traffic on the roads surveyed primarily consisted of cars, jeeps, vans, three-wheelers, two-wheelers, and light commercial vehicles. In the nonmotorized category, bicycles and cycle rickshaws predominated. The same vehicle composition also existed on the control roads. On the project roads, a significant rise in motorized traffic was observed between the baseline and the second surveys (from 54.24% to 58.45%), while the control roads showed a marginal increase in motorized traffic (from 48.77% to 50.98%). On project roads, the categories of car, jeep, van, three-wheeler, and two-wheeler showed substantial traffic increases from the baseline to the second survey, while on the control roads only two-wheeler traffic showed significant increase during the same period. Among the nonmotorized traffic, a substantial decrease in animal-drawn vehicles was observed between the first and second surveys. Based on the latest observations from the supplementary traffic

[38] Socio-economic Impact Assessment Report, Assam, Rural Roads Sector II Investment Program; Socio-economic Impact Assessment Report, West Bengal, Rural Roads Sector II Investment Program; Socio-economic Impact Assessment Report, Orissa, Rural Roads Sector II Investment Program, Technical Support Consultants – Operation Research Group. July 2009.

survey[39] of the PCR for Rural Roads Sector I Project, the traffic forecast was revised to consider the faster socioeconomic development, the improved road networks, and rapid increase in motorized vehicle registrations in the project 1 area. The traffic on the project roads was estimated to increase annually by an average of 9%–11% in 2013–2017, and by 7%–9% in 2018 and beyond. The revised traffic increase rates are much higher in the beginning than those anticipated at appraisal,[40] reflecting faster socioeconomic development in the project area. The revised traffic forecast was used in the economic reevaluation of the PCR mission (Appendix 9).

32. To better measure the project's efficiency, the PCR mission reevaluated the economic internal rate of return (EIRR) using a similar methodology adopted at appraisal and for the updated data. The economic reevaluation compared the economic costs and benefits for with-project and without-project cases. The economic benefits considered in the reevaluation include (i) vehicle operation cost (VOC) savings, (ii) passenger time cost savings, and (iii) other potential benefits. The recalculated EIRR was 21.4% for the whole project (20.4% for Assam, 17.8% for Orissa, and 27.3 for West Bengal). When compared with 18.0% at appraisal,[41] the higher EIRRs were mainly due to much more traffic than estimated at appraisal. The recalculated EIRRs are above the ADB-recommended social discount rate of 12% and the project can be considered to be 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 (20% lower than normal traffic), the EIRR was 16.8%. In a case with a combination of both a 20% maintenance cost increase and a 20% benefit reduction, the EIRR would be 17.8% for the whole project. The sensitivity test also showed that the EIRR is more sensitive to the changes of benefits. Therefore, the government should pay more attention to socioeconomic development in the project states and implement policies to stimulate transport services and increase incomes of the villagers, which may maximize the benefits of the 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 this PCR.

D. Preliminary Assessment of Sustainability

33. The sustainability of the project was rated *likely*. The continuous implementation of the PMGSY with external assistance from development partners has ensured the sustainability of rural road development and poverty reduction in India. The project is the first loan under the Rural Roads Sector II investment program, following the Rural Roads Sector I Project. In considering the successful implementation of these projects, as well as their significant impacts, ADB is preparing a new MFF for continued support of the implementation of the PMGSY. ADB has also 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. To extend support to implementation of the PMGSY, the NRRDA was established in 2002 to focus on technical specifications, project appraisal, quality monitoring,

[39] For validating the data of the traffic surveys and obtaining the latest traffic data, a due-diligence traffic survey was designed and implemented during the PCR mission for Rural Roads Sector I Project. A consultant team was recruited to carry out 24 hour traffic count surveys on 10 selected project roads (five roads in Madhya Pradesh and five roads in Chattisgarh). The survey was carried out on 18–23 May 2011 and hourly traffic by 12 vehicle types (nine types of motorized vehicle and three types of nonmotorized vehicle) were collected and analyzed.

[40] At appraisal, it was estimated that the forecast overall growth rate was approximately 6.5% for 2007–2017 and 6.0% beyond 2017.

[41] In the MFF, the overall EIRR for the sample subprojects was 18.0% (15.6% for Assam, 18.0% for Orissa, and 20.1% for West Bengal).

and management of monitoring systems. The NRRDA was conceived as a compact, professional, and multidisciplinary body to provide the requisite technical and management support to the MORD and the state governments to effectively implement the programs. State governments are responsible for planning, implementation, and maintenance. For better management of PMGSY projects, several computer-based systems—which include a road planning and maintenance system, e-tendering and procurement system, and centralized online monitoring management and accounting systems—have been adopted and used by all the executing agencies, implementation agencies, and regional PIUs.

34. To properly maintain the roads created under the PMGSY, the contracts for civil works contained a provision requiring the contractors to provide 5 years of post-construction maintenance. According to the latest arrangement, the SRRDAs in the project states are responsible for road maintenance after the first 5-year liability period. However, zilla panchayats still participate in maintenance planning and provide comments on prioritizing maintenance activities and projects. The PCR mission noticed during site visits that the roads created under project 1 were well maintained, and the funds and capacity for road maintenance were generally sufficient.

35. 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 in site reconnaissance and consideration of design alternatives. Strengthening this part would avoid unwanted issues and associated delays in project implementation. More precise identification of the need for shifting of utilities and related costs and early initiation of utility shifting with the respective departments are also needed.

(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 traffic and excess loads. When construction of the PMGSY road is done in several phases, consideration should be given in the earlier sections to traffic and construction vehicle loads for the following sections.

(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 and safety measures should be improved. Specifications and standards should be studied and developed, and proper funds should be provided. Road safety audits should be done systematically on a sample of road designs, during construction and on existing roads, and recurrent safety issues addressed on all roads. Villagers have set up random speed breakers of various size 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 constructed and/or upgraded through the PMGSY, while institutional capacity remains the same. The emphasis should shift from construction of roads to the operation and maintenance of the road network. 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. Level of maintenance supervision should be enhanced. 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) 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

36. **Environmental safeguards.** The MFF was categorized as an environment category B project in accordance with ADB's Environmental Assessment Guidelines (2003). The MFF was not subject to the Indian Environmental Impact Assessment Notification of the Ministry of Environment and Forests. The government does not require an environmental assessment for this investment program and its subprojects. On the basis of the environmental classification of the MFF, as well as environmental impacts related to the MFF, an ECOP check list and the initial environmental examination of the sample subprojects were prepared by the project preparatory TA consultant on behalf of the MORD. The examination results indicated that there was no adverse environmental impact perceived due to the location of the rural roads. Of the total 322 km of sample rural road construction works in 48 different stretches, none pass through national parks or wildlife sanctuaries. No archaeological, historical, or protected heritage monuments; natural habitats or nature reserves; or reserve, protected, or unclassified forest areas are situated within 5 km of the subproject roads. The assessment also indicated that (i) the environmental impacts would be only during construction or temporary and reversible, and (ii) mitigation measures could be easily incorporated into design and construction. The EAF was prepared for the entire MFF. During implementation, an ADB environmental specialist visited the project states[42] and noted that, in line with the requirements of the EAF, ECOP check lists were completed for all roads. It was also noted that the project states had incorporated the standard environmental management plan in their bidding document for civil works. The ADB mission also noted that the contractors had included costs for environment mitigation measures in their bill of quantities. Adequate drainage measures were incorporated in the project design and constructed to ensure that the drainage was efficient and there was no waterlogging. Assisted by the consultants, the project states monitored the implementation of the environmental mitigation measures. The ADB mission in July–August 2009 visited selected subproject roads and conducted a detailed review of environmental safeguards. No serious adverse environmental impact was found in the review.

37. **Social safeguards**. During formulation of the MFF, a social assessment and survey of sample households was conducted. This focused on the project impacts on poverty reduction, gender, land availability, and indigenous peoples. The assessment confirmed that the width of the existing roads would be sufficient to accommodate the right-of-way of about 7.5 meters. As a result, minimal acquisition of land would be required for shoulder adjustment and drainage construction. Also, no people would need to be relocated due to minor realignments. Drawing upon the experience of the previous project, as well as harmonizing with the World Bank-financed rural roads project in other states, the CPF was agreed upon between the government and ADB to provide guidance and mitigation measures for voluntary land donation, and to ensure proper community participation during implementation. During the ADB mission in

[42] Back to office report of review mission to Rural Roads Sector II Investment Program, 19 March–2 April 2007.

March–April 2007, the field visit and CPF documentation (randomly selected) review revealed that (i) people agreed to voluntarily contribute their land for the road construction, and this was confirmed through verbal and written records and verified by *gram panchayats* (village or small-town governments), (ii) there was full consultation with landowners and nontitled people on site selection, (iii) grievance redress mechanisms were in place at the village level, and (iv) proper attempts had been made toward fuller implementation of CPFs. The monitoring of social safeguards was done by the TSC, who randomly monitored 76 CPFs (27 in Assam, 34 in Orissa, and 15 in West Bengal). The sample represented 15% of all CPFs. The implementation agencies, with help from the TSC, monitored the socioeconomic impact of the project, conducting a baseline survey and follow-up surveys.

38. **Socioeconomic impact.** The PMGSY program is quickly bringing about a socioeconomic transformation in rural India. A 2-year study was undertaken to gauge the project's socioeconomic impact. Six surveys monitored a sample of 9% of all habitations that were connected by the project in three states. The study found that the presence of all-weather roads has directly or indirectly contributed to improvements in connectivity, transportation, government services, livelihood, commerce, education, health, land value, infrastructure, social interactions, and gender empowerment. However, reduced poverty levels in the project areas cannot be fully attributed to the project as rural roads act as a conduit for products and services reaching the habitations as well as allowing products and services produced in the habitations to reach markets. The survey nevertheless found that, overall, the socioeconomic indicators improved during 2008–2009 in the sample habitations. The living conditions in connected habitations continue to improve and the number of households living below the poverty line is likely to continue to decrease in project areas. Detailed analysis of the socioeconomic impact is in Appendix 11.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

39. The project realized its main objectives of supporting the implementation of the 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*.

40. However, rural road maintenance could be further improved with sufficient capacity and budget. The government should continue to facilitate the states' efforts in putting proper mechanisms for rural road maintenance in place. In addition to strengthened maintenance, the sustainability of the PMGSY program could be further ensured through deepening the institutional reforms in the road subsector, and implementing proper socioeconomic development programs to maximize the project's benefits. The government should also study the lessons learned from the project formulation and implementation, and apply these experiences in ongoing and future PMGSY projects, especially those financed by ADB.

B. Lessons

41. The project was the second ADB loan for the central government and the first under the Rural Roads Sector II investment program for the project states of Assam, Orissa, and West

Bengal. The project has helped the central government and the project states to identify gaps in various project implementation activities (paras. 43–47).

42. **Time requirements for completing a subproject.** Following the PMGSY guidelines, each civil works contract had a stipulated completion period of 12 months. However, it was found during the implementation that 12 months was inadequate and that 15–18 months were needed. The proper timing of the signing of civil works contracts in relation to the monsoon period will avoid the loss of construction time due to the monsoon. This should be incorporated and considered in following subprojects under the MFF.

43. **Catering for future traffic growth.** PMGSY roads usually generate new traffic and are sometimes being used as a shortcut if they provide a through route. Some field visits identified that some of the roads being used as shortcuts have already deteriorated. Consultation with communities also revealed that local residents were concerned about the quality of design and that it might not cater for future traffic. Also, the recent traffic survey (during the PCR mission for the Rural Roads Sector I Project) found much higher traffic on the project roads than anticipated at appraisal. Systematic catering for future traffic growth must be strengthened, both in planning methodology and also in broader road network management.

44. **Availability of contractors and appropriate contract management.** Some of the construction delays were caused by nonavailability of the contractors, including lack of working facilities, mobilization of resources, and/or skilled and qualified staff. Also, some of the civil work packages were geographically spread out which made it difficult for the contractors to manage their resources, labor, and materials. In future project formulation, the size of contracts should be adjusted to the availability of contractors. Also, as a sector-wide issue, the capacity of the construction industry should be increased substantially. A concerted effort is necessary, not only from the government offices dealing with infrastructure but also the offices dealing with the construction industry, technical education, and human resource development. Fostering construction and maintenance capacity, especially in rural roads, could be considered in future PMGSY programs. Currently, there are some issues in routine maintenance contracts, such as fewer contractors participating in the bidding, or some contractors disappearing before the maintenance period is completed.

45. **Utility relocation.** Relocation of electricity poles and telecommunication lines was a common problem faced in almost all contract packages. Early identification and preparation—such as sufficient survey provision, accurate cost estimation, adequate and timely budgeting, and adequate coordination with concerned departments and state organizations—should be incorporated into future subprojects.

46. **Material price escalation**. The price for some materials, especially cement, steel, and asphalt, was substantially adjusted during implementation. Large-scale price eslalation led the contractors to slow down the work. Since the standard contract period for PMGSY works is only 12 months, provision for price escalation is not included in the civil works contract. This means that if the works take longer than 12 months for any reason, price escalation potentially becomes an issue. Future project preparation and implementation should consider price escalation and/or adopt special clauses applicable when the work is extended to more than 12 months.

C. Recommendations

1. Project Related

47. **Impact monitoring**. During implementation, only two socioeconomic impact surveys and assessments were conducted: the baseline survey in May–June 2008 and the follow-up survey in December 2008–January 2009, due to delay in recruiting the TSC. The baseline survey took place when the majority of the subprojects had already been completed, hence the choice of sample subprojects for the survey was quite limited. Since the outcome of impact monitoring will benefit both the borrower and ADB, and considering that there is always a risk of delay in consultant recruitment for survey, alternative arrangements with proactive involvement of ADB to ensure timely impact monitoring needs to be considered.

48. **Future project design**. The later the new connectivity is provided, the smaller its impact will be. In future ADB support, especially to the latter phase of the PMGSY, packaging the rural connectivity component with initiatives and programs in socioeconomic development might be considered. This may maximize the benefits of all the rural road programs and projects. Also, some emphasis should be placed on building capacities for maintenance and on state-based research and training in rural roads.

49. **Timing of the project performance evaluation report**. The project performance evaluation report might be prepared in 2013 or later. By that time, most of the subprojects under the project will have been fully operational for more than 5 years. The traffic, maintenance, physical condition, benefits attained, and impacts on poverty can be better assessed then.

2. General

50. Rural road development will have significant socioeconomic impacts, especially on poverty alleviation, but it will take longer for the impacts to fully realize. To capture more of the project's impact, midterm and long-term follow-up monitoring could be considered.

51. The road network in India has been extensively developed in recent years, with expanding construction 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. This 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.

52. The scale and capacity of the construction industry in India have been inadequate, causing considerable construction delay nationwide. Also, shortage of engineers has caused delays in implementation of works. Considerable scope exists for improving project management and better utilizing human resources and equipment in the construction industry. In future ADB projects, emphasis on building capacities for maintenance and on state-based research and training in rural roads should be considered.

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

DESIGN AND MONITORING FRAMEWORK (PROJECT I)

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks	Results
Impact Contribute to reduction in poverty and deprivation, and support economic growth of the community connected by investment program roads	3–4 years after completion of subprojects under the investment program (2011 for first loan subprojects): Reduction in poverty rates in rural areas served by investment program roads by 5% Improvement in social indicators in rural areas served by investment program roads by 10%, including for maternal and infant deaths, safe delivery, immunization, post-primary dropout, and primary school teacher attendance	Census (next due in 2011) State and district statistics Sample impact study conducted by NRRDA Impact monitoring by the technical support consultant of selected roads in their	Various government rural development schemes are effectively coordinated (assumption)	Level of education increased by 2% for inhabitants who completed grade 12 and above, 3% for the completion of grades 10–12, 3% for grades 5–10, and decrease of 4% for those who are uneducated Frequency of visiting a clinic or hospital increase by 2% for those visiting at least once a month
Outcome Improved connectivity of rural community to markets, district headquarters, and other centers of economic activity via investment program roads	By the end of the investment program (2010): Investment program states to have rural road networks connecting all habitations with populations of 1,000 and above with all-weather roads (as of April 2005, habitations in this population class without all-weather connectivity number 4,692 in Assam, 2,151 in Orissa, and 9,533 in West Bengal) Improved access to markets, and health and education facilities measured in terms of the number of days when access to these facilities are disrupted (currently up to 25% of the year, down to less than 15 days per year)	OMMAS State and district statistics Completion reports of each individual loan and the multitranche financing facility Sample impact study conducted by NRRDA Impact monitoring by the technical support consultant of selected roads in their principal villages	Availability of transport modes and services to newly connected habitations (assumption)	Under project 1, 1,503 habitations were connected by all-weather roads (527 in Assam, 276 in Orissa, and 700 in West Bengal) It is planned that 13,198 km of rural roads will be rehabilitated, constructed, and/or upgraded under the whole MFF Access to markets, health, and education facilities are affected on zero days per year. Percentage of inhabitants employed outside of the household increased by 1% and number of days of employment per year increased by 10 days over

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks	Results
	Diversified income opportunities in rural areas measured in terms of the number of people obtaining work outside the village and the change in cropping pattern and agricultural produce marketing (increase in perishable crops in both cropping and marketing)			the 6 months period after road construction. There was a 1% increase each in the number of inhabitants participating in agriculture and trade and business-related employment. Average distance to work increased by 0.5 km and average time taken to reach work place reduced by 0.5 hours
Outputs 1. Construction and upgrading of rural roads into all-weather standard 2. Improved community participation	By the end of the project period (2008): 3,144 km (Assam 999 km, Orissa 1,189 km, and West Bengal: 956 km) priority rural roads in the investment program states will be constructed and upgraded to all-weather standard connecting 1,769 rural habitations (Assam 525, Orissa 398, and West Bengal 846) The percentage of roads constructed or upgraded under the investment program that are rated “very good” by national quality monitors will be 30% higher than the current ratings (currently28% in Assam and West Bengal and 50% in Orissa)[a] Each road constructed or upgraded under the investment program will be maintained with a pavement condition index (defined in	OMMAS National quality monitor inspection reports Biennial pavement condition index survey Quarterly progress reports and loan completion reports ADB review missions ADB midterm review mission External monitoring of community participation	Continuous allocation of central government’s funds to PMGSY in the investment program states (assumption) Continuous allocation of state government funds for post-construction maintenance works (assumption) Effective quality control and monitoring of civil works (assumption) Active participation of rural community in planning and preparation of subprojects (assumption)	At completion, a total of 2,927.13 km of all-weather rural roads (941.86 km in Assam, 1199.35 km in Orissa, and 785.92 km in West Bengal) were constructed and/or upgraded under project 1, which benefited 1,503 habitations (527 in Assam, 276 in Orissa, and 700 in West Bengal). During implementation, quality control of construction was carried out by the contractors. In the defect liability period, there was no serious quality problem reported. The ADB PCR mission observed that the constructed and/or upgraded roads were of good quality; the road surface roughness was within international roughness index for a comfortable ride (about IRI 4); safety and environment protection facilities were installed in some roads; and routine maintenance of the

	PMGSY Operations Manual) value of not less than 4 Improvements to PMGSY community consultation procedures measured by satisfaction of the affected communities			project roads was in place to keep the roads in good condition. Introduction of community participation framework ensured 100% participation of affected communities.
Activities with Milestones 1.0 Subproject Preparation 1.1 Appraisal of sample subprojects (about 3,200 km) completed by August 2005 2.0 Framework Financing Agreement 2.1 Signed in November 2005 3.0 Periodic Financing Request 3.1 First PFR submitted in November 2005, and updated in June 2006 (for $180 million), which was turned into project 1 and made effective on 18 October 2006 3.2 ADB review of ongoing subprojects—biannually 3.3 ADB review of states' readiness to implement additional loans—to be done concurrently with above review of ongoing subprojects 3.4 Government to notify ADB of forthcoming PFR—at least 15 days in advance 3.5 Government to submit PFR and ADB to approve the requested financing through execution of a corresponding loan agreement—within 30 days of PFR 4.0 Safeguards 4.1 Social and environmental safeguard frameworks prepared during processing 4.2 For new states to be included under the multitranche financing facility, safeguard framework documents to be prepared 4.3 Community consultation completed and land made available in accordance with construction schedule—applicable to all subprojects under the facility 5.0 Subproject Implementation 5.1 Civil works contracts under project 1 awarded from November 2005 onward under retroactive financing 5.2 TSC and PIC mobilization expected in January 2007 6.0 Monitoring and Reporting 6.1 Baseline survey by early 2007 6.2 Monthly internal monitoring using OMMAS 6.3 Quarterly progress reporting 6.4 Quarterly external monitoring of safeguard implementation 6.5 Annual impact monitoring at end of 2007, end of 2008, end of 2009, and investment program completion 6.6 Impact monitoring by NRRDA to continue after completion of the investment program			**Inputs for Investment Program** ADB OCR financing of $750 million Government financing of $1,350 million ADB staff time for multitranche financing facility administration including review of PFRs and preparation of loan/project agreements for individual loans **Inputs for Project 1** ADB OCR financing of $180 million Government financing of $56 million ADB staff time for review of PFRs and preparation of loan/project agreements for individual loans	ADB appraised project 1 on 1–5 August 2005 The FFA was signed on 25 November 2005 ADB received the first PFR under the MFF on 25 November 2005 At completion, $233.4 million was provided to project 1, comprising $173.9 million from the ADB loan and $59.5 million from the government's own resources. Road Connectivity: Assam $99.4 million Orissa $73.3 million West Bengal $50.0 million Subtotal $222.7 million Capacity Building: TSC $0.2 million Financial Charges: IDC and Commitment Charges $10.5 million

ADB = Asian Development Bank; FFA = framework financing agreement; IDC = interest during construction; MFF = multitranche financing facility; NRRDA = National Rural Roads Development Agency; OCR = ordinary capital resources; OMMAS = online management, monitoring, and accounting system; PCR = project completion review; PFR = periodic financing request; PIC = project implementation consultant; PMGSY = Prime Minister's Rural Roads Program, TSC = technical support consultant.

[a] During implementation, rating method of national quality monitors changed so this particular indicator is dropped.

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. Road Connectivity						
a. Assam	87.4	21.8	109.2	77.5	21.9	99.4
b. Orissa	54.7	13.7	68.4	57.2	16.1	73.3
c. West Bengal	37.5	9.3	46.6	39.0	11.0	50.0
Project Implementation Consultant	0.0	11.2	11.2	0.0	0.0	0.0
Subtotal A	**179.6**	**56.0**	**235.6**	**173.7**	**49.0**	**222.7**
B. Capacity Building						
Technical Support Consultant	0.4	0.0	0.4	0.0	0.0	0.2
Subtotal B	**0.4**	**0.0**	**0.4**	**0.2**	**0.0**	**0.2**
C. Financial Charges						
IDC and Commitment Charge	14.2	0.0	14.2	10.5	0.0	10.5
Subtotal C	**14.2**	**0.0**	**14.2**	**10.5**	**0.0**	**10.5**
Total (A+B+C)	**194.2**	**56.0**	**250.2**	**184.4**	**49.0**	**233.4**

IDC = interest during construction
Sources: Report and recommendation of the President, periodic financing request for project 1, project administration memorandum, Asian Development Bank loan financial information system, and information from National Rural Road Development Agency, Government of India.

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	180.0	0.0	**180.0**	71.9	173.9	0.0	**173.9**	74.5
Government	14.2	56.0	**70.2**	28.1	10.5	49.0	**59.5**	25.5
Total	**194.2**	**56.0**	**250.2**	100.0	**184.4**	**49.0**	**233.4**	100.0
% of Cost	77.6	22.4	100.0		79.0	21.0	100.0	

ADB = Asian Development Bank
Source: Report and recommendation of the President, periodic financing request for project 1, project administration memorandum, Asian Development Bank loan financial information system, and India National Rural Road Development Agency.

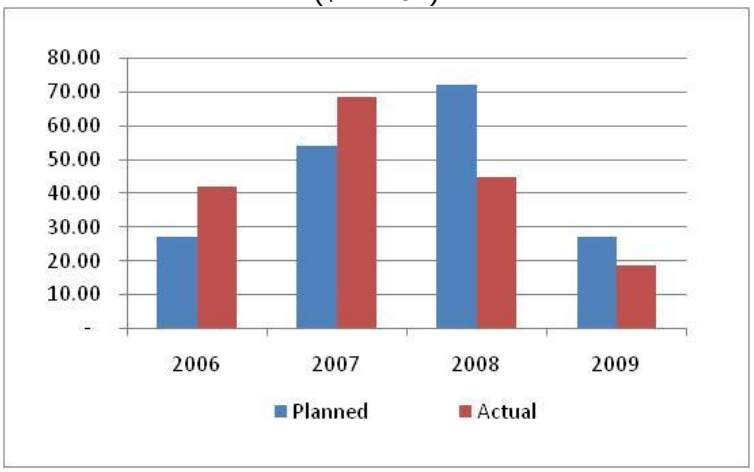
DISBURSEMENT OF ADB LOAN PROCEEDS

Table A3.1: Annual and Cumulative Disbursement of ADB Loan Proceeds

year	Annual Disbursement			Cumulative Disbursement	
	Amount ($million)		% of Total	Amount ($million)	% of Total
	Planned	Actual			
2006	27.00	41.91	24.1	41.91	24.1
2007	54.00	68.52	39.4	110.42	63.5
2008	72.00	44.68	25.7	155.11	89.2
2009	27.00	18.80	10.8	173.91	100.0
Total	**180.00**	**173.91**		**173.91**	

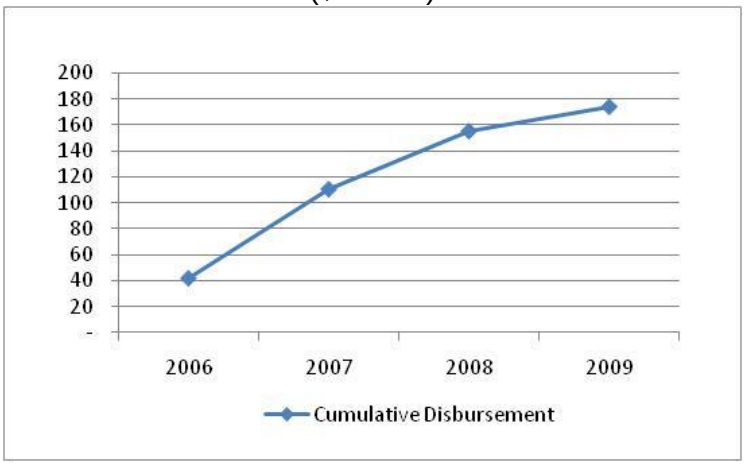
ADB = Asian Development Bank
Source: Asian Development Bank

Figure A3.1: Annual Disbursement of ADB Loan Proceeds
($ million)



ADB = Asian Development Bank
Source: Asian Development Bank

Figure A3.2: Cumulative Disbursement of ADB Loan Proceeds
($ million)



ADB = Asian Development Bank
Source: Asian Development Bank

COMPARISON OF APPRAISAL AND ACTUAL PROGRAM IMPLEMENTATION SCHEDULE

PPTA = project preparatory technical assistance; Q = Quarter.

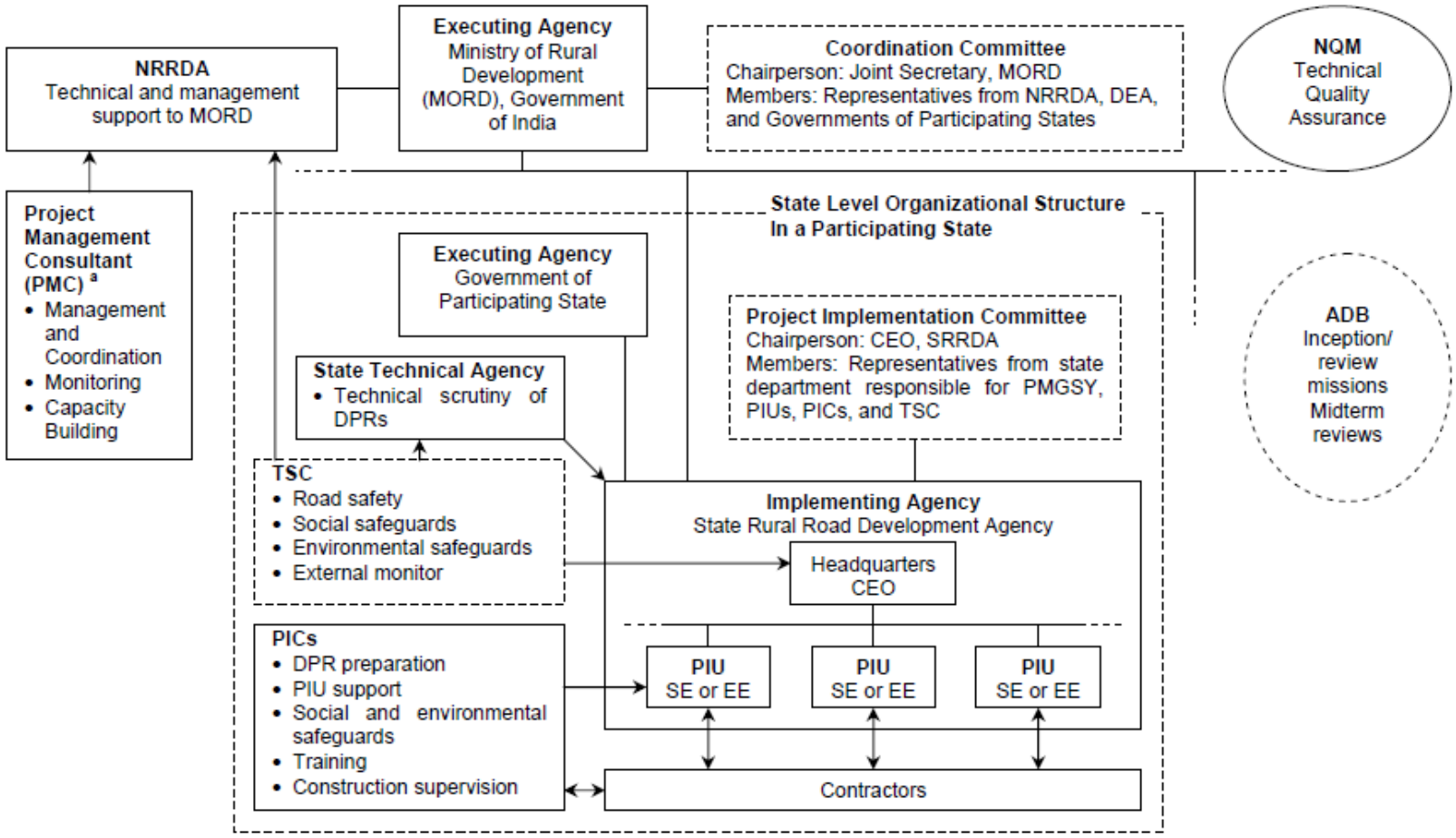
Source: Project Administration Memorandum, India National Rural Road Development Agency

CHRONOLOGY OF MAJOR EVENTS

Date	Main Event
2003	
20 November	ADB approval for Rural Roads Sector II Project, $1.0 million, financed by the Government of the United Kingdom
2005	
18 April–6 May	ADB fact-finding mission to India for the Rural Roads Sector II Investment Program MFF
1–5 August	ADB appraisal mission to India on Proposed Rural Roads Sector II Project
25 August	ADB Board approval of the MFF as per Board paper on Pilot Financing Instruments and Modalities
12–16 September	ADB special consultation mission on Proposed Rural Roads Sector II Project
November	Award of civil work contracts for batch 1 subprojects in Assam
25 November	Signing of the framework financing agreement (Rural Roads Sector II Investment Program) between the government and ADB
25 November	ADB received the first PFR under the MFF
December	Start of contract awarding for batch 1 subprojects in Orissa
2006	
January	Commencement of the civil works of batch 1 subprojects in Assam and Orissa
January–April	Award of civil work contracts for batch 1 subprojects in West Bengal
February	Commencement of the civil works of batch 1 subprojects in West Bengal
19 June	ADB received a revised submission of first PFR from the government
25 July	Negotiations of loan agreement and project agreements for Rural Roads Sector II Investment Program – Project 1
31 July	President approval of Rural Roads Sector II Investment Program – Project 1
29 August	Signing of loan agreement between the government and ADB
18 October	Loan effective for Rural Roads Sector II Investment Program – Project 1
17 November	First disbursement of the Rural Roads Sector II Investment Program – Project 1
17 November–1 December	ADB inception mission for Rural Roads Sector II Investment Program – Project 1
2007	
10 January	ADB approval for the final selection for the TSC consultant
29 January–2 February	ADB review mission of Proposed North Eastern State Roads Investment Program, Rural Roads Sector I Project, and Rural Roads Sector II Investment Program
15 March–2 April	ADB consultation mission for Proposed North Eastern State Roads Investment Program, review of Rural Roads Sector II Investment Program and its first loan (project 1), and review of Urban Transport Strategy TA.
9 April	Signing of contract for the TSC
2–11 May, 23–24 May	ADB review mission of Rural Roads Sector II Investment Program and its first loan (project 1), and consultation on the Proposed Jharkhand State Road Project and the Proposed North Eastern State Roads Investment Program
24–28 September	ADB disbursement review mission for the Rural Roads Sector II Investment Program

Date	Main Event
8–13 October	ADB review mission for Rural Roads Sector II Investment Program and its first loan (project 1), inception of TA cluster for project preparation and capacity development for Jharkhand State Road Project, and review of Technical Assistance for Design and Project Management Support and the Proposed North Eastern State Roads Investment Program
31 December	Original project completion date in LA for batch 1 subprojects
2008	
8–16 April, 24–26 April	ADB review mission of Rural Roads Sector II Investment Program, PPTA for Jharkhand State Roads Project, and TA Urban Transport Strategy
3 September	Letter from the government on request for extension of closing date for Rural Roads Sector II Investment Program – Project 1
29 October	ADB approval to scope change of project 1 and project 2
6 November	ADB approval of extension of loan closing date for Rural Roads Sector II Investment Program – Project 1
10–18 November, 5–11 December	ADB review mission of Rural Roads Sector II Investment Program and loan inception for project 2 and project 3, upgraded to midterm review mission for Rural Roads Sector II Investment Program – Project 1
31 December	Original loan closing date in the loan agreement
2009	
4–13 February	ADB review mission of Rural Roads Sector II Investment Program, review of project 1, project 3, and preparation for project 4 in Assam and West Bengal
31 March	Completion of the TSC consulting services
30 June	Extended loan closing date for Rural Roads Sector II Investment Program – Project 1
30 June	Completion of all civil works for batch 1 subprojects in Assam, Orissa, and West Bengal
27 July–26 August	ADB review mission of Rural Roads Sector II Investment Program, closing of project 1, review of project 2, 3 and 4, preparing for project 5, and inception for Preparing Rural Connectivity Investment Program TA.
9 October	Actual loan closing date and the last disbursement of Rural Roads Sector II Investment Program – Project 1. On the same date, $6,090,561.90 undisbursed loan amount was cancelled
2011	
23–27 May, 28 June–6 July	ADB project completion review mission for Rural Roads Sector II Investment Program – Project 1

ORGANIZATIONAL STRUCTURE FOR PROJECT IMPLEMENTATION



ADB = Asian Development Bank; CEO = chief executive officer; DEA = Department of Economic Affairs, Ministry of Finance; DPR = detailed project report (road design); EE = executive engineer; MORD = Ministry of Rural Development; NQM = national quality monitor; NRRDA = National Rural Roads Development Agency; PIC = project implementation consultant; PIU = project implementation unit; PMC = project management consultant; PMGSY = Prime Minister's Rural Roads Program; SE = superintending engineer; SRRDA = State Rural Road Development Agency; TSC = technical support consultant.

[a] for Rural Roads Sector I Project

Source: ADB. 2007. *Report and Recommendation of the President to the Board of Directors: Proposed Multilateral Financing Facility: Rural Roads Sector II Investment Program.* Manila.

STATUS OF COMPLIANCE WITH MAJOR LOAN COVENANTS

Particulars	Reference in Loan/Project Agreement	Status of Compliance
PARTICULAR COVENANTS	**LA, Article IV**	
1. (a) The Borrower shall cause MORD, Assam, Orissa, and WB to carry out the Project with due diligence and efficiency and in conformity with sound administrative, financial, engineering, environmental, social, and rural roads development practices. (b) In the carrying out of the Project and operation of the Project facilities, the Borrower shall perform, or cause to be performed, all obligations set forth in Schedule 5 to this Loan Agreement.	Section 4.01	**Complied with.** The MORD and all project states implemented the project with due diligence, efficiently, and in conformity with sound administration.
2. The Borrower shall make available to MORD, Assam, Orissa, and WB, promptly as needed, the funds, facilities, services, and other resources which are required, in addition to the proceeds of the Loan, for the carrying out of the Project.	Section 4.02	**Complied with.** The MORD and all project states obtain sufficient support and funds from the central government in a timely manner to carry out project 1.
3. The Borrower shall ensure that the activities of its departments and agencies with respect to the carrying out of the Project and operation of the Project facilities are conducted and coordinated in accordance with sound administrative policies and procedures.	Section 4.03	**Complied with**. The project was carried out fully under the PMGSY guidelines.
4. The Borrower shall take all action which shall be necessary on its part to enable MORD, Assam, Orissa and WB to perform its obligations under the Project Agreement, and shall not take or permit any action which would interfere with the performance of such obligations.	Section 4.04	**Complied with**. The MORD and all project states performed their obligations under the project agreement.
5. (a) The Borrower shall exercise its rights under the financing arrangements in such a manner as to protect the interests of the Borrower and ADB and to accomplish the purposes of the Loan. (b) No rights or obligations under the financing arrangements relating to the Project shall be assigned, amended, abrogated or waived without the prior concurrence of ADB.	Section 4.05	**Complied with**. Five loans were approved and implemented under the MFF. Sixty two subprojects were shifted from batch 2 to batch 1 to properly use the loan.
EXECUTION OF PROJECT AND OPERATION OF PROJECT FACILITIES **A. Execution and Implementation.**	**LA, Schedule 5 :**	
1. (a) The Borrower shall ensure that the Project is carried out in accordance with the PMGSY Guidelines as supplemented by Project-specific requirements including those more fully described in the agreed CPF and the EAF for each state. (b) The Executing Agencies for the Project shall be (i) MORD at the central level and (ii) relevant State at the State level, MORD shall be responsible for overall supervision and execution of the Project at central level and each State through the respective IA shall be responsible for executing the Project at the State level.	Para 1.	**Complied with**. The project was implemented in accordance with PMGSY guidelines. **Complied with**. The executing and implementing agencies for the project were as agreed in the loan agreement.
2. Each State shall assist the related IA in obtaining approvals	Para 2.	**Complied with**

Particulars	Reference in Loan/Project Agreement	Status of Compliance
and clearances for timely Project execution under the PMGSY Guidelines and other applicable laws and regulations of the Borrower and the respective State.		No issues were observed in obtaining approvals and clearances.
3. Each State shall provide, as necessary, respective counterpart staff, land facilities, and counterpart funding for the Project in accordance with the financing plan, cost of making land available for the Subprojects and assistance, and implementation and monitoring under the CPF and EAF (including unforeseen expenses beyond the estimates), utility relocation, general Project management expenses, and road maintenance, in a timely manner through approved annual budget allocations.	Para 3.	**Complied with**. Each project state provided necessary counterpart staff and timely funds for project implementation. Related project villages voluntarily contributed their land for the road construction.
4. Each State shall ensure that the respective IA recruits the PICs with expertise in social development and environmental management to help implement the provisions of the CPF and the EAF for all Subprojects in the State.	Para 4.	**Not complied with**. The PIC was not engaged in time for this project. However, implementation of CPF and EAF provisions was carried out by the PIUs.
B. Coordination Committees.		
5. (a) The Borrower shall ensure that within not more than 3 months of the Effective Date, a Coordination Committee is set up that shall be chaired by the MORD Joint Secretary. The committee members shall comprise senior officials of MORD, the Department of Economic Affairs, Ministry of Finance, NRRDA, and the State governments. The committee shall meet on a quarterly basis and monitor the use of Loan funds and overall implementation performance of the Project under the Facility.	Para 5.	**Complied with**. The coordination committee at the central level comprising leaders from relevant agencies was established for monitoring the use of the loan and overall implementation performance.
(b) Each State shall likewise ensure that within not more than 3 months of the Effective Date, the State level Project implementation Committee is set up in each State. Each of these committees shall each be chaired by the Chief Executive Officer of related IA and its members shall comprise representatives from respective State departments responsible for rural roads development. PIUs and consultants. As necessary other State agencies may be invited to this Committee to assist in implementing the Project in areas such as forestry, land availability etc. Each committee shall meet on a monthly basis to monitor the use of Loan funds and overall implementation performance of the project under the Facility at the respective State level.		**Complied with**. At the state level similar committees were established under PMGSY guidelines for overseeing and monitoring timely implementation of the project. Each IA at the state level was headed by a CEO responsible for overall coordination of project implementation, including planning, management, consultant selection, and procurement. Execution of the technical work was through IA regional PIUs.
C. Road Maintenance		
6. In accordance with the PMGSY Guidelines, each State shall provide adequate and timely funding for proper maintenance of the PMGSY roads. Any increases in the actual amounts to be provided shall be met by the respective State through its respective additional budget allocations, or other alternative sources of financing.	Para 6.	**Complied with.** All the project states have been allocating adequate financing for rural road maintenance as per PMGSY guidelines.
7. Each State shall ensure that the financing of maintenance of PMGSY roads as required under the PMGSY Guidelines shall not involve reduction of budgets for maintaining other roads under the responsibility of the respective State not included	Para 7.	**To be complied with**. All of the maintenance funds are provided by state fiscal expenditure. The states shall

Particulars	Reference in Loan/Project Agreement	Status of Compliance
under the PMGSY.		ensure that this will also be complied with in the future.
8. As also required under the PMGSY Guidelines, except as ADB may otherwise agree, each State shall require the respective IA (through the PIU) to ensure proper maintenance of the PMGSY roads until these are transferred to the designated zilla panchayats in accordance with the PMGSY Guidelines. Each State shall also allocate the requisite funds to the relevant functionaries (the related PIU/Zilla panchayat) for such maintenance in accordance with the requirements of the PMGSY Guidelines.	Para 8.	**Being complied with**. According to the latest arrangement, SRRDAs in both states are responsible for road maintenance after the first 5-year liability period. However, *zilla panchayats* (district governments) still participate in maintenance planning and provide comments on prioritizing maintenance activities and projects.
9. Each State shall ensure that the related PIU/Zilla Panchayat as the case may be, shall enter into further maintenance contracts with competitively procured contractors (on the basis of the standard performance-based contracts for road maintenance to be prepared by PMC under Rural Roads Sector I Project (Loan No. 2018). The contracts shall being upon completion of the initial 5-year maintenance period under the related construction contracts and shall cover routine maintenance and renewal of all PMGSY roads for further periods of not less than 5 years.	Para 9.	**Being complied with**. With the budget provided by the state governments, the SRRDA's regional PIUs employ contractors to carry out routine and periodic maintenance of all PMGSY and project roads. In general, PIUs grant 5-year contracts to contractors for the maintenance, including annual routine maintenance and one periodic maintenance for every contracted road in the contract period. The PIUs are also responsible for monitoring road conditions and developing maintenance plans according to road conditions.
D. Road Safety		
10. As part of the mid term review of the Investment Program as also the Project the Borrower, each State and ADB shall review the outcomes of the road safety program to consolidate the institutional mechanism, financing modalities and detailed implementing arrangements to further ensure sustainable road safety programs for the roads to be developed under PMGSY and the Investment Program at the national and State levels.	Para 10.	**Complied with.** The PMC consultants under Rural Roads Sector I Project developed a road safety guide and road safety campaign materials. The TSC was entrusted with reviewing the road safety program in the project states.
E. Land Availability		
11. Each state shall ensure that the respective IA implements the provisions of the CPF for all Subprojects as agreed upon with ADB and in conformity with all relevant applicable laws and regulations of the Borrower/respective State.	Para 11.	**Complied with.** CPF provisions were implemented for all subprojects.
12. Each State shall ensure that the respective IA shall, subject to compliance with the relevant provisions of the CPF and EAF/ECOP and in accordance with all relevant applicable laws and regulations of the Borrower/respective State, acquire or make available the land and rights to land free from any encumbrances, clear the utilities, trees and any other obstruction from such land, required for commencement of construction activities in accordance with the schedule agreed under the related civil works contract.	Para 12.	**Complied with**. The assessment during project formulation confirmed that the width of the existing roads would be sufficient to accommodate the right-of-way of about 7.5 meters. As a result, minimal acquisition of land would be required, for shoulder adjustment and drainage construction. No affected persons

Particulars	Reference in Loan/Project Agreement	Status of Compliance
		were relocated due to the minor scale of land acquisition.
13. (a) Each State shall ensure that the respective IA shall (i) carry out the community consultation process for all Subprojects in accordance with the PMGSY Guidelines as supplemented by the CPF, (ii) disseminate the information on process of land transfer and/or availability as the case may be support and/or assistance provisions and grievance procedures to the Project affected communities in a timely manner so that all related issues are resolved before awarding civil work contracts, and (iii) ensure that in case of voluntary land donations/transfer there are undertaken in a transparent manner under proper documentation and avoid any kind of coercion or forced donations/transfer; and in this regard shall not exercise any eminent domain or related mechanisms that may be deemed to be compulsory acquisition of land. (b) Each State shall ensure that the details of land made available in accordance with the procedures prescribed in the PMGSY Guidelines, are reflected in the local land records in a timely manner, to avoid any disputes.	Para 13	**Complied with**. Documentation for each subproject was prepared according to the CPF, EAF and ECOP. The TSC reviewed the documents for necessary compliance. The procedures in the CPF were followed to ensure participatory project preparation and that the process for land donation and/or transfer was undertaken in a transparent manner. **Complied with**. IAs carried out the community consultation process for all subprojects in accordance with the PMGSY guidelines as supplemented by the CPF, including disseminating information on process of land transfer and availability, support provisions, and grievance procedures to the project-affected communities in a timely manner. The implementing agencies ensured that voluntary land donation and transfer was undertaken in a transparent manner supported by proper documentation and avoided any kind of coercion or forced donation or transfer.
F. Execution of Civil Works Contracts		
14. Subject to compliance with the requirements of CPF and EAF/ECOP, each State shall ; (i) acquire or make available on a timely basis the land and rights in land, free from any encumbrances; and (ii) clear the utilities, trees and any other obstruction from such land, on a timely basis, i.e., strictly in accordance with the schedule as agreed under the related civil works contract, as required for construction activities relating to each section of the related civil works contract under the Subproject.	Para 14.	**Partially complied with.** Land acquisition was generally done on time; however, shifting of utilities was not done at the time of the construction activities, causing delay in some cases.
15. Each State shall ensure that subsequent to award of civil works contract under any Subproject, no section or part thereof under the civil works contract will handed over to the contractor unless the applicable provisions of the CPF, the EAF and the ECOP have been complied with	Para 15.	**Complied with**. All sections or part thereof were handed over to the contractor only after the applicable CPF, EAF, and ECOP provisions were complied with.
16. Any changes to the land alignment or environment impacts on account of detailed designs of related Subproject roads shall	Para 16.	**Complied with**. All the subproject roads acquired

Particulars	Reference in Loan/Project Agreement	Status of Compliance
be subject to prior approval by ADB or related agency (MORD) as the case may be in accordance with the Subproject selection criteria and procedures included in Schedule 2 to the FFA.		prior approval of ADB or related agency (MORD) in case of any change to the land alignment or environmental impacts.
G. Social Impacts		
17. (a) Each State 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 work sites on the risk of sexually transmitted diseases, HIV and AIDS as part of the health and safety measures for those employed during construction; (ii) follow legally mandated provisions on health, welfare, sanitation, and appropriate working conditions, including accommodation, where appropriate, for construction workers at camp sites; (iii) comply with all applicable labor laws, not employ child labor for construction and maintenance activities, and provide appropriate facilities for children of labor in construction camp sites; (iv) provide equal opportunity for women for road construction activities, and not differentiate wages for men and women for work of equal value.	Para 17.	**Complied with.** The bid documents and the civil works contracts financed under the project included provisions to disseminate information at work sites on the risk of sexually transmitted diseases , HIV and AIDS as part of the health and safety measures for those employed during construction and followed legally mandated provisions on health, welfare, sanitation, and appropriate working conditions for construction workers at camp sites. The provisions also complied with all applicable labor laws including no employment of child labor and equal pay for equal work for women.
(b) Each State shall ensure that compliance with provisions in clause (a) of this paragraph is monitored by the respective IA. The civil works contracts shall also provide for their termination by the employer for breach of any provision.	Para 18.	**Complied with**. IAs properly monitored the contractors.
18. Each State shall ensure acceptance of the Project through effective community participation in selecting and implementing Subprojects in accordance with the PMGSY Guidelines as supplemented by the CPF.	Para 19.	**Complied with**. IAs ensured that project information was disseminated and communities were consulted in accordance with the PMGSY guidelines as supplemented by the CPF.
19. In case of any significant impacts on Scheduled Tribes under any additional Subproject these shall follow the requirements as set out in the CPF as agreed by ADB. As also laid down in the CPF, for any impact on land involving traditional and tenure rights of the Scheduled Tribes, the legal provisions laid down by the Borrower and the related State pertaining to land transfer shall be followed.		**Complied with**. In areas of scheduled tribes, IAs followed the requirements in the CPF for any impact on land involving traditional and tenure rights of the scheduled tribes.
H. Environment		
20. Only those Subprojects that meet the eligibility, requirements set out in Subproject selection criteria and procedures included in Schedule 2 to the FFA, and which adhere to the relevant requirements of the PMGSY Guidelines, the CPF, the EAF and other applicable guidelines for Subproject implementation shall be eligible for financing from the Loan proceeds. Each State shall monitor the implementation of Subprojects through to the completion of each Subproject.	Para 20.	**Complied with**. Only those which met the subproject selection criteria and procedures were financed from the loan proceeds.

Particulars	Reference in Loan/Project Agreement	Status of Compliance
21. Each State shall ensure that; (i) Subprojects shall be implemented in accordance with the EAF; and (ii) relevant provisions of the ECOP identified in the Subproject preparation stage are incorporated into the Subproject designs and followed during Subproject design, construction, operation and maintenance.	Para 21.	**Complied with**. The project states incorporated standard environmental management plan in their bidding document for civil works. The contractors responded to the EAF and ECOP requirements by submitting the costs in their bills of quantities.
22. Each State shall require the related SRRDA to implement the Project in accordance with all applicable laws and regulations regarding wildlife and protected areas/forest areas for Subprojects that involve roads passing through forest areas and address these under the relevant IEE for such Subprojects. No construction work will be undertaken on sections of Subprojects that pass through a forest reserve unless clearance is granted by the Borrower's Ministry of Environment and Forest under applicable laws and regulations of the Borrower/respective State, and no Subproject shall be located within or close to an environmentally sensitive area such as a wildlife sanctuary, national park, or other areas with significant ecological functions that are declared as national parks, sanctuaries, or national/international cultural heritage.	Para 22.	**Complied with**. Assisted by the consultants, the project states monitored the implementation of the environmental mitigation measures. An ADB mission in July–August 2009 visited selected subproject roads and specifically conducted a detailed review on environmental safeguards. The review didn't reveal any serious adverse environmental impacts of the project.
I. Subproject Selection and Approval Process 23. The Borrower through MORD shall ensure that the Subprojects follow the selection criteria and promptly processed for approval by ADB as described in detail in Subproject selection criteria and procedures included in Schedule 2 of the FFA.	Para 23.	**Complied with**. All the subprojects of the project were selected and prepared based on the subproject selection criteria and procedure under PMGSY guidelines.
J. Performance Audit 24. Without limiting the generality of Section 2.09 of the Project Agreements(s), MORD shall cause each State to (i) have Project performance audits of Subprojects on a sample basis, conducted annually by independent consultants and auditors engaged by the State under PMGSY Guidelines, as acceptable to ADB, to evaluate adherence to procurement procedures and overall contract performance, and (ii) allow ADB to carry out procurement audits during Project implementation as part of its regular review process.	Para 24.	**Complied with**. The financial accounts and statements for the project were audited annually by chartered accountants, and the audited financial reports were submitted to ADB. ADB did regular procurement and disbursement audits.
K. Project Performance Monitoring and Progress Reports 25. The State(s) shall ensure that within 3 months of the Effective Date of the first Loan Agreement under the Facility, the respective IAs shall establish an investment Program Performance Monitoring System (IPPMS) in a form and substance acceptable to ADB in accordance with the Investment Program performance indicators. The IAs shall undertake periodic Subproject performance review under the Project as also for the Investment Program, in accordance with the IPPMS to evaluate the Scope, implementation arrangements, progress and achievements of objectives of the project and overall Investment Program.	Para 25.	**Complied with**. The implementation agencies, with assistance of the TSC, implemented monitoring of the socioeconomic impact of the project, including baseline survey and follow-up surveys. The monitoring reports were submitted to ADB.

Particulars	Reference in Loan/Project Agreement	Status of Compliance
26. Notwithstanding the generality of Section 2.08 of the Project Agreement(s): (a) Each State through the IA shall provide monthly progress report of Subprojects implementation under the Project in such form and detail as required by ADB (b) Based on the monthly reports provided by each State, MORD with assistance of NRRDA shall prepare and provide ADB with quarterly progress reports on subprojects' implementation in each State. Such reports shall summarize the monthly reports and include report on progress made during the period of review, use of Loan funds, achievement of Project objectives, compliance with Loan covenants, changes if any on implementation schedule, problems or difficulties encountered and remedial actions taken, and work to be undertaken in coming quarter. The reports that shall be submitted to ADB within 45 days from close of each quarter shall also include a summary financial account for the Project (including the Subprojects), expenditures to date, and report on benefit monitoring undertaken pursuant to previous paragraph of this Schedule.	Para 26.	**Complied with**. The implementation agencies prepared all monthly progress reports and submitted them to NRRDA. NRRDA submitted to ADB all the quarterly project progress reports in a timely manner.
L. Reports and Review		
27. (a) Without limiting the generality of Section 2.08 (c) of each Project Agreement and Section 7.04(d) of the Loan Regulations, the Borrower will submit to ADB a Project completion report within 3 months of physical completion of the Subprojects financed under the Loan and Facility completion report within 3 months of physical completion of the Subprojects under the Facility. These reports shall cover a detailed evaluation of the Project and the Investment Program respectively, covering the design, costs, contractors' and consultants' performance, social and economic impact, economic rate of return, and other details relating to the Project and Investment Program, for each State as may be requested by ADB.	Para 27.	**Complied with**. NRRDA prepared a domestic project completion report in the ADB requested format and submitted it to ADB before the ADB PCR mission.
(b) ADB, the Borrower and each State, shall meet regularly as required to discuss Project progress and any changes to implementation arrangements or remedial measures required to be undertaken towards achieving overall Project and Investment Program objectives.		**Complied with**. During implementation, ADB was closely involved in identifying potential problems and conducted critical activities for resolving issues related to the implementation through regular reviews. During implementation, ADB conducted 10 review missions.
(c) A mid-term review of the Project shall be undertaken by ADB, the Borrower and the States, around September 2008. The mid-term review will include review of issues and any problems or weaknesses in implementation arrangements, and agree on any changes needed to achieve the objectives of the Project.		**Complied with**. The ADB mission in December 2008 discussed and subsequently approved the waiver of the midterm review mission.
(d) A similar mid-term review of the Investment Program by ADB, the Borrower and the States shall be undertaken in the third year from date of approval of the Facility by ADB		Necessary review for the investment program was done through the review missions from time to time.

Particulars	Reference in Loan/Project Agreement	Status of Compliance
M. Inclusion of Subprojects from New States 28. PFRs for financing Subprojects in States other than Assam, Orissa, and WB shall be subject to satisfactory due diligence and preparation of relevant frameworks and other relevant documents. The Borrower and ADB shall agree on a mutually acceptable schedule to initiate these activities, within not more than 6 months of the Effective Date.	Para 28.	**Complied with**. Five loans were approved and implemented under the MFF. In the last loan, the states of Madhya Pradesh and Chhattisgarh were involved in the MFF.
N. Project Implementation Consultants (PIC) 29. The services of domestic consultants financed from the Borrower's own resources (the PIC), shall be utilized in the carrying out of the Project, particularly with regard to assisting the PIUs and the IAs in : (a) preparing additional subprojects; (b) supervising civil works; (c) Implementing the CPF to mitigate social impacts; (d) monitoring and implementing the EAF and the relevant provisions of the ECOP; and (e) Supporting in social and environmental safeguard, and road safety.	Para 29.	**Not complied with**. The project implementation consultants were not engaged as anticipated in the loan covenants. However, the PIUs with their own resources carried out all the tasks which were originally assigned to the PIC.

ADB = Asian Development Bank; AIDS = Acquired immune deficiency syndrome; CEO = chief executive officer; CPF = community participation framework; DPR = detailed project report (road design); EAF = environment assessment and review framework; ECOP = environmental code of practice; FFA = framework financing agreement; HIV = human immunodeficiency virus; IA = implementing agency; IEE = initial environmental evaluation; IPPMS = investment project performance monitoring system; MFF = multitranche financing facility; MORD = Ministry of Rural Development; NRRDA = National Rural Roads Development Agency; PCR = project completion review; PFR = periodical financing request; PIC = project implementation consultant; PIU = project implementation unit; PMGSY = Prime Minister's Rural Roads Program; SRRDA = State Rural Road Development Agency; TSC = technical support consultant; WB = West Bengal.

SUMMARY OF CIVIL WORK CONTRACT PACKAGES

Table 8.1 Summary of Civil Work Contract Packages

Items	unit	Assam	Orissa	West Bengal	Total
Before scope change					
Subprojects/Contracts	no.	139	99	92	**330**
Length Procured	km	999.21	1042.70	797.35	**2839.26**
Contracted Cost	Rs. billion	5.01	3.06	2.98	**11.05**
After scope change					
Subprojects/Contracts	no.	139	161	92	**392**
Length Procured	km	999.21	1042.70	797.35	**3309.26**
Contracted Cost	Rs. billion	5.01	3.06	2.98	**12.50**
At completion					
Subprojects/Contracts	no.	139	161	92	**392**
Length Procured	km	941.86	780.10	785.92	**2507.88**
Actual Cost	Rs. billion	4.46	2.44	2.17	**9.07**
	$ million[a]	92.62	50.77	45.18	**188.58**
Habitation Benefited	no.	527	276	700	**1,503**
>=1000 people	no.	320	113	317	**750**
>= 500 people	no.	92	95	208	**395**
>= 250 people	no.	109	43	114	**266**
< 250 people	no.	6	25	61	**92**

[a] converted using the exchange rate at project completion

Source: Executing agency's project completion report

SUMMARY OF EXISTING TRAFFIC AND FORECAST

A. Traffic Analysis and Forecast at Appraisal

1. During preparation of the project, a traffic survey was conducted to validate the traffic counts supplied by the states. These traffic counts were adjusted to annual average daily traffic and were split into motorized traffic and nonmotorized traffic. It was found that the traffic volume on the subproject roads averaged around 400 vehicles per day. The average traffic composition was 30%–35% motorized traffic and 65%–70% nonmotorized traffic. Traffic forecast was carried out based on income elasticity of the transport demand. The overall traffic growth rate was estimated to be an average of 6.5% for 2007–2017 and 6.0% for beyond 2017. The traffic forecast at appraisal by traffic types is listed in Table A9.1.

Table A9.1: Traffic Forecast at Appraisal

Period	Passenger Car		Intermediate Means of Transport		Goods Traffic	
	Elasticity	Growth	Elasticity	Growth	Elasticity	Growth
2007–2017	1.9	6.0%	2.5	8.5%	2.0	7.0%
2018–2028	1.7	5.5%	2.4	8.0%	1.9	6.5%

Source: ADB. 2007. *Report and Recommendation of the President to the Board of Directors: Proposed Multilateral Financing Facility: Rural Roads Sector II Investment Program. Supplementary Appendix H.* Manila.

B. Traffic Surveys During Implementation

2. During implementation, the technical support consultant conducted a traffic survey in June 2008 (baseline survey) on the selected sample roads of the project, including 30 project roads and 10 control roads. The technical support consultant did the follow-up traffic surveys in January 2009 on the same sample roads. In the monitoring reports,[1] changes in the vehicle composition over the surveys were analyzed. The motorized traffic on the roads surveyed primarily consisted of cars, jeeps, vans, three-wheelers, two-wheelers, and light commercial vehicles. In the nonmotorized category, bicycles and cycle rickshaws predominated. The same scenario existed on the control roads. On the project roads, a significant rise in the composition of motorized traffic was observed between the baseline and the second survey; in percentage terms it jumped from 54.24% to 58.45%, while on the control roads there was a marginal increase in motorized traffic, from 48.77% to 50.98%. In the vehicle categories of car, jeep, van, three-wheeler, and two-wheeler, the percentage increase of traffic was substantial from the baseline to the follow-up survey; on the control roads the increase in two-wheeler traffic was significant in the same period. There was a substantial decrease in animal-drawn vehicles between the first and the follow-up survey.

3. In comparing the traffic volumes in the surveys, there was significant increase in all project states, especially West Bengal. The traffic increase was much greater than that estimated at appraisal, partially contributed by the project and partially by the robust socioeconomic development in the project areas. Table A9.2 summarizes the traffic surveys (motorized vehicles only).

[1] Socio-economic Impact Assessment Report, Assam – Rural Roads Sector II Investment Program; Socio-economic Impact Assessment Report, West Bengal – Rural Roads Sector II Investment Program; Socio-economic Impact Assessment Report, Orissa – Rural Roads Sector II Investment Program; technical support consultants – Operation Research Group. July 2009.

Table A9.2: Summary of Traffic Surveys during Implementation
(vehicle AADT)

State	Truck	Bus	Tractor with Trailer	MCV	LCV	Car, Jeep, Van, 3W	2W	Total
Assam								
Before the Project I								
Total (30 PR)	176	28	258	192	523	851	1,959	**3,987**
Average (per road)	5.9	0.9	8.6	6.4	17.4	28.4	65.3	**132.9**
Composition	4%	1%	6%	5%	13%	21%	49%	**100%**
After the Project I								
Total (30 PR)	251	42	276	282	674	1,275	2,507	**5,307**
Average (per road)	**8.4**	**1.4**	**9.2**	**9.4**	**22.5**	**42.5**	**83.6**	**176.9**
Composition	5%	1%	5%	5%	13%	24%	47%	**100%**
Increased by	43%	50%	7%	47%	29%	50%	28%	**33%**
Annual Increase Rate	13%	14%	2%	14%	9%	14%	9%	**10%**
Orissa								
Before the Project I								
Total (30 PR)	87	7	124	236	263	387	891	**1,995**
Average (per road)	2.9	0.2	4.1	7.9	8.8	12.9	29.7	**66.5**
Composition	4%	0%	6%	12%	13%	19%	45%	**100%**
After the Project I								
Total (30 PR)	108	8	125	343	400	656	1,289	**2,929**
Average (per road)	**3.6**	**0.3**	**4.2**	**11.4**	**13.3**	**21.9**	**43.0**	**97.6**
Composition	4%	0%	4%	12%	14%	22%	44%	**100%**
Increased by	24%	14%	1%	45%	52%	70%	45%	**47%**
Annual Increase Rate	7%	5%	0%	13%	15%	19%	13%	**14%**
West Bengal								
Before the Project I								
Total (30 PR)	50	8	375	149	410	736	2,149	**3,877**
Average (per road)	1.7	0.3	12.5	5.0	13.7	24.5	71.6	**129.2**
Composition	1%	0%	10%	4%	11%	19%	55%	**100%**
After the Project I								
Total (30 PR)	281	29	473	400	848	2,396	4,469	**8,896**
Average (per road)	**9.4**	**1.0**	**15.8**	**13.3**	**28.3**	**79.9**	**149.0**	**296.5**
Composition	3%	0%	5%	4%	10%	27%	50%	**100%**
Increased by	462%	263%	26%	168%	107%	226%	108%	**129%**
Annual Increase Rate	78%	54%	8%	39%	27%	48%	28%	**32%**

AADT = annual average daily traffic, CR = control road, PR = project road. MCV = medium commercial vehicle. LCV = large commercial vehicle. 2W = 2 wheelers. 3W = 3 wheelers.
Source: technical support consultants.

C. Adjusted Traffic Forecast

4. During the project completion review mission, a quick traffic analysis was carried out by comparing the traffic changes on the project roads. The analysis confirmed that (i) traffic increased significantly after completion of the project roads, and (ii) the number of passenger vehicles (small passenger vehicles and buses) increased even more. This conclusion is consistent with the supplementary traffic survey conducted during the project completion review mission for the Rural Roads Sector I Project.[2] According to the site visits and interviews of villagers during the project completion review mission, it was also found that (i) socioeconomic development was booming in the project area, which generated substantial traffic demands; (ii) the construction and/or upgrading of the project roads completely changed the transport

[2] For validating the data of the traffic surveys and obtaining the latest traffic data, a due-diligence traffic survey was designed and implemented during the PCR mission for Rural Roads Sector I Project. A consultant team was recruited to carry out a 24 hour traffic count survey on 10 selected project roads (five roads in Madhya Pradesh and five roads in Chhattisgarh). The survey was carried out on 18–23 May 2011 and hourly traffic data by 12 vehicle types (nine motorized vehicle types and three nonmotorized vehicle types) were collected and analyzed.

conditions in the project areas, which significantly reduced vehicle operating costs and traveling time; (iii) vehicle ownership, especially of motorcycles, in the project states increased sharply, creating more traffic; and (iv) public transport services developed rapidly, making travel for the villagers, especially women, much more convenient.

5. Based on this analysis, the traffic prior to 2012 was adjusted by considering the results of the surveys during implementation and the supplementary traffic survey in 2011. The increase rates for future traffic on the project roads were also adjusted. It was assumed that (i) socioeconomic development would be robust and generate more traffic; (ii) passenger traffic, especially public transport services, would increase more rapidly; and (iii) the increase rates would slow down after 2017. Table A9.3 is the adjusted traffic increase rates by vehicle types. Compared with those in the report and recommendation of the President,[3] these are higher and reflect the actual traffic and faster socioeconomic development in the project area.

Table A9.3: Adjusted Traffic Increase Rates

State	Truck	Bus	Tractor with Trailer	MCV	LCV	Car, Jeep, Van, 3W	2W	Total
Assam								
Baseline—2012	46%	30%	20%	15%	15%	40%	33%	**39%**
2013—2017	8%	10%	4%	8%	8%	12%	8%	**9%**
2018—	6%	9%	4%	6%	6%	11%	9%	**9%**
Orissa								
Baseline—2012	46%	30%	20%	20%	20%	40%	33%	**30%**
2013—2017	9%	12%	5%	9%	10%	15%	10%	**11%**
2018—	7%	10%	5%	6%	7%	11%	9%	**9%**
West Bengal								
Baseline—2012	40%	15%	15%	12%	12%	35%	25%	**34%**
2013—2017	7%	9%	3%	8%	6%	10%	9%	**9%**
2018—	5%	7%	2%	6%	5%	8%	8%	**7%**

MCV = medium commercial vehicle. LCV = large commercial vehicle. 2W = 2 wheelers. 3W = 3 wheelers.
Source: Project completion review mission.

[3] ADB. 2007. *Report and Recommendation of the President to the Board of Directors: Proposed Multilateral Financing Facility: Rural Roads Sector II Investment Program.* Manila.

ECONOMIC REEVALUATION

A. General

1. The Asian Development Bank (ADB) project completion review (PCR) mission conducted an economic reevaluation of the project by comparing with-project and without-project cases using similar methodology as that at appraisal and the updated data. In the without-project case, it was assumed that the original state of the road would be retained. In the with-project case, the roads were constructed and/or upgraded; vehicles could drive at faster speeds with lower operating costs and less travel time. Also, the project was expected to generate more traffic. Economic benefits were estimated by comparing with-project and without-project cases. Consequently, the economic internal rate of return (EIRR) was calculated and sensitivity was tested. The methodology and parameters for economic reevaluation were also coordinated with other recent ADB road projects in India. The economic reevaluation was carried out for the whole project, as well as for the project states (Assam, Orissa, and West Bengal) separately.

B. Costs

2. The project costs consist of capital and maintenance costs. The actual capital cost for the whole project was about 17% lower than that estimated at appraisal, mainly due to a decrease in the scope of the project. However, the unit cost per kilometer (km) for the whole project was about 12% higher than that at appraisal.[1] Actual annual investment costs for the components in Assam, Orissa, and West Bengal 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 Rs23,500 per year per km.[2] It was also assumed that periodic maintenance would constitute about 20% of the capital cost and would take place every 5 years,[3] and its cost is spread over a 5-year period per contract as a general practice. 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 vehicle operation cost (VOC) savings, passenger travel time costs savings, and other nonquantified benefits. The benefit calculation only considered normal and diverted traffic; induced traffic was excluded from the benefit calculation.

4. The VOC savings were recalculated using unit VOC data for different road roughness, which were adopted from the report and recommendation of the President,[4] but adjusted for inflation. The VOC savings in Indian rupees per vehicle km were estimated at Rs26.8 for trucks;

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[1] At appraisal, the total cost was estimated to be $239.1 million and the total length of the roads to be rehabilitated was 3,144 km.

[2] The PCR mission was told that the average routine maintenance cost was about Rs12,000–Rs35,000 per km for the Prime Minister's Rural Roads Program (PMGSY) roads.

[3] The PMGSY guidelines state that periodic maintenance is to be conducted every 5 years.

[4] ADB. 2007. *Report and Recommendation of the President to the Board of Directors: Proposed Multilateral Financing Facility: Rural Roads Sector II Investment Program.* Manila.

Rs25.5 for buses; Rs21.5 for tractors with trailers; Rs25.1 for medium commercial vehicles (MCVs); Rs25.9 for light commercial vehicles (LCVs); Rs6.9 for cars, jeeps, and vans; and Rs2.1 for two wheelers. Average passenger vehicle speeds were assumed to be 40–50 km/hour for the with-project cases and 25 km/hour for the without-project cases. Passenger travel time cost savings were recalculated for different types of passenger vehicles. The passenger time cost was derived from the gross domestic product per capita of the project states in 2009–2010 and was estimated to increase 6%–7% each year to reflect increased incomes in the 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 unavailability of data, 10% was added to the VOCs and time cost savings to reflect other benefits, such as socioeconomic development in the project area, poverty reduction, reduced accident cost, and savings in maintenance costs for the without-project case. The benefit calculation results showed that the VOC savings constituted a major portion (about 81%–88%) of the total benefits but passenger time cost benefits are projected to increase rapidly along with socioeconomic development and increased incomes.

C. Economic Internal Rate of Return Reevaluation

5. The recalculated EIRR was 21.4% for the whole project (20.4% for Assam, 17.8% for Orissa, and 27.3% for West Bengal[5]). Compared with 18.0% at appraisal,[6] the higher EIRRs were mainly caused by much higher actual traffic levels compared to 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 results show that the project continues to be economically viable for all scenarios. For the low traffic case (20% lower than normal traffic), the EIRR was 16.8%. In the case of a combination of both a 20% maintenance cost increase and a 20% benefit reduction, the EIRR would be 17.8% for the whole project. The sensitivity test also shows that the EIRR is more sensitive to changes of benefits. Therefore, 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. The results of the sensitivity tests are in Table A10.1.

[5] The unit cost per kilometer in West Bengal is much lower than that of the other two states.

[6] In the multitranche financing facility (MFF), the overall EIRR for the sample subprojects was 18.0% (15.6% for Assam, 18.0% for Orissa, and 20.1% for West Bengal).

Table A10.1: Sensitivity Analysis

Scenarios	EIRR (%)
Base Case	21.4
Sensitivity Tests	
1 Maintenance Cost 10% Higher	21.3
2 Maintenance Cost 20% Higher	21.1
3 Traffic 20% Lower	16.8
4 Traffic 20% Higher	25.5
5 Benefits 10% Lower	19.8
6 Benefits 20% Lower	18.1
7 Benefits 10% Higher	23.0
8 Benefits 20% Higher	24.4
9 Maint. Cost 10% Higher & Benefits 10% Lower	19.6
10 Maint. Cost 20% Higher & Benefits 20% Lower	17.8

EIRR = economic internal rate of return; maint. = maintenance
Source: ADB PCR mission

6. The EIRR calculations for the whole project as well as for each state are in Tables A10.2–A10.5.

Table A10.2: Economic Reevaluation for Whole Project I

(Rs million)

	Cost			Benefit				Net	
Year	Capital	Maintain	Total	VOC	Time Cost	Others	Total	Benefit	NPV
2006	1,963.1		1,963.1					(1,963.1)	(3,088.9)
2007	3,209.5		3,209.5					(3,209.5)	(4,509.1)
2008	2,093.1	31.8	2,124.9	409.6	14.4	42.4	466.4	(1,658.5)	(2,080.5)
2009	880.8	44.7	925.5	795.1	24.4	82.0	901.5	(24.0)	(26.9)
2010		50.1	50.1	1,110.0	31.7	114.2	1,255.9	1,205.8	1,205.8
2011		50.1	50.1	1,393.3	44.2	143.7	1,581.2	1,531.1	1,367.1
2012		50.1	50.1	1,763.4	61.6	182.5	2,007.5	1,957.4	1,560.4
2013		376.0	376.0	1,912.8	71.6	198.4	2,182.8	1,806.8	1,286.1
2014		376.0	376.0	2,076.0	83.2	215.9	2,375.1	1,999.1	1,270.5
2015		376.0	376.0	2,254.5	96.6	235.1	2,586.2	2,210.2	1,254.1
2016		376.0	376.0	2,449.7	112.3	256.2	2,818.1	2,442.2	1,237.3
2017		376.0	376.0	2,663.3	130.5	279.4	3,073.2	2,697.2	1,220.1
2018		376.0	376.0	2,856.3	150.3	300.7	3,307.3	2,931.4	1,183.9
2019		376.0	376.0	3,064.8	173.1	323.8	3,561.8	3,185.8	1,148.8
2020		376.0	376.0	3,290.1	199.4	349.0	3,838.5	3,462.5	1,114.8
2021		376.0	376.0	3,533.6	229.8	376.3	4,139.7	3,763.7	1,082.0
2022		376.0	376.0	3,796.9	264.7	406.2	4,467.7	4,091.8	1,050.3
2023		376.0	376.0	4,081.8	304.9	438.7	4,825.4	4,449.4	1,019.7
2024		376.0	376.0	4,390.1	351.3	474.1	5,215.5	4,839.6	990.3
2025		376.0	376.0	4,724.0	404.7	512.9	5,641.5	5,265.5	962.0
2026		376.0	376.0	5,085.6	466.2	555.2	6,107.0	5,731.0	934.9
2027		376.0	376.0	5,477.5	537.1	601.5	6,616.1	6,240.1	908.8
2028		376.0	376.0	5,902.3	618.8	652.1	7,173.3	6,797.3	883.9
2029	(4,073.2)	376.0	(3,697.3)	6,363.1	713.0	707.6	7,783.7	11,481.0	1,333.0

Net Present Value (NPV):	11,515.7
Economic Internal Rate of Return (EIRR):	21.4%
Discount Rate:	12%

VOC = vehicle operation cost. NPV = net present value. EIRR = economic internal rate of return.
Source: ADB PCR mission

Table A10.3: Economic Reevaluation for Assam

(Rs million)

	Cost			Benefit				Net	
year	Capital	Maintain	Total	VOC	Time Cost	Others	Total	Benefit	NPV
2006	964.2		964.2					(964.2)	(1,517.1)
2007	1,576.4		1,576.4					(1,576.4)	(2,214.7)
2008	1,028.1	11.9	1,040.0	186.8	6.3	19.3	212.4	(827.6)	(1,038.1)
2009	432.6	16.8	449.4	340.8	12.5	35.3	388.6	(60.8)	(68.0)
2010		18.8	18.8	484.1	16.6	50.1	550.7	531.9	531.9
2011		18.8	18.8	618.5	23.6	64.2	706.3	687.5	613.8
2012		18.8	18.8	797.1	33.6	83.1	913.7	894.9	713.4
2013		178.9	178.9	865.1	38.8	90.4	994.3	815.4	580.4
2014		178.9	178.9	939.3	44.8	98.4	1,082.5	903.7	574.3
2015		178.9	178.9	1,020.3	51.8	107.2	1,179.3	1,000.5	567.7
2016		178.9	178.9	1,108.8	59.9	116.9	1,285.5	1,106.7	560.7
2017		178.9	178.9	1,205.5	69.2	127.5	1,402.2	1,223.3	553.4
2018		178.9	178.9	1,299.3	79.9	137.9	1,517.2	1,338.3	540.5
2019		178.9	178.9	1,401.2	92.4	149.4	1,642.9	1,464.0	527.9
2020		178.9	178.9	1,511.7	106.7	161.8	1,780.3	1,601.4	515.6
2021		178.9	178.9	1,631.8	123.3	175.5	1,930.6	1,751.8	503.6
2022		178.9	178.9	1,762.3	142.5	190.5	2,095.3	1,916.4	491.9
2023		178.9	178.9	1,904.2	164.6	206.9	2,275.7	2,096.9	480.5
2024		178.9	178.9	2,058.6	190.2	224.9	2,473.6	2,294.8	469.6
2025		178.9	178.9	2,226.6	219.7	244.6	2,690.9	2,512.0	458.9
2026		178.9	178.9	2,409.4	253.9	266.3	2,929.6	2,750.7	448.7
2027		178.9	178.9	2,608.6	293.3	290.2	3,192.1	3,013.2	438.9
2028		178.9	178.9	2,825.6	338.9	316.4	3,480.9	3,302.1	429.4
2029	(2,000.6)	178.9	(1,821.7)	3,062.2	391.6	345.4	3,799.1	5,620.8	652.6

Net Present Value (NPV):	4,947.5
Economic Internal Rate of Return (EIRR):	20.4%
Discount Rate:	12%

VOC = vehicle operation cost. NPV = net present value. EIRR = economic internal rate of return.
Source: ADB PCR mission

Table A10.4: Economic Reevaluation for Orissa

(Rs million)

	Cost			Benefit				Net	
year	Capital	Maintain	Total	VOC	Time Cost	Others	Total	Benefit	NPV
2006	528.5		528.5					(528.5)	(831.7)
2007	864.1		864.1					(864.1)	(1,214.0)
2008	563.6	9.9	573.5	89.1	2.4	9.1	100.6	(472.8)	(593.1)
2009	237.1	13.9	251.0	155.5	3.0	15.9	174.4	(76.7)	(85.9)
2010		15.6	15.6	221.0	4.0	22.5	247.4	231.9	231.9
2011		15.6	15.6	281.7	5.7	28.7	316.1	300.5	268.3
2012		15.6	15.6	361.3	8.0	36.9	406.3	390.7	311.5
2013		103.3	103.3	398.0	9.5	40.7	448.2	344.9	245.5
2014		103.3	103.3	438.6	11.2	45.0	494.7	391.4	248.7
2015		103.3	103.3	483.6	13.1	49.7	546.4	443.1	251.4
2016		103.3	103.3	533.6	15.4	54.9	603.9	500.6	253.6
2017		103.3	103.3	589.1	18.2	60.7	668.0	564.7	255.4
2018		103.3	103.3	635.0	21.0	65.6	721.6	618.3	249.7
2019		103.3	103.3	684.7	24.3	70.9	779.9	676.6	244.0
2020		103.3	103.3	738.6	28.0	76.7	843.3	740.0	238.3
2021		103.3	103.3	797.0	32.4	82.9	912.3	809.0	232.6
2022		103.3	103.3	860.3	37.4	89.8	987.5	884.2	226.9
2023		103.3	103.3	928.9	43.3	97.2	1,069.4	966.1	221.4
2024		103.3	103.3	1,003.5	50.0	105.3	1,158.8	1,055.5	216.0
2025		103.3	103.3	1,084.4	57.7	114.2	1,256.3	1,153.0	210.7
2026		103.3	103.3	1,172.2	66.7	123.9	1,362.8	1,259.5	205.5
2027		103.3	103.3	1,267.7	77.1	134.5	1,479.2	1,375.9	200.4
2028		103.3	103.3	1,371.4	89.1	146.0	1,606.5	1,503.2	195.5
2029	(1,096.7)	103.3	(993.4)	1,484.2	102.9	158.7	1,745.8	2,739.2	318.0

Net Present Value (NPV):	1,704.6
Economic Internal Rate of Return (EIRR):	17.8%
Discount Rate:	12%

VOC = vehicle operation cost. NPV = net present value. EIRR = economic internal rate of return.
Source: ADB PCR mission

Table A10.5: Economic Reevaluation for West Bengal
(Rs million)

	Cost			Benefit				Net	
year	Capital	Maintain	Total	VOC	Time Cost	Others	Total	Benefit	NPV
2006	470.3		470.3					(470.3)	(740.1)
2007	769.0		769.0					(769.0)	(1,080.4)
2008	501.5	10.0	511.5	133.7	5.8	13.9	153.3	(358.1)	(449.2)
2009	211.0	14.0	225.0	298.7	8.9	30.8	338.4	113.4	127.0
2010		15.7	15.7	405.0	11.2	41.6	457.7	442.0	442.0
2011		15.7	15.7	493.1	14.9	50.8	558.9	543.2	485.0
2012		15.7	15.7	605.0	20.0	62.5	687.5	671.8	535.5
2013		93.8	93.8	649.7	23.3	67.3	740.4	646.6	460.2
2014		93.8	93.8	698.2	27.2	72.5	797.9	704.1	447.5
2015		93.8	93.8	750.6	31.7	78.2	860.5	766.7	435.1
2016		93.8	93.8	807.3	37.0	84.4	928.7	834.9	423.0
2017		93.8	93.8	868.7	43.1	91.2	1,003.0	909.2	411.3
2018		93.8	93.8	922.0	49.4	97.1	1,068.5	974.7	393.7
2019		93.8	93.8	978.9	56.5	103.5	1,139.0	1,045.2	376.9
2020		93.8	93.8	1,039.8	64.7	110.4	1,214.9	1,121.1	361.0
2021		93.8	93.8	1,104.8	74.1	117.9	1,296.7	1,203.0	345.8
2022		93.8	93.8	1,174.3	84.8	125.9	1,385.0	1,291.2	331.4
2023		93.8	93.8	1,248.6	97.1	134.6	1,480.2	1,386.4	317.7
2024		93.8	93.8	1,328.0	111.1	143.9	1,583.1	1,489.3	304.7
2025		93.8	93.8	1,413.0	127.2	154.0	1,694.3	1,600.5	292.4
2026		93.8	93.8	1,503.9	145.6	165.0	1,814.5	1,720.7	280.7
2027		93.8	93.8	1,601.2	166.7	176.8	1,944.7	1,851.0	269.6
2028		93.8	93.8	1,705.3	190.8	189.6	2,085.8	1,992.0	259.0
2029	(975.9)	93.8	(882.2)	1,816.8	218.5	203.5	2,238.8	3,121.0	362.4

Net Present Value (NPV):	4,863.6
Economic Internal Rate of Return (EIRR):	27.3%
Discount Rate:	12%

VOC = vehicle operation cost. NPV = net present value. EIRR = economic internal rate of return.
Source: ADB PCR mission

SOCIOECONOMIC IMPACT
RURAL ROADS SECTOR II INVESTMENT PROGRAM, PROJECT 1

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 barrier to realizing socioeconomic growth potential in these areas. In an effort to address this issue, the government established a national rural roads program, the Prime Minister's Rural Roads Program (PMGSY), in 2000. The 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 was requested for funding from development partners.[1] The Asian Development Bank (ADB) has provided a series of loans to the government, beginning with the Rural Roads Sector I Project[2] in the states of Madhya Pradesh and Chhattisgarh, followed by the Rural Roads Sector II Investment Program[3] using the multitranche financing modality for the amount of $750 million. The investment program's first tranche of $180 million was approved by the ADB Board of Directors on 31 July 2006 and became effective on 18 October 2006. The project provided assistance to three states—Assam, Orissa, and West Bengal. 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 state rural roads development agencies at the state level (Assam State Road Board, Orissa State Rural Roads Agency, and West Bengal State Rural Development Agency). A total of 2,927.13 kilometers (km) of all-weather rural roads with 7.5 meters (m) roadway width and 3.75 m carriageway were constructed and/or upgraded to connect 1,503 habitations, benefitting approximately 2 million people.[4] Table A11.1 provides the detailed breakdown of construction output. The project closed on 30 June 2009.

Table A11.1: Project Output

Item	Assam	Orissa	West Bengal	Total
Total length of roads rehabilitated	942	1,199	786	2,927
Number of habitations connected	527	276	700	1,503

Source: Executing agency

2. In the three states, about 75% of people live in rural areas, and the majority of rural habitations did not have all-weather road connections. The poverty head count rate in these three states was among the highest in India. According to Planning Commission and National

[1] A habitation is the unit used by the PMGSY. A habitation is a population cluster living in an area, the location of which does not change over time. It is not a revenue village or a *panchayat* (village government). Commonly used terms to describe a habitation are *desam*, *dhanis*, *tolas*, *majras*, and hamlets. An unconnected habitation is one with a population of designated size located at a distance of at least 500 meters or more (1.5 kilometers of path distance in case of hills) from an all-weather road or a connected habitation. For estimating the number of beneficiaries, 750 habitations had populations of 1,000 or more, 375 were between 500 and 1,000, 266 were between 250 and 500, and 92 were below 250. Population was based on the 2011 government census. Average populations of 2,000, 750, 375, and 125 were used as an estimate for each category of habitation. A decadal growth rate of 10.4% was used for rural population growth between 2001 and 2011.

[2] ADB. 2003. *Rural Roads Sector I Project*, Manila. (Loan 2018-IND, $400 million)

[3] ADB. 2006. *Rural Roads Sector II Investment Program*, Manila. (MFF, $750 million)

[4] The rehabilitations consisted of (i) strengthening and widening roads, (ii) adding asphalt surface to the existing roads, and (iii) adding structures to enhance road protection.

Sample Survey Organisation data for 2004–2005 and calculation based on uniform reference period, the percentage of people living below the poverty line in rural areas was 22% in Assam, 47% in Orissa, and 29% in West Bengal. The percentages are higher than the all-India value of 28% for Orissa and West Bengal and lower for Assam.

3. The project, being part of the PMGSY initiative, strategically focused on the poor through provision of 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. In addition, the theme of ADB's country strategy and program for 2003–2006[6] was mainstreaming poverty reduction. Specifically, the country strategy and program focused on 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 and employment, as well as through reducing human poverty by improving access to social services. After implementation, it was observed that the project was highly relevant to the government and ADB's objectives, policies, and strategies. More importantly, the project had a remarkable positive socioeconomic impact on the 1,503 habitations that became connected.

II. SCOPE AND METHODOLOGY

4. **Scope.** A multiyear study was undertaken to gauge the socioeconomic impact of the project. The survey monitored a sample of 15 habitations in 15 districts in the three states. The all-weather roads also benefited habitations that are connected by unpaved roads that branch off from the PMGSY roads. All data and analysis from this appendix are derived from the socioeconomic impact assessment reports for the three states prepared by the technical support consultants engaged by the National Rural Roads Development Agency (NRRDA).[7]

5. **Study approach.** The approach involved four different types of surveys to assess the impact of the project on road users and inhabitants living along the road between May 2008 and January 2009. The "before-after, with-and-without" approach was selected by the NRRDA, 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. A baseline survey for the selected project and control roads and habitations was conducted. After project completion, a final survey was conducted to assess the same sample and control roads and habitations.

6. **Survey instruments.** The survey instruments used to assess socioeconomic impact were (i) sample inhabitants' perception obtained through focus group discussion, (ii) habitation primary data collected through key informant interviews, (iii) habitation primary data collected through community self monitoring, and (iv) household tracer study consisting of surveying 10 households per habitation of varying economic condition. Table A11.2 provides additional detail regarding the survey instruments and their scope in the three states.

[5] http://planningcommission.nic.in/plans/planrel/fiveyr/welcome.html

[6] ADB. 2006. *Country Strategy and Program; India. 2003–2006.* Manila.

[7] Socio-economic impact assessment reports for Rural Roads Sector II Investment Program were prepared by Operations Research Group. Separate reports were prepared for Assam, Orissa, and West Bengal.

Table A11.2: Survey Instruments and Scope

Survey	Source	Frequency	Assam	Orissa	West Bengal
Habitation perception	Focus group discussions	Annual	15 SHs	15 SHs	15 SHs
			15 CHs	15 CHs	15 CHs
Habitation primary data	Key informant interview	Annual	15 SHs	15 SHs	15 SHs
			15 CHs	15 CHs	15 CHs
Habitation primary data	Community self-monitoring	Semi-annual	5 SHs	5 SHs	5 SHs
Change process	HH tracer study	Semi-annual	50 HHs	50 HHs	50 HHs

CH= control habitation, HH = household, and SH = sample habitation.
Source: Executing agency

7. **Selection process.** Thirty project roads were selected from each state 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 higher level of socioeconomic activity along the road was selected as the sample habitation to be surveyed for socioeconomic baseline and impact; 45 habitations were surveyed from the three states.

8. Roads and habitations with comparable socioeconomic environments were selected to act as the counterfactual. 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 the second quarter of 2011, the Asian Development Bank (ADB) fielded missions to the three states to validate the data collected during the study, as well as to gather anecdotal information that would deepen the analysis of the data. Focus group discussions were held in eight sample habitations and eight control habitations in the three states with a cross-section of the community represented, including women and youth.[8]

10. **Limitations of method.** Several limitations were observed during the assessment:

(i) The sample size of the study was fairly limited, encompassing 45 habitations in the three states where habitation perception and primary data were collected and only 15 habitations where the household tracer surveys were conducted. The sample size only represented about 3% of the total number of habitations that were connected under the project.

(ii) The completion date of the roads varied between early 2008 and mid-2009, while the final surveys were all conducted in January 2009, sometimes before the road was completed. Therefore, the amount of time for socioeconomic impacts to realize varied between villages, and in some cases, had not even been realized and therefore not fully captured. It was observed that habitations that had been connected for a longer period had higher overall socioeconomic indicators than those habitations that had only been recently connected.

(iii) Self-estimating was difficult for some informants during the surveys, therefore leading to potential biases. For example, farmers had difficulties estimating their

[8] The villages visited were located in Bongaigaon, Kamrup (rural), and Tinsukia districts in Assam; Balasore, Dhenkanal, and Puri districts of Orissa; and North 24 Parganas and Hooghly districts of West Bengal.

income or expenditure because it 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 nonmotorized vehicles was also hard to verify, especially in larger habitations.

(iv) During the final survey, some of the control habitations were either connected, or the earthen road had been improved. This led to a smaller variance in socioeconomic improvements between sample habitations and control habitations.

(v) The improvements in socioeconomic standings 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. SOCIOECONOMIC IMPACT IN PROJECT AREA

11. Lack of connectivity and remoteness of habitations are major hurdles for the rural population in securing productive employment and income opportunities, accessing health care 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 nonmotorized vehicles;
(iii) long journey times, especially during the rainy season;
(iv) low levels 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 nonpermanent materials.

12. The studies indicate that connectivity has impacted rural living conditions in two main ways: (i) giving the communities more reliable and quicker access to outside products, services, information, and social links; 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.

13. The presence of all-weather roads has directly or indirectly contributed to improvements in connectivity, transportation, access to government services, livelihood, commercial activities, education, health, land value, building material, social interactions, and gender empowerment. Overall, the aggregate impact has been a contribution to poverty alleviation in rural communities in the three states. Due to the limitations of this study (para. 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 it can be forecasted that the number of households living below the poverty line will continue to decrease over time.

A. Connectivity

14. As per its main objective, 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, educational institutions, information, and family and friends living elsewhere. According to household tracer survey conducted in the three states, the average distance to the workplace increased by about 0.5 km, whereas the average time taken to reach the workplace decreased by 0.6 hours. This demonstrates that, with improved connectivity, inhabitants are able to expand the area where they seek employment and that although the distance increases the travel time decreases. During data validation survey, villagers in Lotibari II Village in Bongaigaon District of Assam reported that the journey time to the nearest town 7 km away took 1–3 hours by bicycle (during the rainy season) prior to connectivity. Since being connected, the journey takes 15–20 minutes by motorcycle or 30 minutes by bicycle.

15. For people outside of the village, PMGSY roads allow government workers—including health workers, teachers, and agriculture extension workers—to have easier access to the habitations in order to provide services and information to rural communities. The roads also promote greater social interaction 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 a partner who is a nonresident.

B. Transportation

16. **Public transportation.** Buses, jeeps, vans, and three-wheelers provide reliable public transportation for newly connected villages to and from nearby towns and cities. In sample habitations in the three states, an average 50% increase in buses, 150% increase in jeeps, and 50% increase in taxis were observed to be serving habitations daily. During the same period, control habitations saw a decrease in public transportation services. Women utilize public transport but some preferred to use it with a group or with male family members. However, when it was necessary, women were comfortable using public transportation by themselves.

17. **Private transportation.** Table A11.3 details the change in percentage of motorized versus nonmotorized vehicles on project roads versus control roads during the two survey periods.

Table A11.3: Motorized Versus Nonmotorized Vehicles on Project and Control Roads

	June 2008		January 2009		Change in Motorized Traffic	
Item	**Project Road**	**Control Road**	**Project Road**	**Control Road**	**Project Road**	**Control Road**
Assam						
Motorized Traffic	54.24%	48.77%	58.45%	50.98%	4.21%	2.21%
Non-motorized Traffic	45.76%	51.23%	41.55%	49.02%	-	-
Orissa						
Motorized Traffic	25.55%	24.02%	32.10%	29.12%	6.55%	5.10%
Non-motorized Traffic	77.07%	75.98%	70.52%	70.88%	-	-
West Bengal						
Motorized Traffic	18.48%	25.27%	24.75%	33.93%	6.27%	8.66%
Non-motorized Traffic	81.52%	74.73%	75.25%	66.07%	-	-

Source: Executing agency.

18. The study observed an overall increase in private ownership of motorized and nonmotorized vehicles in project habitations. Most notably, there has been a large increase in the number of motorcycles. Motorcycles are nearly always operated by men, however in a few sample habitations women were using automatic scooters (mopeds). Some women health workers were using scooters to travel between habitations. For nonmotorized vehicles, there

has been a decrease in the number of bicycles; however, it was observed that it was the main mode of transportation for students to reach school. The number of bullock carts is still increasing, although at a slower rate. With more time, it can be envisaged that the number of motorized vehicles will continue to increase while the number of nonmotorized vehicles will decrease.

C. Access to Government Services

19. **Government programs and schemes.** The government and state governments operate a variety of schemes and programs to delivers basic social infrastructure to rural areas. The government has identified several elements of social and economic infrastructure critical to the quality of rural life, including infrastructure, livelihood, education, health, training and employment, welfare, and governance.

20. Based on the data validation focus group discussions, prior to connectivity most rural habitants had difficulties in obtaining information about the different schemes and even more difficulties in accessing them. Due to the improved connectivity, rural populations now have better access to all government schemes through access to information at government offices at the block and district level as well as being informed through a variety of media. Specific government schemes operating in the habitations are discussed in subsequent sections.

21. **Security**. In areas of unrest with frequent attacks by insurgency groups, better roads have allowed government security forces better access to remote habitations in order to provide security. For example, in the previously insurgency-affected Assam, communities noted that the security situation has improved following the improvements in the rural road network.

D. Livelihood

22. Improved connectivity has boosted the overall levels of livelihood opportunities for rural inhabitants. Easier access to markets has led to an increase in income levels. Better links have also increased overall per capita expenditure levels. During data validation focus group discussions, it was found that there was 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. Through focus group discussions, it was found that the per capita spending has increased by as much as 50% in the three states. Savings levels have increased dramatically in some socioeconomic groups but have declined somewhat in the non-poor and ultra-poor groups. The focus group discussions found that, for those villagers who reported a decline in savings, expenditures were mostly for one-time large ticket items. For the non-poor, the large ticket items were typically motorcycles or upgrading of mobile phones; for the ultra-poor, it was typically for household goods or agricultural inputs. Villagers believed that, in the long run, savings levels would increase due to better connectivity.

1. Agriculture

23. Agriculture is the main source of livelihood in project-affected areas. Transport improvements have helped farmers in two main ways: (i) better access to inputs such as knowledge, equipment, and materials, which improves yield and reduces risk; and (ii) reduced transport cost to markets.

24. In the three states it was seen that there were increased extension services offered by government agricultural extension officers and *gram sewaks* (local officers) to the habitations.

There was a 400% increase in the number of visits by gram sewaks and a 200% increase in visits by agriculture extension officers in most sample habitations. The 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 such as the Promotion of Integrated Pest Management that started in 1991 and the Campaign for Seed Treatment in 2007.[9] In Orissa, there has been about a 5% increase in farmers utilizing crop diversification 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 a more efficient, time saving, and profitable process of cultivation. Farmers also indicated that there has been a change in cropping pattern; with the added efficiency and inputs, farmers are now switching from food crops to cash crops such as wheat, soybean, maize, jute, and sugar cane. There has also been an increase in cropping intensity as a result of improved agricultural trade.

25. The roads have allowed more farmers to visit *haats* (nearby markets). For example, in West Bengal, 20% more farmers are now visiting haats regularly. Connectivity has also reduced transport costs to markets, mainly by decreasing the amount of produce being spoiled or damaged during transit and increasing the amount of produce able to be transported. Previously, farmers and women would utilize bullock carts to transport large loads or carry small loads such as vegetables either on the back of a bicycle or on their heads while walking. After connectivity, farmers use tractors or motorcycles to quickly and efficiently bring products to the haats. Farmers reported a reduction of around 15% in the amount of produce being spoiled, wasted, or damaged while in transit in the three states. Farmers also noted that many more products were able to reach the market.

2. Government Employment Programs

26. Connectivity has improved the delivery and implementation of different types of schemes operated by the government and state governments. Villagers who qualify subscribe to employment programs under the National Rural Employment Guarantee Act, 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.[10] In nearly all habitations, officials noted that all persons who qualify in the habitation subscribed to the scheme.

27. Most habitations operated multiple self-help groups for women. These groups were either started by the Swarnjayanti Gram Swarozgar Yojana scheme of the government or by nongovernment organizations. The scheme's objective is to bring the assisted poor families above the poverty line by providing training and assistance to set up income-generating enterprises. The scheme is based on local requirements. Most frequently, groups are involved in sewing or providing midday meals for local schools. The surveyors also found that a small percentage of women owned or operated micro enterprises in the habitations.

3. Female Employment

[9] http://india.gov.in/citizen/agriculture/viewscheme.php?schemeid=1816; http://india.gov.in/outerwin.php?id=http://dacnet.nic.in/ppin/Seedtreatment.htm

[10] Government of India. 2008. *NREGA Operating Guidelines.* New Delhi.

28. Women have benefited greatly from improved connectivity. Road connectivity has increased the mobility of women as they can now travel alone in buses and on bicycles to and from nearby towns and cities. Focus group discussions during data validation revealed that, since connectivity, there were more women's self-help groups as well as more women working outside of the home in positions such as government workers, shopkeepers, and daily wage laborers.

29. There has also been an increased role for women in local governance. It was revealed during focus group discussions that, throughout the three states, at least 50% of the habitations had a woman as the *sarpanchni* (the democratically elected head of a village 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

30. The general level of commerce in rural habitations is low. The number of micro enterprises at the habitation level has been slowly increasing. In the three states, the survey estimates an increase of about 1.5% in terms of 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. Some examples are tailors, motorcycle and bicycle repairers, blacksmiths, seed and fertilizer shops, DVD shops, jewelers, barbers, and shoe repairers.

31. Villagers have reliable access to financial services. For the purchase of motorcycles, most villagers indicated they utilize their own savings, however some villagers also indicated that they take out a loan for the purchase. For larger vehicles such as a tractor, farmers are able to access financing plans through the dealer.

F. Education

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

33. Travel time to education facilities outside of the habitation has decreased since connectivity and more young people are taking advantage of higher-education opportunities in nearby towns and major cities. For example, in the habitation of Upper Golasahi in Puri District in Orissa, prior to connectivity three young people pursued secondary education outside of the habitation; now there are 19 young people studying outside, with five enrolled in university. Overall in the three states, the level of education increased by 2% for inhabitants who

completed grade 12 and above, by b3% for the completion of grades 10–12, and by 3% for grades 5–10; there was a decrease of 4% for those who are uneducated.

34. Connectivity has improved teacher attendance by about 5% and increased the amount of time teachers spend in the school. Villagers reported that prior to road construction teachers would show up to school during the rainy season but would arrive late and leave early. Therefore, the increase of 5% in teacher attendance rate may underestimate the actual impact of connectivity on teacher attendance rate. The number of teachers at the primary school level has also increased after the construction and/or upgrading of roads. From anecdotal information collected during validation in Assam, a retired government education officer also noted the improvements in teaching quality due to more frequent trainings for teachers as well as more frequent monitoring visits from government officials.

35. Improved transport has improved school attendance rates through safer travel and the implementation of government schemes. In the three states, the percentage of unenrolled children at the primary school level dropped by about 16%. Parents reported that improved connectivity has led to an increase in the number of girls in attendance. Most parents mentioned that they were now more confident about sending their daughters to schools unescorted. In the case of education, the government-sponsored midday meal scheme for up to grade 8 was established in 1995.[11] However, prior to connectivity, villagers reported that, although the scheme was in place, it could not be implemented effectively due to shortages of rice and pulses, especially during the rainy season. Since connectivity the program has been fully implemented. The program has helped to improve student attendance rates and has contributed to increased employment for rural women, who typically are involved in organizing and cooking the midday meals.

G. Health

36. Prior to connectivity, the availability of health services was reported to be poor in the habitations, despite many habitations having a multipurpose health worker whose job was to provide basic health care, including immunization. Attendance rates of these health workers varied greatly and some were spending very little time in each habitation due to long travel times. Transportation options for carrying sick people or pregnant women to health care institutions were by bullock carts, on the shoulders of adult male, or by hiring a tractor. The safe delivery rate was high in the states, partly due to the traditional *dhai* (or midwife) system attending to deliveries. The safe birth rate was above 93% for the three states.

37. 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 by as much as 120 minutes during the rainy season in some habitations. In the three states, the frequency of visiting a clinic or hospital increased by 2% for those visiting at least once a month.

38. Multipurpose health workers reported that they were spending more time in each community due to shortened travel time. Many now travel by motorcycle, moped, or bicycle in between the habitations they service. The connectivity has also helped the implementation and delivery of the National Rural Health Mission aimed at strengthening the Panchayati Raj institutions and promoting access to improved health care through the Accredited Female

[11] http://india.gov.in/outerwin.php?id=http://education.nic.in/mdm/mdm.asp

Health Activities. The scheme also strengthens existing primary health care centers and community health centers.

39. Neonatal and maternal health has improved due to all-weather connectivity. Difficult pregnancies and deliveries have benefitted the most. The government implemented the Janani Suraksha Yojana Scheme and Sukhibhava Schemes [12] in 2003 but, without good connectivity, service delivery was reported to be nonexistent. Communities such as Hahkhati in Tinsukia District of Assam now report that the schemes are fully utilized and nearly 100% of all births are taking place in government health care facilities, and most are taking full advantage of ambulatory services provided under the scheme. Ambulatory care was rated as quick and dependable.

H. Land Value

40. When comparing the land value of sample habitations versus nearby control habitations, the land price per acre increased on average by about five times in connected habitations.

41. The price increase can be partially attributed to better connectivity but is also caused by factors such as (i) habitations receiving a new or improved irrigation scheme during the period of road construction, (ii) an increase in habitation population (normally about 1% per annum), and (iii) villagers choosing to stay in the community instead of seeking employment outside after better connectivity. The demand for land had increased dramatically in some habitations. It can be forecasted that, as time passes, land values in connected rural habitations will continue to climb with improved access coupled with increased demand.

I. Building Materials

42. A clear distinction is present between the construction materials used for homes and public buildings in connected habitations versus 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. It was observed during the validation mission that many villages along newly connected roads had started a brick-making facility in order to provide building materials to newly connected habitations. Buildings in unconnected areas are mostly characterized by the use of non- or semi-permanent building materials such as mud, thatch, straw, and other natural materials.

J. Social Interactions

43. Unconnected habitations are not only characterized by economic isolation but also by social isolation; communities have limited interactions with relatives from outside the habitation. Women who were married into Champta village in Hooghly District in West Bengal conveyed that, prior to all-weather connectivity, they averaged one visit per year to their families and relatives. After connectivity, they visit their families more frequently for festivals and other major events.

[12] 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 post-partum care. Women undergo delivery in a government health care institution, i.e., teaching hospitals, district headquarters hospitals, area hospitals, community health centers, and other government hospitals. http://india.gov.in/citizen/health/janani_suraksha.php

44. One common grievance that was seen in unconnected habitations in all states was that parents found it difficult to marry 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 Hahkhati village in Tinsukia District of Assam, community members noted that, during the 2 years prior to connectivity, because of remoteness there were no marriages in the village.

K. Gender Empowerment

As indicated in the previous sections, rural women from all socioeconomic background have benefited from the construction of all-weather roads. Most notably, there has been an overall improvement in access to health and education facilities for women. As indicated in paras. 34–37, there has been a dramatic decrease in the journey time between habitation and government health facilities, leading to a reduction in maternal and neonatal deaths. For education, parents are now more confident and willing to send their daughters to schools and colleges, as the transportation to school, especially to higher levels of education, is more reliable. Children now cycle or take the bus to school or college instead of walking.

IV. NEGATIVE IMPACT

A. Road Safety

45. Several negative impacts were observed or envisioned after the completion of project roads. The foremost impact is increased traffic movement. 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 by bicycles to travel to schools. Villagers suggested the installation of prominent signage and speed breakers near community infrastructure. In the surveyed habitations, it was noted that there has not been any major accidents causing serious injury or death on project roads. Project roads in West Bengal and Orissa were observed to already have incorporated prominent road safety features into the design.

B. Potential Degradation of Natural Resources

46. It is envisaged that improved roads will be a catalyst for urbanization and commercialization. Forests and natural resources which were earlier inaccessible to outsiders will become more accessible. If not properly managed, this may cause depletion and illegal extraction of natural resources. By providing improved access, there has already been an increase in coal mining in certain areas of Assam due to easy transportation of materials.

C. Outward Migration

47. 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 in providing additional livelihood opportunities to previously isolated populations. However, in focus group discussions, some inhabitants voiced concern that, in the medium and long run, the phenomenon of 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 are likely to remain in the rural areas.

D. Loss of Livelihood

48. In cases were households donated land for the PMGSY project, a temporary production loss 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 National Rural Employment Guarantee Act to affected persons.

E. HIV/AIDS and Trafficking

49. During the study and focus group discussions, no negative impact of the road related to HIV/AIDS transmission or human trafficking were identified in project-affected habitations in the three states.

V. CONCLUSION

50. Connectivity has impacted rural living conditions by giving communities more reliable and quicker access to outside products, services, information, and social links, and by 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 connectivity, transportation, access to government services, livelihood, commercial activities, education, health, land value, building materials, social interactions, and 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.

51. Overall, nearly all socioeconomic indicators for connected habitations have increased. However, as previously mentioned, socioeconomic improvements and poverty alleviation cannot be solely attributed to improved road connectivity as there are various external factors that contribute to higher standards of living, such as the implementation of government schemes and other infrastructure projects as well as development of industries in the vicinity. The living conditions in connected habitations continue to improve and it can be forecasted that the number of households living below the poverty line will continue to decrease.

52. Being ADB's second intervention in rural roads in India, the project has provided valuable lessons for the design and implementation of subsequent rural roads projects in order to maximize socioeconomic gains. However, most importantly, the project has provided important lessons for evaluating subsequent rural road projects. The Rural Connectivity Investment Program that is currently under preparation will incorporate a more robust impact evaluation arrangement to better yield quantitative measurements of ADB's efforts in supporting the government's PMGSY scheme.

53. 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 develop, 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.

SUMMARY OF THE MULTITRANCHE FINANCING FACILITY

Table A12.1 Summary of the Multitrance Financing Facility – Rural Roads Sector II Investment Program

Item	Project 1	Project 2	Project 3	Project 4	Project 5	MFF Total
Loan No.	2248-IND	2414-IND	2445-IND	2535-IND	2651-IND	
Batch of Subprojects and States	Batch I in Assam, Orissa and West Bengal	Batch II in Orissa	Batch II in Assam and West Bengal	Batch III in Assam, Orissa, and West Bengal	Batch I in Chhattisgarh and Madhya Pradesh, Batch IV in Orissa, and West Bengal	
Road Length anticipated (km)	2,507.88	1,200.00	1,670.00	3,111.62	4,708.44	**13,197.94**
Habilitations Impacted (no.)	1,503					
Loan Amount (original)	$180.00 million	$77.65 million	$130.00 million	$185.00 million	$222.20 million	**$794.55 million**
Loan Amount (actual or revised)	$173.90 million	$53.55 million				
ADB Approval	31 July 2006	17 March 2008	26 September 2008	7 August 2009	6 July 2010	
Loan Agreement Singning	29 August 2006	28 March 2008	10 November 2008	3 September 2009	2 August 2010	
Loan Effective	18 October 2006	9 July 2008	5 January 2009	26 November 2009	29 October 2010	
Loan Closing (original)	31 December 2008	31 December 2009	31 December 2010	30 June 2012	30 June 2013	
Loan Closing (extended)	30 June 2009	31 December 2010	31 December 2011			

ADB = Asian Development Bank; MFF = multi-tranche financing facility; km = kilometer.
Note: The data for project 1 are actual.
Source: http://www.adb.org/projects/project.asp?id=37066; the PCR mission.