Completion Report

Project Number: 37066
Loan Number: 2535
June 2014

India: Rural Roads Sector II Investment Program (Project 4)

Asian Development Bank

CURRENCY EQUIVALENTS

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

		At Appraisal (31 October 2005)	At Project Completion (31 December 2012)
Rs1.00	=	$0.022	$0.018
$1.00	=	Rs44.995	Rs54.810

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
FFA	–	framework financing agreement
IEE	–	initial environment examination
km	–	kilometer
LIBOR	–	London interbank offered rate
m	–	meter
MFF	–	multitranche financing facility
MORD	–	Ministry of Rural Development
NCB	–	national competitive bidding
NRRDA	–	National Rural Roads Development Agency
PCR	–	project completion review
PFR	–	periodic financing request
PIC	–	project implementation consultant
PIU	–	project implementation unit
PMGSY	–	*Pradhan Mantri Gram Sadhak Yojana* (Prime Minister's Rural Roads Program)
QCBS	–	quality- and cost-based selection
SRRDA	–	State Rural Roads Development Agency
TOR	–	terms of reference
TSC	–	technical support consultant
VOC	–	vehicle operating cost

NOTES

(i) The fiscal year (FY) of the government of India and the state government ends on 31 March. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2010 ends on 31 March 2010.

(ii) For an explanation of rating descriptions used in ADB evaluation reports, see: ADB. 2006. *Guidelines for Preparing Performance Evaluation Reports for Public Sector Operations.* Manila.

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

Vice-President	W. Zhang, Operations 1
Director General	J. Miranda, South Asia Department (SARD)
Director	H. Yamaguchi, Officer-in-Charge, Transport and Communications Division, SARD
Team leader	A. Heriawan, Transport and Communications Division, SARD
Team member	T. Prado, Transport and Communications Division, SARD

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BASIC DATA

A. Loan Identification

1.	Country	India
2.	Loan Number	Loan 2535-IND
3.	Project Title	Rural Roads Sector II Investment Program (Project 4)
4.	Borrower	India
5.	Executing Agency	Ministry of Rural Development at the central government level; governments of Orissa, West Bengal, and Assam at the state level
6.	Amount of Loan	$185.00 million
7.	Project Completion Report Number	IND 1450

B. Loan Data

1.	Appraisal	
	– Date Started	1 August 2005
	– Date Completed	5 August 2005
2.	Loan Negotiations	
	– Date Started	29 July 2009
	– Date Completed	29 July 2009
3.	Date of Board Approval	7 August 2009
4.	Date of Loan Agreement	3 September 2009
5.	Date of Loan Effectiveness	
	– In Loan Agreement	90 days from the Loan Agreement
	– Actual	26 November 2009
	– Number of Extensions	None
6.	Closing Date	
	– In Loan Agreement	30 June 2012
	– Actual	31 December 2012
	– Number of Extensions	1
7.	Terms of Loan	
	– Interest Rate	London interbank offered rate-based
	– Commitment Charge	0.15%
	– Maturity (number of years)	25
	– Grace Period (number of years)	5
	– Front-end Fee	0

8. Disbursements

a. Dates

Initial Disbursement	**Final Disbursement**	**Time Interval**
17 February 2010	23 April 2013	39 months
Effective Date	**Original Closing Date**	**Time Interval**
26 November 2009	30 June 2012	31 months

b. Amount ($)

Category	Original Allocation	Last Revised Allocation[a]	Amount Increased/ (Canceled)	Amount Disbursed	Undisbursed Balance
1. Goods and Works	184,600,000	184,774,222	174,222	184,774,310	(88)
2. Consulting Services	400,000	225,778	(174,222)	225,690	88
Total	**185,000,000**	185,000,000	0	185,000,000	0

( ) = negative.
[a] The last loan allocation was made on 25 February 2013.

9. Local Costs (Financed)

–	Amount ($ million)	0.00
–	Percentage of Local Costs	0.00
–	Percentage of Total Cost	0.00

C. Project Data

1. Project Cost ($ million)

Cost	Appraisal Estimate	Actual
Foreign Currency Cost		
Local Currency Cost		
Total	**239.80**	**248.35**

Note: At project preparation in 2009, the project cost was not estimated by foreign currency and local currency.

2. Financing Plan ($ million)

Cost	Appraisal Estimate	Actual
Implementation Costs		
Borrower Financed	46.95	61.44
ADB Financed	185.00	185.00
Total	**231.95**	**246.44**
Financial Charges[a]		
Borrower Financed	7.85	1.91
ADB Financed		
Total	**7.85**	**1.91**

[a] Including interest during construction and commitment fee.
ADB = Asian Development Bank.

3. Cost Breakdown by Project Component ($ million)

Component	Appraisal Estimate	Actual
Road Connectivity Component	230.75	245.74
Consulting Services	1.20	0.70
Financial Charges	7.85	1.91
Total	**239.80**	**248.35**

4. Project Schedule

Item	Appraisal Estimate	Actual
Assam		
Clearance of right-of-way	Before construction activity	Q1 2008–Q3 2008
Procurement for civil work contracts	Q1 2009–Q2 2009	Q1 2009–Q4 2009
Civil works	Q3 2009–Q4 2011	Q4 2009–Q3 2013
Orissa		
Clearance of right-of-way	Before construction activity	Q1 2008–Q2 2008
Procurement for civil work contracts	Q4 2008–Q2 2009	Q4 2008–Q4 2011
Civil works	Q3 2009–Q4 2011	Q1 2009–Q2 2013
West Bengal		
Clearance of right-of-way	Before construction activity	Q1 2008–Q2 2009
Procurement for civil work contracts	Q1 2009–Q2 2009	Q1 2009–Q2 2009
Civil works	Q3 2009–Q4 2011	Q2 2009–Q4 2013
Technical Support Consultants	Q3 2008–Q4 2011	Q2 2007–Q4 2013

Q = quarter.

5. Project Performance Report Ratings

	Ratings	
Implementation Period	**Development Objectives**	**Implementation Progress**
From 31 August 2009 to 31 December 2009	Satisfactory	Satisfactory
From 1 January 2010 to 30 June 2010	Satisfactory	Satisfactory
From 1 July 2010 to 31 December 2010	Satisfactory	Satisfactory
From 1 January 2011 to 31 March 2011	Satisfactory	Satisfactory
From 1 April 2011 to 30 June 2011[a]	On track	On track
From 31 July 2011 to 31 December 2011[a]	On track	On track
From 1 January 2012 to 30 June 2012[a]	On track	On track
From 1 July 2012 to 31 December 2012[a]	On track	On track

[a] Based on new ratings for project performance in the E-operations ADB. 2011. Project Performance Monitoring. *Project Administration Instructions.* PAI No. 5.08. Manila.

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members
Fact-finding	18 April–6 May 2005	9	135	t, i, t, p, j, f, s, i, d
MFF appraisal	1–5 August 2005	4	20	t, j, e, a
Review 1[a]	27 July–26 August 2009	6	180	t, t, s, c, c, c
Inception[a]	14 November–2 December 2009	5	85	t, s, c, c, a
Review 2[a]	2–20 December 2010	3	57	t, t, k
Review 3[a]	27 January–7 February 2011	4	44	t, t, e, s
Project completion review	15–25 October 2013	4	40	t, a, c, c

a = analyst, c = consultant, d = director, e = environment specialist, f = financial specialist, h = economist, i = project implementation, j = counsel, k = control officer, MFF = multitranche financing facility, p = procurement, s = social and/or resettlement specialist, t = transport specialist.

[a] Combined with the missions for other projects under the investment program.

I. PROJECT DESCRIPTION

1. Inadequate road connectivity was an obstacle to realizing the growth potential of rural India. To address this issue, the Government of India established the Prime Minister's Rural Roads Program (PMGSY) in 2000. The national program identified more than 170,000 habitations eligible under its criteria, improving about 738,000 kilometers (km) of rural roads at a total estimated cost of about $30 billion.[1] From 2006 to 2010, the estimated budget required for the PMGSY was $11 billion, 40.00% of which would be from the government's own funding and 7.00% from committed assistance from development partners such as the Asian Development Bank (ADB) and the World Bank; funding sources for the balance of 53.00% had not been identified. Following the first ADB loan,[2] the government requested further assistance for the PMGSY, using a new lending instrument—the multitranche financing facility (MFF). Pursuant to the provisions of the framework financing agreement (FFA) for the Rural Roads Sector II Investment Program,[3] ADB approved the first loan of $180.00 million on 31 July 2006 (Project 1), the second loan of $77.65 million on 17 March 2008 (Project 2), and the third loan of $130.00 million on 26 September 2008 (Project 3).

2. The Rural Road Sector II Investment Program – Project 4 is the fourth project package financed under the investment program. Based on the fourth periodic financing request (PFR) received from the government on 28 April 2009, ADB approved the loan for the project amounting to $185.00 million on 7 August 2009. The loan and project agreements were signed on 3 September 2009, and declared effective on 26 November 2009. The loan for the project was proposed to finance (i) improvements to 3,111.62 km of rural roads in the states of Assam, Orissa,[4] and West Bengal; and (ii) consultancy services for technical support of the project implementation. The total cost for the project was estimated at $239.80 million, of which 77.10% would be financed by the ADB loan and 22.90% by the government fund. The expected outcome of the project was improved connectivity between rural communities and markets, district headquarters, and other centers of economic activity via improved roads, which was subsequently expected to bring about impacts of reduced poverty and deprivation, and economic growth of rural communities near the project roads. As for the other projects under the investment program, the executing agency was the Ministry of Rural Development (MORD) at central level and the respective state governments at state level. The implementing agencies were the State Rural Roads Development Agencies (SRRDAs). The project completion date was expected to be 31 December 2011 and the loan closing date was expected to be 30 June 2012.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

3. At appraisal, the project was developed into a well-defined program with clear goals and well-structured standard operating procedures based on an annual implementation cycle.

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[1] A habitation, a unit used in the PMGSY, 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. Government of India, Ministry of Rural Development (RC Division). 2006. *PMGSY Briefing Book*. Delhi.

[2] ADB. 2003. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Technical Assistance Grant to India for the Rural Roads Sector I Project*. Manila. (Approved on 20 November 2003 with total loan of $400.00 million, completed in June 2009).

[3] The FFA was signed between India and ADB on 25 November 2005.

[4] The government changed the name of Orissa state to Odisha on 1 November 2011. To be consistent with the report and recommendation of the President and the project administration manual, the original name (Orissa) is used throughout this report.

Sustainability of the program was increased through capacity strengthening of state agencies in project planning and design, management oversight for construction activities, social and environmental safeguards, procurement and contract management, and fiduciary arrangements. These capacity strengthening measures made the project implementation approach more appropriate than arrangements for the Rural Roads Sector I Project.

4. In line with the government's priorities supporting economic growth, including both high growth and equitable pro-poor growth, ADB's assistance to India was aimed at supporting infrastructure-led poverty reduction. The investment program focused strategically on assisting the poor by providing connectivity in the states that meet the investment program requirements. Through the investment program, 5,611 km of rural roads were constructed or upgraded under Projects 1, 2, and 3—significantly improving connectivity in the project areas, and bringing about remarkable socioeconomic impacts. These projects used a large amount of consulting services to assist in the successful implementation as well as the capacity building of rural road development and maintenance. The project continued to focus on assisting the poor by providing road connectivity in the project states, which had a large rural population and lacked adequate coverage in terms of all-weather roads.

5. During and after implementation, the project was deemed *relevant* to the government's objectives and policies as well as ADB's country strategy. The subprojects were selected based on the PMGSY criteria and consultation with the communities prior to road construction, using a community participation framework (CPF) that was included in the FFA.[5] At completion, 2,975.23 km of all-weather rural roads were constructed or upgraded, which significantly improved connectivity in the project area (paras. 6 and 27), brought remarkable socioeconomic impacts, and directly benefited about 1.18 million people (para. 36). A large amount of consulting services was engaged to assist the SRRDAs with capacity building and project implementation. Despite some reductions in the project quantity and a longer implementation period (paras. 7 and 12), the project scope was generally in line with the original design, and the objectives of the project anticipated at appraisal were substantially achieved. The outputs and outcomes of the project met the government's objectives and were in line with ADB's country strategy. The design and monitoring framework of the project, with the corresponding achievements, is in Appendix 1.

B. Project Outputs

6. At project preparation,6 it was anticipated that a total of 3,111.62 km of rural roads would be constructed or upgraded—916.77 km in Assam, 1,498.58 km in Orissa, and 696.27 km in West Bengal. 7 At completion, a total of 2,975.23 km of rural roads was constructed or upgraded—914.27 km in Assam, 1,458.7 km in Orissa, and 602.26 km in West Bengal. The civil works included construction and/or upgrading of rural roads to full single-lane cross-sections with a 3.50 meter (m) roadway and 7.50 m formation width with bitumen surface, strengthening of existing culverts and bridges, construction of new bridges and cross-drainage structures, and provision of road furniture and safety facilities. Cement concrete pavement was constructed for the village or habitation sections. The project roads connected 1,224 habitations and benefited

[5] The selection criteria for the subprojects under the MFF cover 12 aspects, e.g. engineering aspect, social aspect, cost-efficiency, land requirements, environmental aspect, counterpart funds, approval of the governments, etc.

[6] The project appraisal for the whole investment program was carried out in 2005. Preparation for project 4 was done in 2009.

[7] ADB. 2009. *Project Administration Memorandum: Rural Roads Sector II Investment Program (Project 4) – States of Assam, Orissa and West Bengal in India*. Manila. 30 November.

about 1.18 million people in the project area. The project roads and habitations connected are detailed in Appendix 2. The community participation has been improved by carrying out consultations will all affected communities according to the CPF and grievance mechanisms were in place during the project implementation. As a result, there were no complaints received from the affected communities. Information boards containing the project data have been also been installed at the start of each project road to be constructed.

7. During implementation, 711 subprojects were selected. However, 11 subprojects were not successfully procured or implemented, and were excluded from the project scope:

(i) one subproject in Assam was converted to a regular PMGSY road because of land issues;
(ii) seven subprojects in Orissa were not procured due to nonresponsive bid; and
(iii) one subproject in West Bengal was removed due to nonresponsive bid, and two subprojects were abandoned because of political unrest in West Bengal.

8. As required in the contracts, the contractors implemented quality control of civil works with supervision from the project implementation units (PIUs). In addition, the national and state quality monitors inspected the project roads regularly. ADB's project completion review (PCR) mission in October 2013 observed that (i) the completed roads were generally of good quality; (ii) the roughness of the road surface generally met the design specifications and it was within the acceptable range of international roughness index, as indicated by the comfortable ride during the site visit; (iii) some safety and environment protection facilities were installed on the project roads; and (iv) routine maintenance of the project roads was in place.

C. Project Costs

9. During project preparation, the total project cost was estimated at $239.80 million, including the costs for the road connectivity component, consulting services, and financial charges. Upon completion, the total actual project cost was $248.35 million equivalent—3.53% higher than that at project preparation.[8] The unit cost per km for the road connectivity component rose by 11.40%, mainly because of higher contract prices. The cost for consulting services fell from $1.20 million to $0.70 million since less consulting services were required for the project than anticipated. The total finance charges for the ADB loan, including interest during construction and commitment charges, fell from $7.85 million to $1.91 million as the actual interest rate was lower than expected. Appendix 3 compares in detail the project costs at project preparation and at completion stages.

10. Under the financing plan envisaged at project preparation, the project was to be financed by an ADB loan of $185.00 million (77.10% of the total project cost) and the government fund of $54.80 million equivalent (22.90% of the total project cost). The ADB loan was from ADB's ordinary capital resources under its London interbank offered rate (LIBOR)-based lending facility with a 25-year term, including a grace period of 5 years and a commitment charge of 0.15%. The government fund was from the central government, through MORD, to the state governments on a grant basis. The increase in total project costs caused the actual project financing to be revised. At completion, the ADB loan of $185.00 million was fully utilized (74.50% of the total project cost), whereas the government share increased to $63.35 million equivalent (25.50% of the total project cost). The ADB loan financed the cost for the technical support consultants (TSCs), and the government financed the costs for the project implementation

[8] The project costs in Indian rupees were converted to US dollars using the exchange rate at project completion.

consultants (PICs). The costs for the civil works completed after loan closing were financed by the government. Detailed comparison of the project financing at project preparation and completion is in Appendix 3.

D. Disbursements

11. The ADB loan was approved on 7 August 2009, signed on 3 September 2009, and became effective on 26 November 2009. The loan proceeds were disbursed according to ADB's *Loan Disbursement Handbook* (2007, as amended from time to time). As specified in the loan agreement, the loan financed 80.00% of the expenditures for goods and civil works and 100.00% of the expenditures for consulting services (exclusive of taxes and duties). The statement of expenditure procedure was used to reimburse eligible expenditures. To facilitate project implementation, ADB approved retroactive financing on 3 September 2008. During the ADB inception mission in November 2009, the loan disbursements for 2010 were projected for the three project states. The first loan disbursement was made on 17 February 2010. The ADB mission in December 2010 found that project progress in Orissa and West Bengal was on track, and the loan disbursements exceeded projections. However, the actual loan disbursement in Assam was significantly lower than projected. MORD and the National Rural Roads Development Agency (NRRDA) fielded a mission to Assam to investigate the reasons. The ADB mission in January 2011 visited Assam separately, and attributed the slow loan disbursement mainly to the implementation delay (largely resulting from floods and ethnic violence) and shortage of funds in 2009 and early 2010. The ADB mission recommended that the state create a separate account for ADB projects to facilitate better financial management and avoid slow disbursement of funds.[9] The NRRDA requested Assam to address the issues identified. Nevertheless, implementation of the whole project was not completed before the original loan closing date of 30 June 2012. To facilitate project implementation, ADB approved an extension to the loan closing date by 6 months up to 31 December 2012.[10] The remaining loan amount under consulting services was reallocated to the goods and works category (see Basic Data).[11] By the actual loan account closing date of 23 April 2012, the total loan proceeds of $185.00 million had been disbursed. The annual projected and actual disbursement of the loan is shown in Appendix 4.

E. Project Schedule

12. At project preparation, the project was planned to be implemented over 2.5 years, inclusive of the implementation under retroactive financing, and expected to be completed by 31 December 2011. Civil works contracts usually require 12–18 months for completion. However, in Assam, contracts with multiple roads or those located in remote areas were given a longer contract period of 18–24 months. To expedite project implementation, ADB approved advance procurement action and retroactive financing in September 2008. Procurements under the advance action started in November 2008 for Orissa and in February 2009 for Assam and West Bengal. Procurement progress was slow and rebidding was required (para. 19). This was affected by the parliamentary election and the monsoon in 2009. Up to November 2009, 166 contracts had been awarded in Orissa (out of 210 packages put to tender) and 116 contracts in West Bengal (out of 125 packages put to tender). During the ADB mission in December 2010, a

[9] Some states, including Assam and West Bengal, used consolidated accounts for all PMGSY subprojects.
[10] ADB. 2012. *Loan 2535-IND: Rural Roads Sector II Investment Program – Project 4 – Extension of Loan Closing Date*. SATC. Fax. Manila. 20 January.
[11] ADB. 2013. *Loan 2535-IND: Rural Roads Sector II Investment Program – Project 4 – Reallocation of Loan Proceeds*. SATC. Fax. Manila. 25 February.

number of subprojects were found to be significantly delayed in all project states. Reasons for the delays included land and security issues, an unusually long and intensive rainy season in 2010 (from March to November), nonavailability of materials in some states, bridge constructions (some bridges were financed by the government only and needed to be constructed one by one), rebidding of some contracts, and local demand for realignments. By the end of 2011 (original completion date), only 370 out of 700 subprojects had been completed.[12] The project was substantially completed by 31 December 2012 (loan closing date), with 83.40% of the total project length completed. The outstanding subprojects covering the remaining project length, which were fully financed by the government, were completed in 2013.

13. The original TSCs, recruited under project 1 of the investment program, continued to work on the project. The newly recruited TSC was mobilized in May 2011. After loan closing in December 2012, the new TSC continued to work on ongoing projects (projects 3 and 5). Each project state recruited its own PICs. Some of the PICs were originally engaged for the previous projects under the investment program, and continued to work on project 4. The new PICs were engaged in July 2011 for Assam and in January 2011 for West Bengal. The PICs worked for the project until completion of the civil works (some PICs continued to work on projects 3 and 5). The actual project implementation schedule is in Appendix 5, and a chronology of major events is in Appendix 6.

F. Implementation Arrangements

14. As for all projects under the PMGSY, the executing agencies for the project were MORD at the central level and the state governments at the state level.[13] MORD, with technical and management support from the NRRDA, continued to be responsible for overall project supervision and execution of the project. During implementation, the coordination committee, chaired by the MORD joint secretary and comprising representatives from relevant agencies, met on a regular basis to monitor the use of the loan and overall implementation performance. Similar committees were also established at state level under the PMGSY guidelines.[14] In each district, one or two PIUs were established. The number of staff in a PIU varies from 20 to 50, depending on workload. The PIUs were led by chief executive officers responsible for overall coordination of project implementation in the respective districts. The PIUs were delegated adequate powers for taking effective and timely decisions on project implementation issues. With their own resources and local consultants, the PIUs carried out the preparation of detailed project reports of the subprojects, implementation of the CPF to mitigate the social impacts, and implementation of the environmental assessment framework (EAF) and relevant provisions of the environment codes of practice (ECOP). After project completion, the PIUs are responsible for managing road maintenance, including road condition inspection, contractor procurement, financial management, and coordination with local governments.

15. The TSC worked at the central level to conduct safeguard due diligence and impact monitoring, prepare project progress reports, and provide other services for all projects under the investment program according to the terms of reference (TOR). The PICs were engaged by each project state to implement the provisions of the CPF, EAF and ECOP for the subprojects. The organizational structure for project implementation is in Appendix 7.

[12] NRRDA. 2012. *Comprehensive Quarterly Progress Report*. New Delhi. December.
[13] Assam State Public Works Department, Orissa State Department of Rural Development, and West Bengal State Department of Panchayat and Rural Development.
[14] Government of India, Ministry of Rural Development. 2004. *Programme Guidelines of PMGSY*. http://pmgsy.nic.in/pmg31.asp

G. Conditions and Covenants

16. The project implementation complied with the loan conditions and covenants, including subproject selection, procurement and contract management, financial management, environment and social safeguards, road safety, and maintenance. A completed institutional framework for implementing the PMGSY projects was well established and functional. The executing and implementing agencies at both central and state levels implemented the project activities efficiently with due diligence in all aspects, and in accordance with the PMGSY guidelines. All loan covenants concerning environmental and social safeguards were complied with. Consolidated project progress reports were submitted to ADB.[15] Chartered accountants audited the financial accounts and statements, and the audited financial reports were submitted to ADB.[16] However, a financial audit report was not submitted to ADB on time.[17]

17. The loan covenants also required the project roads to be properly maintained with sufficient funds. During implementation, the civil works contracts had a provision for a 5-year post-construction maintenance by the contractors in accordance with the PMGSY guidelines (para. 30). Currently, the project states are responsible for the 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* (village or small-town governments), and the PIUs should continue to be responsible for maintenance until the *zilla panchayats* are able to take over road maintenance functions. The *zilla panchayats* in the project states participate in maintenance planning and provide comments on prioritizing maintenance activities and projects. The status of compliance with key loan covenants of the project is summarized in Appendix 8.

H. Consultant Recruitment and Procurement

18. As envisaged at project preparation, the TSC was engaged in accordance with ADB's *Guidelines on the Use of Consultants* (2002, as amended from time to time). The first TSC was originally engaged in 2007 for Project 1.[18] For Project 4, the contract with the first TSC was extended to 31 March 2010, financed by the ADB loan. A new TSC was recruited for the ongoing investment program as well as the subsequent investment program (Rural Connectivity Investment Program)[19]. The new TSC was also financed by the loan until loan closing. The TSC recruitment followed the quality- and cost-based selection (QCBS) procedure. The process of engaging the new TSC started in March 2010. After the bid evaluation and approval from ADB, the contract with the new TSC was signed on 4 May 2011.[20] The PICs, recruited in each project state, were fully financed by the government funds and the recruitment followed national competitive bidding (NCB). For Orissa, the existing PICs recruited in 2007 continued to work throughout project implementation. New PICs were engaged in July 2011 for Assam and in January 2011 for West Bengal.

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[15] Consolidated project progress reports were prepared quarterly, covering all projects under the investment program.
[16] The financial accounts were audited by J. Mandal & Co. Chartered Accounts.
[17] For example, submission of the financial audit report of FY2012 for Assam was delayed by about 13 months.
[18] Loan 2248-IND: MFF-Rural Roads Sector II Investment Program (Project 1).
[19] ADB.2012. *Report and Recommendation of the President to the Board of Directors for the Proposed Multitranche Financing Facility, Technical Assistance, and Administration of Technical Assistance to India for the Rural Connectivity Investment Program*, Manila.
[20] M/S Operations Research Group in association with Aarvee Associates Architects Engineers & Consultants (the same consultants as the former TSC for the investment program).

19. All the civil works procurement under the project followed NCB procedures and conformed to ADB's *Procurement Guidelines*. At appraisal, it was planned that contracts for works projected to exceed $10.00 million would be procured using international competitive bidding. In practice, all civil works contracts were procured using NCB, since all the contract sizes were below the threshold. Under the advance contracting and retroactive financing provisions of the FFA, procurement action started as early as October 2006, but was formally implemented after ADB approval of the advance procurement action and retroactive financing for the project in September 2008. The first contract was awarded in June 2009. The number of nonresponse and single bidder responses was notably high in some states, compared with other projects under the investment program. This is mainly due to security issues, subproject locations (in remote areas), and lack of qualified contractors in the project area. Rebidding for such nonresponsive contracts was required. To attract smaller contractors, some contracts were split into smaller packages. Eventually, 441 civil works contracts were awarded, comprising 702 subprojects. Procurement of civil works also followed the PMGSY standard bidding documents and procedures, with some adjustment to meet the requirements for ADB financing requirements in the areas of eligibility, anticorruption, and social and environmental safeguards under the project. During procurement, an electronic tendering system approved by ADB was mandatory for the contracts under the project. An ADB-engaged procurement consultant carried out post-facto review of the procurement process followed and documentations used. The review confirmed that there was no deviation from the procurement arrangements agreed earlier. The procurement review also revealed that a number of contractors had been awarded more than one contract, and most of them were bidding for multiple contracts within a district.

20. During project implementation, two civil works contracts in West Bengal were terminated because of poor contractor performance and security issues in the project area. A total of 442 contracts was completed under the project, comprising 439 civil works contracts, one TSC contract, and two PIC contracts. The project contract packages with actual costs are summarized in Appendix 9.

I. Performance of Consultants, Contractors, and Suppliers

21. The performance of the TSC with respect to the scope of services assigned was *highly satisfactory*. As anticipated at appraisal, the TSC was engaged by the NRRDA to support the project states in implementing the project. The TSC deployed a team of experts comprising social development experts, environment specialists, and road safety experts. The TSC checked the compliance of the subprojects with the CPF, EAF and ECOP provisions. The TSC provided technical support to the PIUs to implement the road safety awareness program, and conducted road safety workshops. The TSC also provided training to the PIUs and contractors in complying with social and environmental safeguard requirements. The same TSC was appointed for projects 1 and 2 under the investment program, and its performance was rated *highly satisfactory* for both projects. TSC services also included assistance in the preparation of project 5.

22. The overall performance of the PICs was rated *satisfactory*. At the design stage, the PICs carried out social and environmental screening activities, identified impacts and mitigation measures, performed community consultations, and prepared CPF documents and environmental checklists in accordance with the approved CPF and ECOP for the project. During implementation, the PICs monitored the social and environmental safeguards for all subprojects under the investment program.

23. The overall performance of the contractors was *satisfactory* with respect to deployment of personnel, supervision, checking the quality of work, and field inspections of the subprojects. Contractor personnel were self-motivated, dedicated, and result-oriented; and understood the requirements of the project. The capacity of the contractors was enhanced through frequent contract management workshops. However, the ADB review missions noticed that the overall contractors industry was overstretched in the project areas while the length of the PMGSY roads under construction was steadily increasing. Most of the contractors were small, and required assistance in accessing construction machinery and equipment. The contracts of some non-performing contractors were terminated, and the procurement for the remaining works were required and caused delayed in the project implementation.

J. Performance of the Borrower and the Executing Agency

24. The performance of the borrower and the executing agencies was rated *highly satisfactory*. The borrower for the loan was India, and the executing agencies for the project were MORD at central level and the state governments at state level. During implementation, sufficient organizational arrangements were established to ensure efficient and timely management of project implementation. The central government provided the required counterpart funds of $63.35 million equivalent and all necessary support in a timely manner. To ensure successful project implementation, the executing agencies provided close and regular monitoring and coordination of the construction progress and quality control. The executing agencies, with assistance from the consultants, prepared the required periodic project progress reports and project completion report. Chartered accountants audited the financial accounts and statements, which indicated that the ADB loan was used properly. Through the investment program and other capacity building programs, the capacity of the executing agencies, implementing agencies, and PIUs were significantly strengthened. The executing and implementing agencies also facilitated the ADB review missions for the whole investment program, particularly for the project.

K. Performance of the Asian Development Bank

25. ADB's overall performance is rated *satisfactory*. The investment program, including the project, was administered and supervised from ADB headquarters. During implementation, ADB was closely involved in identifying potential problems and conducted regular reviews to resolve issues related to the project implementation (see Basic Data).[21] During missions, ADB carried out substantial project site visits to a number of selected subprojects, checked the project's physical progress, reviewed compliance with social and environmental safeguards, and provided advice on various aspects of project implementation. In addition, ADB conducted regular procurement and disbursement audits, and provided substantial assistance for consultant recruitment, implementation progress, and loan disbursement. The executing and implementing agencies recognized the role of the ADB missions in advising on matters relating to technical issues and contract administration.

[21] All the ADB review missions for the project were combined with the reviews of other loans under the investment program and related technical assistance programs.

III. EVALUATION OF PERFORMANCE

A. Relevance

26. The project is considered *relevant* to the government's strategy for economic growth and poverty reduction through the development of rural access roads, at both appraisal and completion. As in projects 1 and 2, the all-weather rural roads developed or upgraded in this project were designed in accordance with the PMGSY guidelines. Technical as well as safeguard requirements were incorporated in the design project report prepared for each project road and due diligence activities were carried out to ensure that technical and safeguard requirements were fulfilled. Up to the ADB PCR mission in October 2013, 130,432 rural roads with a total length of 503,632 km had been constructed or upgraded under the PMGSY, connecting 211,409 habitations. The project contributed 700 rural roads with a total length of 2,975.23 km, and connected 1,224 habitations. As part of the PMGSY, the project was *relevant* to the government's 10th Five Year Plan, 2002–2007 and its succeeding plans.[22] ADB's India country partnership strategy, 2009–2012[23] was designed to support the government's efforts in addressing some of the binding constraints identified in the 11th Five-Year Plan, 2007–2012, and to support the government's efforts toward facilitating inclusive growth. The MFF modality in the rural roads sector development has facilitated continuous improvements in the way each tranche was prepared. Challenges and opportunities faced in implementing previous projects under the investment program were identified, and lessons learned from these projects were incorporated in the project design. The outputs and outcomes of the project were important, timely, and effective for implementation of the PMGSY.

B. Effectiveness in Achieving Outcome

27. The project is rated *effective* in achieving its outcome. At completion, 2,975.23 km of all-weather rural roads were constructed or upgraded in Assam, Orissa and West Bengal, which is slightly below the target of 3,111.62 km due to the various issues as explained in para 7. However, these roads have connected 1,224 rural habitations, which is about 14.00% higher than the target of 1,071 habitations at the design stage, and benefited about 1.18 million people. At appraisal, most of the project roads were not paved and some sections were disconnected during rainy seasons. In conjunction with the improvements to state roads and other rural roads in the area, the project significantly improved connectivity between the rural habitations and workplaces, markets, social and health services, and education facilities. The socioeconomic impact study and the ADB missions revealed that the average distance to the workplace increased by about 2 km, whereas the average time taken to reach the workplace decreased by 0.5 hours. Travel time to health care facilities has decreased by 40 minutes on average and by as much as 120 minutes during the rainy season in some habitations. Apart from via a variety of media, rural populations now have better access to all government schemes through the information provided at government offices at the block and district level. Access to transport services, such as goods vehicles and rural passenger services, has also increased because of better road conditions. The daily public transport service to habitations increased by an average of 107.00% for buses, and 155.00% for jeeps, vans, and three-wheelers. Vehicle travel speed increased from 25 km per hour to 40–50 km per hour on the improved roads, which has significantly reduced travel time and vehicle operating costs (VOC). It was expected that a

[22] Government of India, Planning Commission.2002. *Tenth Five Year Plan 2002 - 07*. Delhi. and Government of India, Planning Commission.2008. *Eleventh Five Year Plan 2007 - 12*. Delhi.
[23] ADB. 2009. *Country Partnership Strategy: India, 2009–2012.* Manila.

substantial proportion of the VOC savings would go to road users after the rural road improvement, and road transport safety would be substantially improved by the road safety measures designed under the project. Supplemented with other rural socioeconomic development schemes, the improved roads have brought and will continuously bring significant benefits to local residents, especially the poor. The project has met the targets in terms of community participation. Consultations with all affected communities according to the Community Participation Framework (CPF) were conducted, grievance mechanisms were in place, and the project data information boards were installed at the start of each road to be built. There were no complaints received from the affected communities.

C. Efficiency in Achieving Outcome and Outputs

28. Despite the slightly longer project implementation period and slightly reduced number of project outputs in terms of the quantity of subprojects, the project implementation is rated *efficient* considering its robust traffic growth and the result of the economic reevaluation. Following the ADB PCR mission, a due diligence traffic survey was conducted.[24] Actual traffic on the sample project roads was collected. The analysis of the traffic survey results, i.e. by comparing it with that at appraisal, showed that the number of road users on the project roads had significantly increased. Based on the survey results, the traffic forecast at appraisal was revised by considering the faster socioeconomic development, the improved road networks, and the rapid increase in motorized vehicle registrations in the project area. The traffic on the project roads was estimated to increase by an average of 7.60%–13.80% annually over 2014–2020 and by 6.10%–9.10% from 2021 onward. The revised traffic rates are much higher than those anticipated at appraisal, reflecting a faster increase in traffic demand in the project area.

29. To measure the project's efficiency, an economic reevaluation was performed by recalculating the economic internal rate of return (EIRR), using similar methodology to that at appraisal and taking into account the data collected after project implementation. The economic reevaluation compared the economic costs and benefits of the with- and without-project scenarios. Economic benefits considered in the reevaluation include (i) VOC savings; (ii) passenger time cost savings; and (iii) other potential benefits such as socioeconomic development, poverty reduction, reduced accident cost, and savings in maintenance costs for the without-project case. The recalculated EIRR was 20.10% for the whole project (17.20% for Assam, 15.20% for Orissa, and 34.50% for West Bengal). The lower EIRR for Orissa was mainly caused by a lower traffic level. The higher EIRR for West Bengal was due to a lower unit investment cost. Compared with 18.00% at appraisal,[25] the higher EIRRs were mainly caused by much higher actual traffic levels. The recalculated EIRRs are above the ADB-recommended social discount rate of 12.00% and the project can be considered economically viable. The EIRRs were subjected to a sensitivity analysis. The results show that the project continues to be economically viable for all scenarios tested. In the case of a combination of a 20.00% maintenance cost increase and a 20.00% benefit reduction, the EIRR would be 16.60% for the whole project. The sensitivity test also shows that the EIRR is more sensitive to changes in benefits. Therefore, the government should pay more attention to socioeconomic development in the project area, and implement policies to stimulate transport services and increase villagers' incomes. The economic reevaluation is summarized in Appendix 10.

[24] To obtain the latest traffic data, a due diligence traffic survey was designed and implemented during the ADB PCR mission for the project. A consultant team was recruited to carry out 12-hour traffic count surveys on selected project roads.

[25] In the MFF, the overall EIRR for the sample subprojects was 18.00% (15.60% for Assam, 18.00% for Orissa, and 20.10% for West Bengal).

D. Preliminary Assessment of Sustainability

30. The project is rated *most likely to be sustainable*. Under the PMGSY guidelines, the contracts for civil works contained a provision requiring contractors to provide 5 years of post-construction maintenance. According to the latest arrangement, the SRRDAs are responsible for road maintenance after the first 5-year liability period. *Zilla panchayats* participate in maintenance planning, and provide comments on prioritizing maintenance activities and projects. MORD, in its two circulars of 9 September 2010 and 12 November 2010, introduced a built-in mechanism to ensure that state governments provide timely and adequate funding for maintenance of the PMGSY roads during the 5-year post-construction period. Each state government is required to compute annual requirements for maintenance funds for all PMGSY contracts in force, issue a certificate-cum-undertaking regarding proper maintenance of all PMGSY roads, and act upon it. Further, each state government is required to deposit the associated maintenance funds to the maintenance accounts of the SRRDAs in two installments every a year. Starting on 31 October 2010, the release of PMGSY funds (for construction) is made contingent upon compliance with the stipulations on the circulars. The funding of PMGSY roads after the 5-year post-construction period is covered by the government's non-plan resources on a grants-in-aid basis. The current funds for maintenance of PMGSY roads are provided in accordance with the recommendations of the 13th Financial Commission in its report submitted to the President on 30 December 2009, which covers 2010–2015. The financial commission assessed the requirement of ordinary repairs of roads in a state, and recommended a grant equivalent to 90.00% of the estimated funding requirement for PMGSY roads. Since PMGSY is a priority government scheme, the grants-in-aid for maintenance of PMGSY roads beyond the 5-year post-construction period is likely to remain a priority item. For example, in Orissa, allocations of road maintenance funds increased from Rs820.00 million in FY2012 to Rs1,180.00 million in FY2015. The ADB PCR mission noted that the roads created under the project were generally well maintained, and the funds and capacity for road maintenance were sufficient. For better monitoring, the NRRDA intended to publish the road maintenance status on the PMGSY website, including costs.

31. Road maintenance is generally in place. The ADB PCR mission noticed a few defects and drainage issues on roads visited during the mission. However, these project roads were still under the contractors' liability for the first 5-year maintenance, and were due for maintenance. The mission emphasized the need for local PIUs to enhance their capacity to identify problems on the project sites, and to take the necessary actions promptly. Road safety has also become a critical issue in the project areas to keep the project sustainable. The project has installed a significant number of traffic signs and vehicle guard posts at road bends, in accordance with PMGSY design standards. The PIUs also conducted several road safety campaigns and activities. The ADB PCR mission noted that some vehicles tend to exceed the speed limit because of the improved road conditions. The increase in average vehicle speed on the project roads has slightly elevated safety issues, particularly in mixed traffic conditions involving pedestrians, nonmotorized vehicles, and animal-driven carts on the project roads. This should be addressed in the road safety campaigns, by enforcing speed limits identifying potential black spots, and installing corresponding countermeasures. Transport services, such as goods vehicles and passenger services, have been promoted because of the improved road conditions, but are still very inadequate in some project areas, especially in West Bengal. In addition, local governments need to implement policies to promote transport services and to provide affordable transport services for local people. A well-developed rural public transport system is important to increase accessibility and enable the poor to participate more in economic activities and access social services.

32. The continuous implementation of the PMGSY program, with external assistance from development partners, has contributed to the sustainability of rural road development and poverty reduction in India. The project is the fourth loan under the investment program. Considering the successful implementation of the previous projects under the investment program, ADB has approved a new investment program to continue support for implementation of the PMGSY.[26] The NRRDA was conceived as a compact, professional, and multidisciplinary body to provide the requisite technical and management support to MORD and state governments to implement the PMGSY effectively. Under the program, state governments are responsible for planning, implementation, and maintenance of rural roads. For better management of the PMGSY projects, several computer-based systems—including 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 the executing agencies, implementing agencies, and regional PIUs.

E. Impact

33. **Poverty and other social indicators.** The project impact is rated *significant*. The whole investment program, including the project, has contributed to the effort in reducing poverty in the country by using a large amount of local labor during implementation, totaling 1,167 million person-days. Most of these laborers were from poor families in the project area. Using education as a proxy attribute that reflects poverty rate, the project has contributed to the 8.00% reduction in uneducated inhabitants. Access to health care for rural communities has been substantially improved, especially during rainy season in some habitations. The frequency of visiting clinic or hospital increased by 5.00% for those visiting at least once a month.

34. **Environmental safeguards**. The whole investment program, including the project, was categorized environment category B in accordance with ADB's *Environmental Assessment Guidelines* (2003). The investment program 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. However, an initial environmental examination (IEE) of sample subprojects was prepared as part of the detailed project reports. The anticipated environmental impacts were removal of trees caused by road widening, generation of dust and emissions from construction equipment and machinery, sedimentation and erosion from the earthworks, mismanagement of borrow areas, localized flooding resulting from siltation of drainage canals, and occupational health and safety of construction workers as well as local communities in the project area. Due diligence on the implementation of the environmental safeguards for the investment program found that the IEE report adequately assessed the potential environmental issues, and the contractors had implemented mitigation measures during the construction stage. At project preparation, a monitoring system was requested to be established as part of the PIC's work assignments, aimed at improving the contractor's performance. The state governments and PIUs, with assistance from the TSC, carefully implemented the environment mitigation measures during project implementation; and the PICs carried out regular environment monitoring. The ADB PCR missions noted that implementation of the environmental safeguards in all project states was generally in order; the project states had incorporated the standard environmental management plan in their bidding document for civil works; the contractors' bill of quantities had included

[26] ADB. 2012. *Report and Recommendation of the President to the Board of Directors on a Proposed Multitranche Financing Facility, Technical Assistance, and Administration of Technical Assistance, India: Rural Connectivity Investment Program.* Manila. (Approved on 12 July 2012 with total loan of $800.00 million).

costs for environment mitigation measures; and certain drainage measures were incorporated in the project design and constructed to ensure that the drainage was efficient and that no waterlogging occurred. The traffic survey during the PCR mission identified an increased traffic flow in the project roads—higher than the projections. However, since the setting is rural and the level of traffic is still fairly low, the risk of standards being exceeded is low.

35. **Land acquisition and social safeguards.** During formulation of the investment program, a social assessment and survey of sample households was conducted, which concluded that the width of the existing roads would be sufficient to accommodate the right-of-way of about 7.5 m. As a result, minimal acquisition of land was required—only for road shoulder adjustment. No relocation was needed, following minor realignments. Drawing on the experience of the previous projects, as well as harmonizing with World Bank-financed rural roads project in other states, the CPF was agreed between the government and ADB to provide guidance and mitigation measures for voluntary land donation, and to ensure community participation during implementation. During implementation, the voluntary land donation system was used in such cases where it was necessary to secure private land for specific subprojects. In very few cases, revenue land was provided to vulnerable affected persons as replacement land through an extensive legal procedure with support from the PIUs. During the ADB mission in December 2011–January 2012, the field visit and the CPF documentation review (randomly selected) revealed that (i) people agreed to contribute their land voluntarily for the road construction (this was confirmed through verbal and written records, and verified by *zilla panchayats*); (ii) landowners and non-titled people were fully consulted regarding site selection; (iii) redress mechanisms were in place at the village level; and (iv) proper attempts had been made toward fuller implementation of the CPFs. During implementation, the PIUs ensured that the road selection criteria, process for community participation, and their documentation complied with the CPF principles and procedures. Adverse social impacts were mitigated through design modifications and selection of alternative alignments.

36. **Socioeconomic impact**. The PMGSY is very effective for socioeconomic transformation in rural India. A multiyear study was undertaken to gauge the project's socioeconomic impacts of the investment program. Six surveys in 2008 and 2009 monitored a sample of 9.00% of all habitations that were connected by the subprojects in the states of Assam, Orissa, and West Bengal. In the second quarter of 2011, ADB fielded missions to the three states to validate the data collected during the study, and to gather anecdotal information that would deepen the analysis. Following the ADB PCR mission, a due diligence survey was conducted in November 2013, which included a quick traffic survey and social impact analysis. The socioeconomic impact study and the ADB missions revealed that (i) better access to markets has led to a 50% average increase in income levels in the sample habitations and a 35.00% average rise in per capita monthly expenditure in the sample habitations; (ii) the project employed a large amount of local labor during implementation—1,167 million person-days, including 6,434 million person-days labor for women;[27] (iii) the proportion of inhabitants who had completed grade 12 and above increased by 4.00%, while those who had completed grades 5–10 increased by 5.00%; and the amount of uneducated inhabitants fell by 8.00%; (iv) the services offered by government agricultural extension officers increased fivefold, leading to more farmers using scientific approaches to farming, such as crop diversification and the incorporation of fertilizers and pesticides; (v) the frequency of visiting a clinic or hospital increased by 5.00% for those visiting at least once a month; and (vi) land prices per hectare in the sample habitations increased by about five times in habitations with improved connectivity. The survey and assessment

[27] The Mahatma Gandhi National Rural Employment Guarantee Act 2005. http://nrega.nic.in/

concluded that the connectivity has substantially 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 roads have acted as a catalyst for sustained improvements in living conditions and will be a conduit to continual development in rural India. A summary of the socioeconomic impacts is in Appendix 11.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

37. Overall, the project is rated *successful*. The project was relevant to the government's overall development objectives and ADB's country partnership strategy. The completed rural roads have effectively improved connectivity in the project area and significantly supported rural socioeconomic development. Implementation of the project has delivered its main objectives of supporting implementation of the PMGSY. The economic reevaluation confirmed the project's robust economic viability. The project impact study concluded that remarkable socioeconomic benefits have accrued to the direct beneficiaries, especially the poor. The project is also considered most likely to be sustainable, considering the presence of the road maintenance program as well as the overall development and arrangement of the PMGSY. The objectives of the project's impacts, outputs, and outcomes anticipated at appraisal have been achieved.

B. Lessons

38. The project was the fourth package under the investment program. It has helped the government at both central and state levels to gain more experience and to identify capacity gaps and areas for improvement in various project implementation activities. Some of the lessons learned are listed below, which could be incorporated in ongoing and future projects.

39. **Subproject packaging and procurement**. During procurement for civil works packages, the response to bid was low. Some packages received no response, even after the 7th call. Repackaging and rebidding for such contract packages slowed down the procurement process. In the meantime, the ADB procurement review revealed that a number of contractors had been awarded more than one contract and that most of them submitted bids for multiple contracts within a district. This indicates that the size of the packages should be determined in close consultation with the implementing agencies to suit the technical and financial capability of local contractors.

40. **Time requirements for completing a subproject**. Following the PMGSY guidelines, each civil works contract has a stipulated completion period of 12 months. However, 12 months were found to be inadequate, especially considering the pre-construction activities, contractor's capability, and weather conditions in the project area. At least 18–24 months were found to be needed for all project activities. Proper timing of signing the civil works contracts, in relation to the monsoon period, may avoid the loss of construction time to the monsoon. This should be incorporated and considered in other similar projects.

41. **Fostering local contractor industry**. All civil works contractors for the project were local, and some of them were small and lacked working facilities, fund resources and/or skilled and qualified staff. During civil works procurement, the responses from bidders were low, which led to repackaging (split into small packages) and rebidding of some civil works packages. Some of the civil works packages were geographically spread out, which made it difficult for

contractors to manage their resources, labor, and materials. In future projects, local road development authorities may develop adequate measures to assist small contractors in terms of equipment, funds, and project management. In the meantime, the state governments should strengthen contract management to ensure the proper and timely completion of subprojects.

42. **Monitoring of environmental impacts.** It is important to ensure continuous engagement of PICs to avoid gaps in environmental impact monitoring activities during project implementation. In future projects, if a new PIC is to be recruited, the start of the new contract should be immediately after, or overlap with, the existing PIC contract. The handover process should be seamless to avoid the gap in the monitoring activities. Capacity building for PICs in environmental impact monitoring should be considered to ensure consistency in the quality of monitoring activities.

C. Recommendations

1. Project Related

43. **Project benefit monitoring and evaluation**. The investment program has demonstrated remarkable socioeconomic impacts of rural road development. It is recommended that ADB, in association with the government, design and carry out a long-term socioeconomic monitoring program through regular surveys and analysis to understand the yearly changes brought about by the investment program. A set of measurable socioeconomic indicators should be used to analyze the impacts, including income, age, and gender-disaggregated data. The analysis results could be used to improve the design of future ADB projects to enhance the socioeconomic benefits of rural road projects.

44. **Road design**. The project roads were designed according to the PMGSY guidelines and standards. However, many parts of the project roads have no roadside drainage provision because of practical constraints such as land availability. The ADB PCR mission noted that some local inhabitants requested that the project roads should have roadside drainage to avoid road surface water runoff entering their property during the rainy season. It is therefore recommended that the road design be strengthened to provide a covered roadside drainage system along residential areas.

45. **Road safety**. Provision and maintenance of road furniture and safety measures should be monitored, and may be promoted as a form of community participation. An example of such community participation activities were found in Assam during the ADB PCR mission. Road safety audits should be done periodically to facilitate the sustainability of the road performance. Continuous road safety campaigns should be conducted for all road users, including drivers, villagers, and children.

2. General

46. **Capacity improvement for rural road development.** In some project states, institutional capacity in rural road development is inadequate, especially in institutional arrangements and the adoption of modern concepts and techniques. A capacity building and human resource development program could be designed and incorporated in future project design. ADB should increase the emphasis on training for PIU staff and local consultants. Advanced road asset management concepts and tools could be adopted to maintain the operational performance of the increasing rural road network effectively and efficiently.

PROJECT FRAMEWORK

Design Summary	Performance Targets/Indicators	Results
Impact Contribute to reduction in poverty and deprivation, and support economic growth of the community connected by investment program roads	Three to four 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 5.00% Improvement in social indicators in rural areas served by investment program roads by 10.00%, including for maternal and infant deaths, safe delivery, immunization, post-primary dropout, and primary school teacher attendance.	Large amount of local labor was used for project implementation—1,167 million person-days, including 6,434 million person-days labor for women. Most of these laborers were from poor families in the project area. The proportion of inhabitants who had completed grade 12 and above increased by 4.00%, while the proportion who had completed grades 5–10 increased by 5.00%; there was a decrease of 8.00% in uneducated inhabitants. Access to health care for rural communities has been substantially improved; travel time to health care facilities decreased on average by 40 minutes and by as much as 120 minutes during the rainy season in some habitations. The frequency of visiting a clinic or hospital increased by 5.00% 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: 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 is disrupted (currently up to 25.00% of the year, down to less than 15 days per year). Diversified income opportunities in rural areas measured in terms of the number of people	Under the project, 2,975.23 km of rural roads were constructed or improved, connecting 1,224 habitations by all-weather roads—393 habitations in Assam, 488 habitations in Orissa, and 343 habitations in West Bengal. Including projects 1 and 2, the investment program has developed a total of 6,915.36 km of all-weather rural roads and benefited 3,063 rural habitations. Access to markets, health, and education facilities is affected on zero days per year. Percentage of habitants employed outside of villages increased by 1.00% and number of days of

Design Summary	Performance Targets/Indicators	Results
	obtaining work outside the village and the change in cropping pattern and agricultural produce marketing (increase in perishable crops in both cropping and marketing).	employment per year increased by 10 days over the 6-month period after road construction. The number of inhabitants participating in agriculture and trade and business-related employment rose by 1.00% each.
Outputs 1. Construction and upgrading of rural roads into all-weather standard	By 30 June 2011: 3,111.62 km priority rural roads in Assam, Orissa, and West Bengal constructed and upgraded to all-weather standard connecting 1,071 rural habitations.	The road connectivity component of the project was substantially completed by the end of 2012. Upon completion, a total of 2,975.23 km of all-weather rural roads were constructed and/or upgraded, which connected and benefited 1,224 rural habitations in the project states. Including projects 1 and 2, the investment program has developed a total of 6,915.36 km of all-weather rural roads and benefited 3,063 rural habitations.
2. Improved community participation	Rural roads improved under earlier-completed loans of the investment program to maintain pavement condition index (defined in PMGSY Operations Manual) value of 4. By the start of civil works (July 2009): Consultation with all affected communities according to CPF fully completed. Grievance mechanisms are in place. Information boards containing related project data are installed at the start of each road to be built. By completion of civil works (June 2011): There are virtually no complaints from affected communities. All complaints (if any) are resolved.	The constructed and/or upgraded roads were of good quality; the road surface roughness was within international roughness index for a comfortable ride (about international roughness index 4–6). Consultations with all affected communities according to CPF were conducted. Grievance mechanisms were formed and in place during the project implementation. Information boards containing related project data were installed at the start of each road to be built. No complaints were received from affected communities.

Activities with Milestones	**Inputs of Project 4 at Project Preparation**	**Main Milestones and Inputs at Actual**
0.0 Framework Financing Agreement (FFA) 0.1 Signed on 25 November 2005 1.0 Subproject Preparation and Implementation 1.1 Subproject preparation by Assam in January 2009, Orissa in November 2008, and West Bengal in March 2009 1.2 Advance contracting by February 2009 1.3 Contract award by June 2009 1.4 Subproject completion by June 2011 2.0 Periodic Financing Request 2.1 Review of status of PFR 4 preparation by ADB mission in February 2009 2.2 Review of draft PFR 4 by ADB in March 2009 2.3 PFR 4 submission on 28 April 2009 for $185.00 million 3.0 ADB Review 3.1 Review of ongoing subprojects—at least biannually 3.2 ADB review of states' readiness to implement additional loans—to be done concurrently with above review of ongoing subprojects	ADB OCR financing of $185.00 million (under the same MFF, ADB OCR financing of $180.00 million for project 1, $53.55 million for project 2, and $130.00 million for project 3 has already been committed) Government counterpart financing of $54.80 million ADB staff time for MFF administration, including review of draft PFRs and preparation of loan and/or project agreements for individual loans.	ADB appraised the project during 1–5 August 2005. The FFA was signed on 25 November 2005. ADB received the four PFRs under the investment program on 28 April 2009. The loan for the project was approved on 7 August 2009, signed on 3 September, and became effective on 26 November 2009. At completion, $248.35 million was provided to the project implementation, comprising $185.00 million from the ADB loan and $63.35 million equivalent from the government's own resources. TSC and PICs were engaged to assist the project implementation. Actual cost for the project ($ million): Road Connectivity $245.74 Consulting Services $0.70 Financial Charges $1.91 **Total** **$248.35**

ADB = Asian Development Bank, CPF = community participation framework, FFA = framework financing agreement, km = kilometer, MFF = multitranche financing facility, OCR = ordinary capital resources, PFR = periodic financing request, PIC = project implementation consultant, TSC = technical support consultant.

Source: Asian Development Bank project completion review mission.

DETAILS OF PROJECT OUTPUTS

Item	Assam	Orissa	West Bengal	Total
Sanctioned				
Subprojects/roads	274.00	310.00	127.00	**711.00**
Length (km)	916.77	1,498.57	696.27	**3,111.61**
Procured				
Packages	107.00	210.00	124.00	**441.00**
Subprojects/roads	273.00	303.00	126.00	**702.00**
Length (km)	914.27	1,458.70	680.90	**3,053.87**
Completed Total				
Packages	107.00	210.00	122.00	**439.00**
Subprojects/roads	273.00	303.00	124.00	**700.00**
Length (km)	914.27	1,458.70	602.26	**2,975.23**
New Connection Total				
Subprojects/roads	273.00	247.00	114.00	**634.00**
Length (km)	914.27	1,016.68	539.85	**2,470.80**
Upgraded Total				
Subprojects/roads		56.00	10.00	**66.00**
Length (km)		442.02	62.41	**504.43**
Habitations Connected				
>1,000	200.00	115.00	233.00	**548.00**
>500	2.00	198.00	110.00	**310.00**
>250	191.00	67.00		**258.00**
<250		108.00		**108.00**
Total	**393.00**	**488.00**	**343.00**	**1,224.00**

PMGSY = *Pradhan Mantri Gram Sadhak Yojana* (Prime Minister's Rural Roads Program).
Notes:
1. One road in Assam was converted to a normal PMGSY road.
2. Seven roads in Orissa were not procured because of nonresponse.
3. One road in West Bengal was removed because no tender response was received after 7 calls.
Source: Project implementing agencies.

PROJECT COST AND FINANCING PLAN

Table A3.1: Project Costs

($ million)

Item	At Project Preparation				Actual			
	Assam	Orissa	West Bengal	Total Cost	Assam	Orissa	West Bengal	Total Cost
Road Connectivity Component	90.15	94.00	46.60	**230.75**	105.06	94.76	45.93	**245.74**
Consulting Services				**1.20**				**0.70**
PIC	0.24	0.17	0.39	**0.80**	0.21	0.15	0.12	**0.47**
TSC				**0.40**				**0.23**
Financial Charges				**7.85**				**1.91**
Total	**90.39**	**94.17**	**46.99**	**239.80**	**105.27**	**94.91**	**46.04**	**248.35**

PIC = project implementation consultant, TSC = technical support consultant.
Note: Numbers may not sum precisely because of rounding.
Source: Asian Development Bank. 2009. *Periodic Financing Request Report, India: Rural Roads Sector II Investment Program – Proposed Tranche 4*. Manila.; The Project Implementation Units.

Table A3.2: Project Financing

($ million)

Source	At Project Preparation		Actual	
	Total Cost	% of Cost	Total Cost	% of Cost
ADB	**185.00**	77.1	**185.00**	74.5
Government	**54.80**	22.9	**63.35**	25.5
Total	**239.80**	100.0	**248.35**	100.0

ADB = Asian Development Bank.
Source: Asian Development Bank. 2009. *Periodic Financing Request Report, India: Rural Roads Sector II Investment Program– Proposed Tranche 4*. Manila.; The Project Implementation Units.

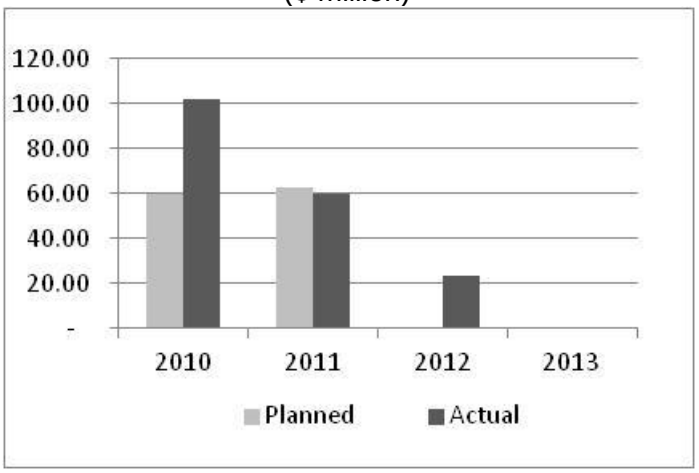
DISBURSEMENT OF ADB LOAN PROCEEDS

Table A4: Annual and Cumulative Disbursement of ADB Loan Proceeds
($ million)

	Annual Disbursement			Cumulative Disbursement	
	Amount ($ million)		**% of Total**	**Amount**	**% of Total**
Year	**Planned**	**Actual**		($ million)	
2010	60.00	101.70	55.0	101.70	55.0
2011	62.50	59.50	32.2	161.19	87.1
2012		23.58	12.7	184.78	99.9
2013		0.22	0.1	185.00	100.0
Total		**185.00**	**100.0**		

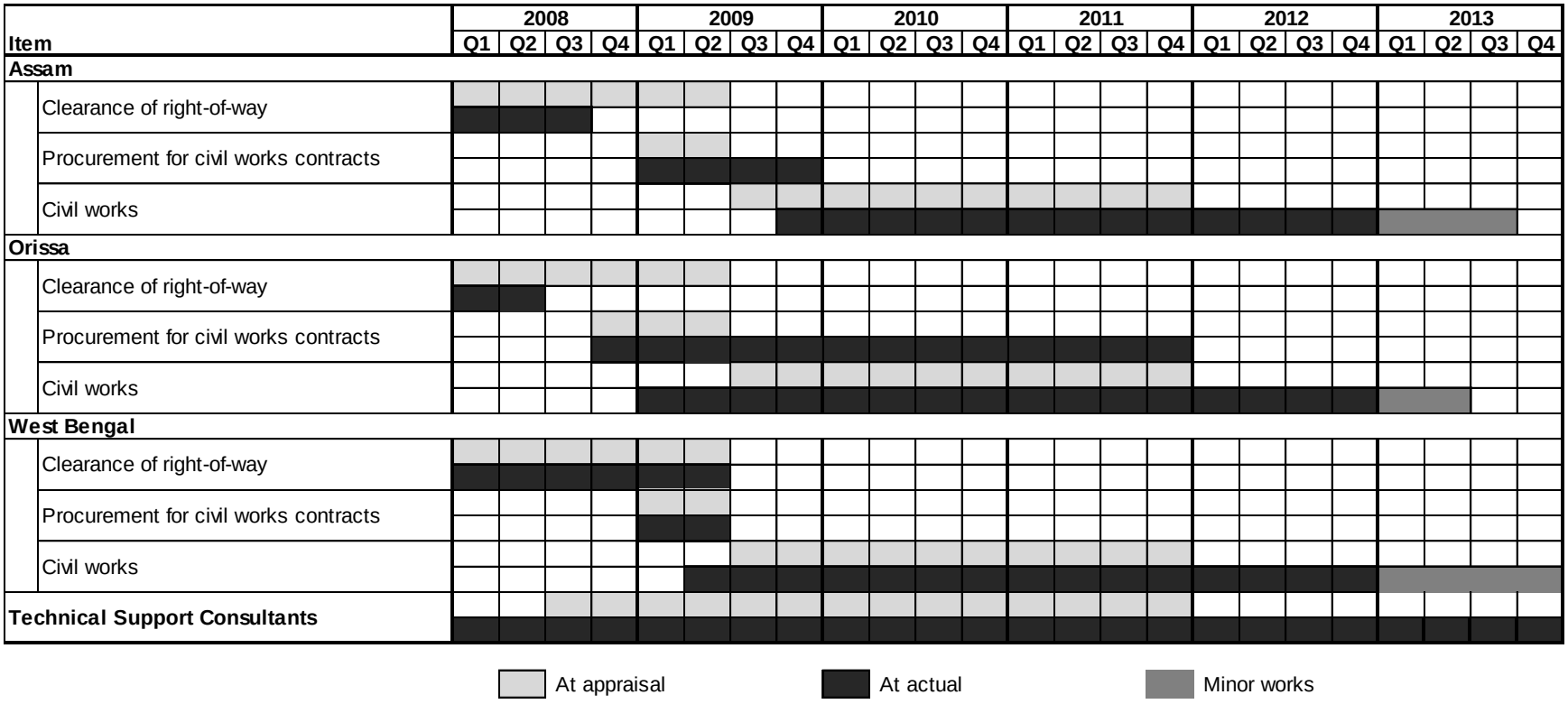
ADB = Asian Development Bank.
Source: Asian Development Bank.

Figure A4: Annual Disbursement of ADB Loan Proceeds
($ million)



ADB = Asian Development Bank.
Source: Asian Development Bank.

ACTUAL PROJECT IMPLEMENTATION SCHEDULES



Q = quarter.

Sources: Project implementing agency; Asian Development Bank project completion review mission.

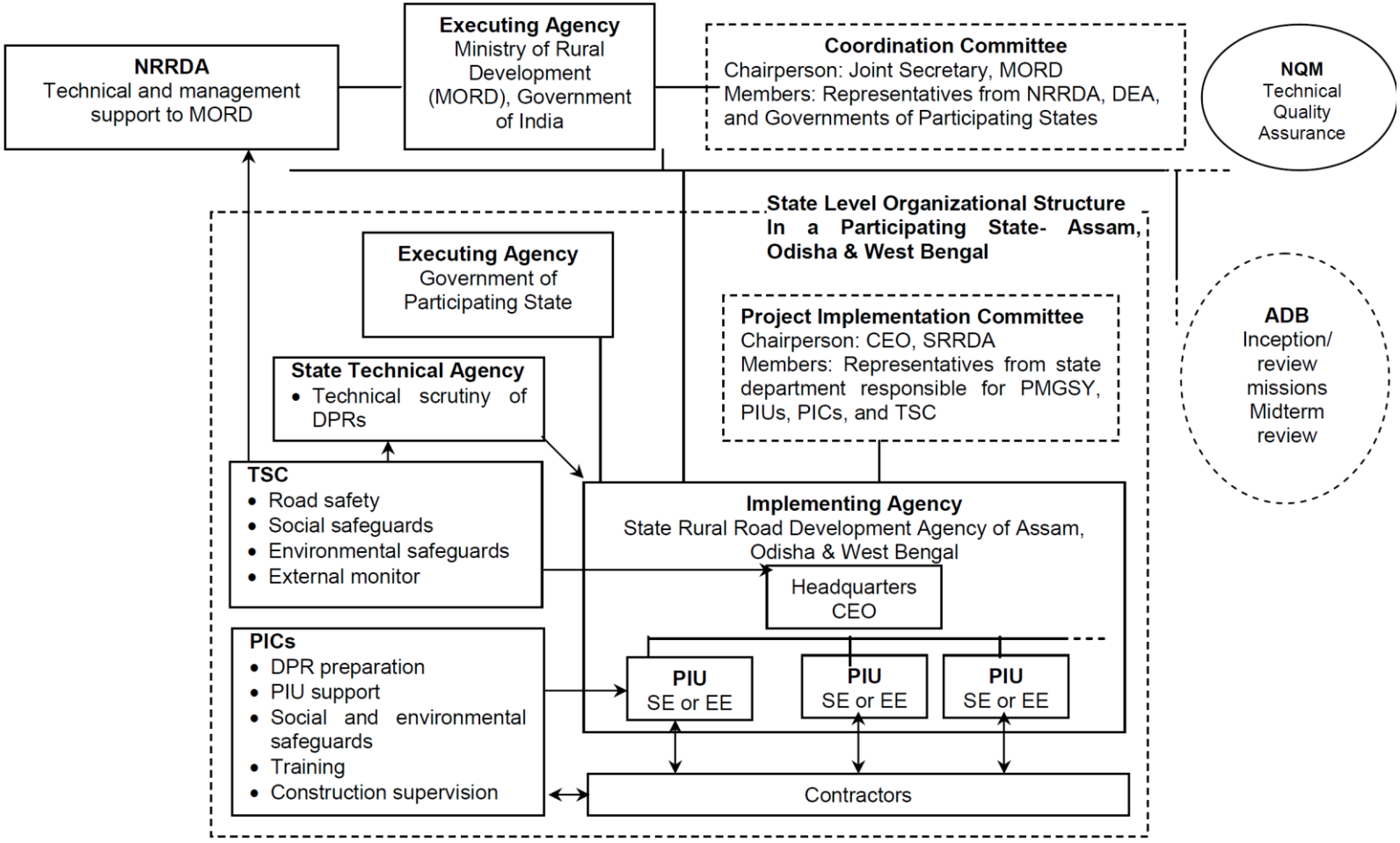
CHRONOLOGY OF MAJOR EVENTS

Date	Main Event
A. Processing of the Multitranche Financing Facility	
2003	
20 November	Approval of PPTA 4220-IND: Rural Roads Sector II Investment Program
2004	
November	Start of feasibility study
2005	
18–28 March	ADB consultation mission
10 April–17 May	ADB fact-finding mission
18–28 April	ADB consultation mission
11 July	ADB first Management Review Meeting
1–5 August	ADB appraisal mission
31 August	Borrower officially communicated its view that the loan size should be expanded, subject to availability of MFF to the borrower
August	Completion of feasibility study
12–16 September	ADB specific consultation
14 October	ADB second Management Review Meeting
19 October	ADB approval to proceed with loan negotiations
24 November	Framework financing agreement negotiation held in India
25 November	Signing of framework financing agreement
25 November	First periodic financing request from government for an indicative amount of $100.00 million
28 November	ADB Board RRP circulation
20 December	Board consideration and approval of $750.00 million for the investment program
B. Processing of the Fourth Loan (Project 4)	
2009	
28 April	Fourth periodic financing request received from government for an indicative amount of $185.00 million
2 July	ADB Management's approval to proceed with negotiations for the fourth loan
29 July	Loan negotiations between the Government of India and ADB in India
7 August	ADB approval of the loan
3 September	Signing of the loan agreement and project agreement
26 November	Loan effective

Date	Main Event
C. Project Implementation (Project 4)	
2008	
3 September	ADB approved advance contracting and retroactive financing for the project
3 November	Start of civil works procurement in Orissa
2009	
6 February	Start of civil works procurement in Assam
24 February	Start of civil works procurement in West Bengal
27 July–26 August	ADB project review mission
14 November–2 December	ADB project inception mission
2010	
17 February	First disbursement of the loan proceeds
2–20 December	ADB project review mission
2011	
15 January	Contract signing with new project implementation consultants for West Bengal
27 January–7 February	ADB project review mission
4 May	Contract with new technical support consultants signed
12 July	Contract signing with new project implementation consultants for Assam
1 November	Name of Orissa changed to Odisha
31 December	Original project completion date
2012	
20 January	ADB approved extension of the loan closing date to 31 December 2012
30 June	Original loan closing date
31 December	Substantial completion of civil works under the project
31 December	Actual loan closing date
2013	
25 February	Last loan reallocation
23 April	Loan financial account closing
15–25 October	ADB project completion review mission

ADB = Asian Development Bank, MFF = multitranche financing facility, PPTA = project preparatory technical assistance, RRP = report and recommendation of the President.
Source: ADB project completion review mission.

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; PMGSY = *Pradhan Mantri Gram Sadhak Yojana* (Prime Minister's Rural Roads Program); SE = superintending engineer; SRRDA = State Rural Roads Development Agency; TSC = technical support consultant.
Source: ADB. 2005. *Report and Recommendation of the President to the Board of Directors for the Proposed Multitranche Financing Facility to India for the Rural Roads Sector II Investment Program*. Manila.

STATUS OF COMPLIANCE WITH MAJOR LOAN COVENANTS

Particulars	Reference in Loan Agreement	Status of Compliance
PARTICULAR COVENANTS		
(a) The Borrower shall cause MORD and the State 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.	LA, Article IV Section 4.01	**Complied with.** MORD and the project states implemented the project with due diligence, efficiently, and in conformity with sound administration.
The Borrower shall make available to MORD, and the States, 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.	LA, Article IV Section 4.02	**Complied with**. MORD and the project states obtained sufficient support and funds from the central government in a timely manner to carry out the project. Upon completion, total government funds of $63.35 million equivalent were provided to the project.
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.	LA, Article IV Section 4.03	**Complied with**. A coordination committee, chaired by the MORD joint secretary and comprised of representatives from relevant agencies, was in place to monitor the use of the loan and overall implementation performance of the project. The project was implemented fully under the PMGSY guidelines.
The Borrower shall take all action which shall be necessary on its part to enable MORD, and the State 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.	LA, Article IV Section 4.04	**Complied with.** MORD and the project states performed their obligations under the project agreement.
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.	LA, Article IV Section 4.05	**Complied with.** The project was implemented under the financing arrangement in the manner as to protect the interests of the borrower and ADB and to accomplish the purposes of the loan.
PROCUREMENT OF GOODS AND WORKS, AND CONSULTING SERVICES		
Procurement for Goods and Works Except as ADB may otherwise agree, Works shall be procured only on the basis of the methods of procurement set forth below: National Competitive Bidding. The method of procurement is subject to, among other things, the detailed arrangements and threshold values set forth in the Procurement Plan. The Borrower may only modify the methods of procurement or threshold values with the prior agreement of ADB, and modifications must be set out in updates to the Procurement Plan. National Competitive Bidding. The Borrower, through MORD and the States, and ADB shall ensure that any procurement activity under national competitive bidding must be consistent with the Procurement Guidelines. The PMGSY standard bidding documents and procurement procedures used for national competitive	LA, Schedule 4 Para. 3	**Complied with.** The procurement for civil work contracts conformed to ADB's *Procurement Guidelines* (2007, as amended from time to time). All works were procured using national competitive bidding. The procurement of civil works also followed the PMGSY standard bidding documents and procedures with the agreed adjustment for items under ADB-financing in eligibility, anticorruption, and social and environmental safeguards under the project.

Particulars	Reference in Loan Agreement	Status of Compliance
bidding under Project 1 shall continue to apply to Subprojects financed under the proceeds of the Loan. Any modifications and clarification to such procedures agreed between the Borrower and ADB shall be set out in the Procurement Plan. Any subsequent change to the agreed modifications and clarifications shall become effective only after the concurrence of such change by the Borrower and ADB.		
Conditions for Award of Contract The Borrower through MORD and the State shall ensure that no Works contracts financed under the Loan are awarded until all requirements as referred to in this Schedule and in paragraphs 12, 13, and 23 of Schedule 5 to this Loan Agreement have been complied with.	LA, Schedule 4 Para. 5	**Complied with.** All works contracts were awarded until all related requirements in the loan agreements were complied with.
Selection of Consulting Services Quality-and Cost-Based Selection. Except as ADB may otherwise agree, for consultants financed under the Loan, the Borrower shall apply quality-and cost-based selection for selecting and engaging consulting services.	LA, Schedule 4 Para. 6	**Complied with.** The recruitment of the TSC and PIC consulting services was in conformance with ADB's *Guidelines on the Use of Consultants* (2002, as amended from time to time). Quality- and cost-based selection was used.
Industrial or Intellectual Property Rights (a) The Borrower through MORD and the State shall ensure that all Goods and Works procured (including without limitation all computer hardware, software and systems, whether separately procured or incorporated within other goods and services procured) do not violate or infringe any industrial property or intellectual property right or claim of any third party. (b) The Borrower through MORD and the State shall ensure that all contracts for the procurement of Goods and Works contain appropriate representations, warranties and, if appropriate, indemnities from the contractor or supplier with respect to the matters referred to in subparagraph (a) of this paragraph.	LA, Schedule 4 Para. 7	**Complied with.** Works procured under the project did not violate or infringe any industrial property or intellectual property right. All contracts for procurement of works had representations, warranties, and indemnities with respect to industrial or intellectual property rights.
The Borrower thorough MORD and the State shall ensure that all ADB financed contracts with consultants contain appropriate representations, warranties and, if appropriate, indemnities from the consultants to ensure that the consulting services provided do not violate or infringe any industrial property or intellectual property right or claim of any third party.	LA, Schedule 4 Para. 8	**Complied with.** The contract with the consultants had appropriate representations, warranties, and indemnities to ensure that the consulting service did not violate or infringe any industrial property or intellectual property rights.
EXECUTION OF PROJECT AND OPERATION OF PROJECT FACILITIES; FINANCIAL MATTERS		
Execution and Implementation The Project Executing Agencies for the Project shall be (a) MORD at the central level, (b) Assam through its Public Works Department, (c) Orissa through its Rural Development Department, and (c) West Bengal through its Panchayat and Rural Development Department at the state level. MORD shall be responsible for overall supervision and execution of the Project at central level and each State shall be responsible for the execution of the Project at their state level.	LA, Schedule 5 Para 1	**Complied with**. The project was fully implemented in accordance with PMGSY guidelines. As arranged during project preparation, the executing agencies for the project were MORD at the central level and state governments at the state level. MORD was responsible for overall supervision and execution of the project.
Each State shall assist the related IA in obtaining approvals and clearances for timely Project execution under the PMGSY Guidelines and other applicable laws and regulations of the Borrower and the State.	LA, Schedule 5 Para 2	**Complied with.** The execution of the project was assisted by the state governments in obtaining approvals and clearances for timely

Particulars	Reference in Loan Agreement	Status of Compliance
		project implementation under the PMGSY guidelines. No issues were observed in obtaining approvals and clearances.
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 related IEE (including unforeseen expenses beyond the estimates), utility relocation, general Project management expenses, and road maintenance, in a timely manner through approved annual budget allocations.	LA, Schedule 5 Para 3	**Complied with.** Each project state provided respective counterpart staff, land facilities, and counterpart funds for the project implementation and monitoring in accordance with the financing plan in a timely manner through approved annual budget allocations.
Each State shall ensure that the PICs continue to assist in the implementation of the provisions of the CPF and the EAF (and related IEE) for all Subprojects under this Project.	LA, Schedule 5 Para 4	**Complied with.** The PICs were engaged by the project states for monitoring the implementation of the CPF and EAF.
Coordination Committees (a) The Borrower shall ensure that the Coordination Committee set up under Project 1 for the Investment Program, continues to meet on a semi-annual basis and monitor the use of Loan funds and overall implementation performance of the Project under the Facility. (b) Each State shall likewise ensure that the State-level standing committee established for the PMGSY that has been serving as the State level Project Implementation Committee under Project 1 shall continue to meet on a quarterly basis to monitor the use of Loan funds and overall implementation performance of the Project under the Facility at the State level.	LA, Schedule 5 Para 5	**Complied with.** The coordination committee at the central level comprising leaders from relevant agencies met semiannually, and continued to monitor the use of the loan and overall implementation performance. At the state level, similar committees were established under the PMGSY guidelines for overseeing and monitoring timely implementation of the project.
Project Implementation Unit Each State shall ensure that the Program Implementation Units (PIUs) established by each State in accordance with the PMGSY Guidelines shall implement the Subprojects and carry out necessary coordination with the concerned departments in the State and panchayats to ensure the smooth implementation of the Subprojects.	LA, Schedule 5 Para 6	**Complied with.** In the project states, the project implementation agencies were the SRRDAs. In each district, one or two PIUs were established in accordance with the PMGSY guidelines, headed by chief executive officers responsible for overall coordination of project implementation in each district.
Each State shall ensure that the services of the PICs shall be utilized in the carrying out of the Project, particularly with regard to assisting the PIUs in: (a) preparing additional subprojects; (b) implementing the CPF to mitigate social impacts; (c) monitoring and implementing the EAF and the relevant provisions of the ECOP and the related IEE; and (d) supporting in social and environmental safeguards.	LA, Schedule 5 Para 7	**Complied with.** The PIC was engaged by each project state to prepare additional subprojects, implement the provisions of the CPF, EAF and ECOP, monitor and implement the EAF, and support social and environmental safeguards.
Road Maintenance 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.	LA, Schedule 5 Para 8	**Complied with.** MORD, in its two circulars of 9 September 2010 and 12 November 2010, introduced an in-built mechanism to ensure that states provide timely and adequate funding for maintenance of the PMGSY roads within the 5-year post-construction period. Funding of the PMGSY roads after the 5-year post-construction period is

Particulars	Reference in Loan Agreement	Status of Compliance
		covered by the government's non-plan resources on a grants-in-aid basis.
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 roads are transferred to the designated zilla panchayats in accordance with the PMGSY Guidelines. Each State shall ensure availability of the requisite funds to the relevant functionaries at either the zilla panchayat or the PIU, as the case may be, for such maintenance in accordance with the requirements of the PMGSY Guidelines.	LA, Schedule 5 Para 9	**Complied with.** According to the latest arrangement, the SRRDAs are responsible for road maintenance after the first 5-year liability period. *Zilla panchayats* (village or small-town governments) participate in maintenance planning, and provide comments on prioritizing maintenance activities and projects.
Road Safety As part of the mid term review of the Investment Program as also the Project, the Borrower, the 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.	LA, Schedule 5 Para 10	**Complied with**. The midterm review for the project was waived. 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.
Land Availability Each State shall ensure that the 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 and the State.	LA, Schedule 5 Para 11	**Complied with.** 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 project implementation, the provision of the CPF was implemented accordingly.
Each State shall ensure that the IA shall, subject to compliance with the relevant provisions of the CPF and EAF/ECOP (and related IEE) and in accordance with all relevant applicable laws and regulations of the Borrower/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.	LA, Schedule 5 Para 12	**Complied with.** The project appraisal 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 was required for shoulder adjustment and drainage construction. No affected persons were relocated because the scale of land acquisition was minor. During implementation, pre-construction activities were completed before commencement of civil works in all project states.
Each State shall ensure that (a) 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 and the related IEE, (ii) disseminate the information on process of land transfer/availability as the case may be, support/assistance provisions and grievance procedures to the Project affected communities in a timely manner so that all related issues are resolved before awarding 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	LA, Schedule 5 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 or transfer was undertaken in a transparent manner. During implementation, the PIUs carried out the community consultation process for all subprojects in accordance with the PMGSY guidelines as supplemented by the CPF, including disseminating information on the process of land transfer

Particulars	Reference in Loan Agreement	Status of Compliance
that may be deemed to be compulsory acquisition of land; and (b) 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.		or land availability, support provisions, and grievance procedures to the project-affected communities in a timely manner. The implementing agencies ensured that voluntary land donation or transfer was undertaken in a transparent manner, supported by proper documentation, and avoided any kind of coercion or forced donation or transfer.
Bid Document Execution of Civil Works Contracts Subject to compliance with the requirements of CPF and EAF/ECOP (and related IEE), MORD shall ensure that the bid documents include the environmental management plan (EMP) and environmental checklist, to enable the contractor to include the cost required for implementing the EMP in its bid.	LA, Schedule 5 Para 14	**Complied with.** The bid documents included the environmental management plan and the environmental checklist. Sample documents were reviewed by ADB. Generally, all EMP requirements have been met.
Subject to compliance with the requirements of CPF and EAF/ECOP (and related IEE), the State shall: (i) acquire or make available on a timely basis the land and rights in land, free from any encumbrances; (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.	LA, Schedule 5 Para 15	**Complied with.** Land donation was generally done on time. The government obtained timely clearances for construction from the forest, railway, and revenue departments wherever required.
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 be handed over to the contractor unless the applicable provisions of the CPF and the EAF/ECOP (and related IEE) have been complied with.	LA, Schedule 5 Para 16	**Complied with**. All sections or part thereof were handed over to the contractor only after the applicable CPF, EAF or ECOP provisions were complied with. Approvals were obtained from the competent authorities when necessary.
Each State shall ensure that any changes to the land alignment or environment impacts on account of detailed designs of related Subproject roads shall 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.	LA, Schedule 5 Para 17	**Complied with.** In case of any change to the land alignment or environmental impacts, such subproject roads were approved by ADB and MORD.
Social Impacts Each State EA shall ensure that civil works contracts under the Project follow all applicable labor laws of the Borrower and the State and that the bid documents further include provisions to the effect that contractors: (i) carry out HIV/AIDS awareness programs for labor, and disseminate information at worksites on risks of sexually transmitted diseases and HIV/AIDS as part of health and safety measures for those employed during construction; and (ii) follow and implement all statutory provisions on labor (including not employing or using children as labor, equal pay for equal work), health, safety, welfare, sanitation, and working conditions. Such contracts shall also include clauses for termination by the State in case of any breach of the stated provisions by the contractors.	LA, Schedule 5 Para 18	**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 infections and HIV/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. During implementation, the government and PIUs monitored implementation of the contracts.
Each State shall ensure acceptance of the Project	LA,	**Complied with.**

Particulars	Reference in Loan Agreement	Status of Compliance
through effective community participation in selecting and implementing Subprojects in accordance with the PMGSY Guidelines as supplemented by the CPF (and related IEE).	Schedule 5 Para 19	In selecting and implementing the subprojects, the implementation agencies ensured that project information was disseminated and communities were consulted in accordance with the PMGSY guidelines as supplemented by the CPF.
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 State pertaining to land transfer shall be duly followed.	LA, Schedule 5 Para 20	**Complied with.** In areas of scheduled tribes, the government and PIUs followed the requirements in the CPF for any impact on land involving traditional and tenure rights of the scheduled tribes.
Environment 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 related IEE) and other applicable guidelines for Subproject implementation, shall be eligible for financing from the Loan proceeds. The State shall monitor the implementation of Subprojects through to the completion of each Subproject.	LA, Schedule 5 Para 21	**Complied with.** As agreed, only those which met the subproject selection criteria and procedures were selected and financed by the loan proceeds. The government and PIUs monitored the project progress closely, and quarterly progress reports were submitted to ADB in a timely manner.
Each State shall ensure that: (i) Subprojects shall be implemented in accordance with the EAF and related IEE, (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, and (iii) adequate Project documentation related to environment, as mutually acceptable to ADB, and MORD, environmental checklists, and reports on environmental monitoring shall be properly maintained.	LA, Schedule 5 Para 22	**Complied with.** The subprojects were implemented in accordance with the EAF and related IEE. The project states incorporated standard EMPs in their bidding documents for civil works. The contractors responded to the EAF and ECOP requirements, and included the costs in their bills of quantities. Documentation of environmental issues and monitoring reports was properly maintained.
Each State shall require the respective IA 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 shall be undertaken on sections of Subprojects that pass through a forest reserve unless clearance is granted in accordance with applicable laws and regulations of the Borrower and each 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.	LA, Schedule 5 Para 23	**Complied with.** The governments and PIUs, with assistance from the TSC, carefully implemented the environmental mitigation measures during project implementation; and the PICs carried out regular environmental monitoring. The ADB project review missions noted that implementation of the environmental safeguards in all project states was generally in order.
Subproject Selection and Approval Process; Subprojects Implementation The Borrower through MORD shall ensure that the Subprojects follow the selection criteria and are promptly processed for approval by ADB as described in detail in Subproject selection criteria and procedures included in Schedule 2 to the FFA.	LA, Schedule 5 Para 24	**Complied with.** A total of 711 subprojects were selected and prepared based on the subproject selection criteria and procedure under PMGSY guidelines, and approved by ADB.

Particulars	Reference in Loan Agreement	Status of Compliance
Performance Audit Without limiting the generality of Section 2.09 of the Project Agreement, MORD shall cause the State to allow ADB to carry out procurement audits during Project implementation as part of its regular review process.	LA, Schedule 5 Para 25	**Complied with.** ADB's designated consultant performed regular procurement audits.
Project Performance Monitoring and Progress Reports Each State through the respective IA shall undertake periodic Subproject performance review under the Project and the Investment Program, in accordance with the Investment Program Performance Monitoring System, to evaluate the scope, implementation arrangements, progress and achievements of objectives of the Project and overall Investment Program.	LA, Schedule 5 Para 26	**Partially complied with.** Performance reviews of the subprojects were undertaken regularly. The TSC implemented multiyear monitoring of the socioeconomic impacts of the project roads under the investment program. The monitoring reports, with survey results and evaluations for 2008 and 2009, were submitted to ADB. However, the subsequent monitoring was not carried out.
Notwithstanding the generality of Section 2.08 of the Project Agreements, each State through the respective IA shall submit to MORD the monthly progress reports on the implementation of the Subprojects under the Project. Based on these reports, MORD through NRRDA shall prepare and provide ADB with quarterly progress reports on the implementation of the Subprojects under the Project within 45 days of the close of each quarter.	LA, Schedule 5 Para 27	**Complied with.** The project implementing agencies prepared all monthly project progress reports. Consolidated project quarterly progress reports were submitted by the NRRDA to ADB in a timely manner, covering all ongoing projects under the investment program.
Reports and Review (a) Without limiting the generality of Section 2.08(c) of the Project Agreements and Section 7.04(d) of the Loan Regulations, the Borrower shall submit to ADB a project completion report within 3 months of physical completion of the Project. The report shall include a detailed evaluation of the Project, covering the design, costs, contractors' and consultants' performance, social and economic impact, economic rate of return, implementation of social and environmental safeguards measures and other details relating to Project, as may be requested by ADB. (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.	LA, Schedule 5 Para 28	**Complied with.** The NRRDA prepared a project completion report generally in the ADB requested format, which was submitted to ADB before the PCR mission. During implementation, ADB conducted regular review missions for the project, which combined the reviews for other projects under the investment program. Several tripartite meetings were held to discuss critical issues regarding project implementation.

ADB = Asian Development Bank, CPF = community participation framework, EA = executing agency, EAF = environmental assessment and review framework, ECOP = environment code of practice, EMP = environmental management plan, FFA = framework financing agreement, IA = implementing agency, IEE = initial environmental examination, LA = loan agreement, MORD = Ministry of Road Development, NRRDA = National Rural Roads Development Agency, PCR = project completion review, PIC = project implementation consultant, PIU = project implementation unit, PMGSY = *Pradhan Mantri Gram Sadhak Yojana* (Prime Minister's Rural Roads Program), QCBS = quality- and cost-based selection, SRRDA = State Rural Roads Development Agency, TSC = technical support consultant.
Source: ADB's project completion review mission.

SUMMARY OF CONTRACT PACKAGES

No.	State	Contractor/Consultant Name	No. of Contracts	No. of Roads	Total Length (km)	Procurement Method	Contract Dates	Contract Cost (Rs million)	Actual Cost (million) Rs	Actual Cost (million) $ equivalent
Road Connectivity										
1.	Assam		107	273	914.27	NCB	Q2 2009—Q4 2009	5,758.30	5,758.30	105.06
2.	Orissa		210	303	1,458.70	NCB	Q1 2009—Q4 2011	5,760.70	5,193.70	94.76
3.	West Bengal		122	124	602.26	NCB	Q2 2009—Q3 2009	2,795.30	2,517.15	45.93
	Total		**439**	**700**	**2,975.23**			**14,314.30**	**13,469.15**	**245.74**
Consultants										
1.	TSC Consultant									
	Original TSC	M/S Operations Research Group in association with Aarvee Associates Archit Engineers				QCBS	9 April 2007		5.85	0.13
	New TSC	M/S Operations Research Group in association with Aarvee Associates Archit Engineers				QCBS	4 May 2011		5.42	0.10
2.	PIC Consultants									
	Assam	M/S SMEC International				QCBS	20 August 2007		6.43	0.14
		LEA Associates South Asia				QCBS	12 July 2011		3.10	0.07
	Orissa	MSV International				QCBS	31 October 2007		8.10	0.15
	West Bengal	Consulting Engineering Services				QCBS	15 September 2007		4.00	0.07
		CRAPHTS Consultants				QCBS	15 January 2011		2.40	0.04
	Total								**35.30**	**0.70**

NCB = national competitive bidding, PIC = project implementation consultant, Q = quarter, QCBS = quality- and cost-based selection, TSC = technical support consultant.
Sources: Implementing agencies; Asian Development Bank project completion review mission.

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- and without-project cases, using similar methodology to that at appraisal and input from the updated traffic and economic data. In the without-project case, it was assumed that the original state of the roads would be retained. In the with-project case, the roads were constructed and/or upgraded so that vehicles could drive at faster speeds with lower operating costs and less travel time. Economic benefits were estimated by comparing the with- and without-project cases. The economic internal rate of return (EIRR) was calculated and sensitivity was tested. The economic reevaluation was carried out for the whole project, as well as separately for the project states (Assam, Orissa, and West Bengal).

B. Traffic Survey and Analysis

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 for each state. During the ADB PCR mission, a due diligence traffic survey was conducted in November 2013, which collected the actual traffic accounts of 10 sample roads in Assam, 10 sample roads in Orissa, and five sample roads in West Bengal. The actual traffic counts for 12 hours were collected by vehicle type including cars, jeeps, vans, three-wheelers, two-wheelers, light commercial vehicles, medium commercial vehicles, trucks, and tractors. By comparing the actual traffic -counts after project completion with those at baseline, a significant increase was registered in all project states—about 35.00% in Assam, 59.00% in Orissa, and 133.00% in West Bengal. Tables A10.1–A10.3 summarize the traffic surveys and increase rates.

Table A10.1: Actual Traffic in Assam (vehicle, AADT)

Item	Truck	Bus	Tractor with Trailer	MCV	LCV	Car, Jeep, Van, or Three-Wheeler	Two-Wheeler	Total
Before the project (2008)								
Average (per road)	6	1	9	6	17	28	65	**133**
Composition (%)	4	1	6	5	13	21	49	**100**
After the project (2013)								
Average (per road)	9	2	10	9	21	43	85	**179**
Composition (%)	5	1	5	5	12	24	48	**100**
Increased by (%)	59	82	13	39	22	52	30	35
Annual increase rate (%)	10	13	2	7	4	9	5	6

AADT = annual average daily traffic, MCV = medium commercial vehicle, LCV = light commercial vehicle.
Source: Technical support consultants.

Table A10.2: Actual Traffic in Orissa (vehicle, AADT)

Item	Truck	Bus	Tractor with Trailer	MCV	LCV	Car, Jeep, Van, or Three-Wheeler	Two-Wheeler	Total
Before the project (2008)								
Average (per road)	3	0	4	8	9	13	30	**67**
Composition (%)	4	0	6	12	13	19	45	**100**
After the project (2013)								
Average (per road)	5	1	6	12	14	22	47	**106**
Composition (%)	5	1	5	11	13	21	45	**100**
Increased by (%)	66	157	33	46	59	73	59	59
Annual increase rate (%)	11	21	6	8	10	12	10	10

AADT = annual average daily traffic, MCV = medium commercial vehicle, LCV = light commercial vehicle.
Source: Technical support consultants.

Table A10.3: Actual Traffic in West Bengal (vehicle, AADT)

Item	Truck	Bus	Tractor with Trailer	MCV	LCV	Car, Jeep, Van, or Three-Wheeler	Two-Wheeler	Total
Before the project (2008)								
Average (per road)	2	0	13	5	14	25	72	**129**
Composition (%)	1	0	10	4	11	19	55	**100**
After the project (2013)								
Average (per road)	6	1	14	14	28	84	155	**301**
Composition (%)	2	0	5	5	9	28	51	**100**
Increased by (%)	272	200	14	178	102	241	116	133
Annual increase rate (%)	30	25	3	23	15	28	17	18

AADT = annual average daily traffic, MCV = medium commercial vehicle, LCV = light commercial vehicle.
Source: Technical support consultants.

3. Based on the actual traffic and analysis, the increase rates for future traffic on the project roads were adjusted by assuming that (i) the 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 2020. Table A10.4 shows the adjusted traffic increase rates by vehicle type. These rates are higher than at appraisal, which reflects the higher traffic volume than anticipated and faster socioeconomic development in the project area. The traffic forecast was made accordingly and the forecast result has been used in the economic reevaluation.

Table A10.4: Adjusted Traffic Growth Rate (% per annum)

State	Truck	Bus	Tractor with Trailer	MCV	LCV	Car, Jeep, Van, or Three-Wheeler	Two-Wheeler	Total
Assam								
Baseline–2013	9.7	12.7	2.4	6.8	4.0	8.7	5.5	6.1
2014–2020	10.0	10.0	4.0	8.0	8.0	12.0	10.0	9.9
2021–	6.0	9.0	4.0	6.0	6.0	11.0	9.0	9.0
West Bengal								
Baseline–2013	30.0	24.6	2.6	22.7	15.1	27.8	16.7	18.4
2014–2020	7.0	9.0	3.0	7.0	6.0	10.0	7.0	7.6
2021–	5.0	7.0	2.0	6.0	5.0	8.0	5.0	6.1
Orissa								
Baseline–2013	10.6	20.8	5.9	7.9	9.7	11.6	9.7	9.7
2014–2020	15.0	15.0	8.0	10.0	12.0	15.0	15.0	13.8
2021–	8.0	12.0	6.0	6.0	8.0	11.0	9.0	9.1

AADT = annual average daily traffic, MCV = medium commercial vehicle, LCV = light commercial vehicle.
Source: Asian Development Bank project completion review mission.

C. Project Costs

4. The project costs consist of capital and maintenance costs. The actual capital cost for the whole project was about 3.57% higher than estimated at appraisal. The unit cost per kilometer (km) for the road connectivity component rose by 11.40%, mainly because of higher contract prices. Actual annual investment costs for the subprojects 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.[1] It was also assumed that periodic maintenance would constitute about 20.00% of the capital cost and would take place every 5 years.[2] The financial costs for both capital and maintenance were converted into economic costs with a standard conversion factor of 0.85 in the project area. All economic costs were estimated in constant 2013 prices.

D. Economic Benefits

5. Using the same methodology as at appraisal, the main sources of economic benefits considered include vehicle operating cost (VOC) savings, passenger travel time cost savings, and other potential benefits. The benefit calculation only considered normal and diverted traffic; induced traffic was excluded. The VOC savings were recalculated using unit VOC data for different road roughness, which were adopted from the appraisal calculation, but adjusted for inflation. The VOC savings in Indian rupees per vehicle-km were estimated at Rs30.4 for trucks; Rs28.9 for buses; Rs24.3 for tractors with trailers; Rs28.5 for medium commercial vehicles (MCVs); Rs23.7 for light commercial vehicles (LCVs); Rs7.9 for cars, jeeps, vans and three-wheelers; and Rs2.3 for two-wheelers. Average passenger vehicle speeds were assumed to be 40–50 km/hour for with-project cases and 25 km/hour for without-project cases. The passenger travel time cost was derived from the average income per capita of the

[1] The PCR mission was told that the average routine maintenance cost was Rs12,000–Rs35,000 per km for the Prime Minister's Rural Roads Program (PMGSY) roads.
[2] The PMGSY guidelines state that periodic maintenance is to be conducted every 5 years.

project states in FY2013, and was assumed to increase 6.00%–8.00% each year to reflect increased incomes. 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. Since data are unavailable, 10.00% 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 costs, and savings in maintenance costs for the without-project case. The benefit calculation results showed that the VOC savings constituted a major portion (about 80.00%) of total benefits in the early years of the project operation, but passenger time cost benefits were projected to increase rapidly along with socioeconomic development and increased incomes (about 35.00% in 2030).

E. Economic Internal Rate of Return Reevaluation

6. The recalculated EIRR was 20.10% for the whole project (17.20% for Assam, 15.20% for Orissa, and 34.50% for West Bengal). The lower EIRR for Orissa was mainly caused by lower traffic levels. The higher EIRR for West Bengal was caused by a lower unit investment cost. Compared with 18.00% at appraisal, the higher EIRR was mainly caused by much higher actual traffic levels compared with those estimated at appraisal.[3] The recalculated EIRRs are above the ADB-recommended social discount rate of 12.00% and the project can be still considered economically viable. The EIRRs were subjected to sensitivity analysis to test different scenarios. The sensitivity analysis results showed that the project continued to be economically viable for all scenarios. In the case of a combination of both a 20.00% maintenance cost increase and a 20.00% benefit reduction, the EIRR would be 16.60% for the whole project. The sensitivity test also shows that the EIRR is more sensitive to changes in benefits. Therefore, the government should pay more attention to socioeconomic development in the project area and implement policies to stimulate transport services and increase villagers' incomes. The results of the sensitivity tests are in Table A10.5.

Table A10.5: Sensitivity Analysis

	Scenarios	**EIRR** (%)	**ENPV** (Rs million)
	Base Case	**20.1**	**17,432.3**
	Sensitivity Tests		
1	Maintenance Cost 10% Higher	19.8	16,973.8
2	Maintenance Cost 20% Higher	19.6	16,515.4
3	Benefits 10% Lower	18.6	13,865.2
4	Benefits 20% Lower	17.1	10,298.2
5	Benefits 10% Higher	21.4	20,999.3
6	Benefits 20% Higher	22.7	24,566.3
7	Maintenance Cost 10% Higher and Benefits 10% Lower	18.4	13,406.8
8	Maintenance Cost 20% Higher and Benefits 20% Lower	16.6	9,381.4

EIRR = economic internal rate of return, ENPV = economic net present value
Source: Asian Development Bank project completion review mission.

[3] In the multitranche financing facility (MFF), the overall EIRR for the sample subprojects was 18.00% (15.60% for Assam, 18.00% for Orissa, and 20.10% for West Bengal).

7. The detailed cash flows of the EIRR calculations for the whole project as well as for each state are in Tables A10.6–A10.9.

Table A10.6: Economic Reevaluation for the Whole Project (Rs million)

	Cost			Benefit				Net	
Year	Capital	Maintenance	Total	VOC	Time	Others	Total	Benefit	NPV
2008	198.60		198.6					(198.6)	(350.0)
2009	3,067.66		3,067.7					(3,067.7)	(4,827.0)
2010	4,098.11		4,098.1					(4,098.1)	(5,757.6)
2011	2,578.75	5.94	2,584.7	498.3	69.4	56.8	624.4	(1,960.3)	(2,459.0)
2012	1,457.17	17.83	1,475.0	830.5	115.6	94.6	1,040.7	(434.3)	(486.4)
2013	70.59	29.72	100.3	1,328.8	185.0	151.4	1,665.2	1,564.9	1,564.9
2014		59.43	59.4	1,661.0	231.2	189.2	2,081.5	2,022.0	1,805.4
2015		59.43	59.4	1,806.7	276.0	208.3	2,291.0	2,231.6	1,779.0
2016		59.43	59.4	1,966.8	329.7	229.6	2,526.1	2,466.7	1,755.8
2017		59.43	59.4	2,142.6	394.3	253.7	2,790.6	2,731.2	1,735.7
2018	2,294.18	59.43	2,353.6	2,336.0	471.9	280.8	3,088.7	735.1	417.1
2019		59.43	59.4	2,548.8	565.4	311.4	3,425.6	3,366.2	1,705.4
2020		59.43	59.4	2,783.3	677.9	346.1	3,807.2	3,747.8	1,695.3
2021		59.43	59.4	2,975.2	795.2	377.0	4,147.4	4,087.9	1,651.0
2022		59.43	59.4	3,181.6	933.3	411.5	4,526.4	4,467.0	1,610.8
2023	2,294.18	59.43	2,353.6	3,403.9	1,096.1	450.0	4,950.0	2,596.4	836.0
2024		59.43	59.4	3,643.2	1,288.0	493.1	5,424.3	5,364.9	1,542.3
2025		59.43	59.4	3,901.0	1,514.4	541.5	5,957.0	5,897.5	1,513.7
2026		59.43	59.4	4,178.9	1,781.5	596.0	6,556.5	6,497.0	1,489.0
2027		59.43	59.4	4,478.4	2,097.0	657.5	7,233.0	7,173.5	1,467.8
2028	2,294.18	59.43	2,353.6	4,801.5	2,469.6	727.1	7,998.3	5,644.7	1,031.3
2029		59.43	59.4	5,150.2	2,910.0	806.0	8,866.2	8,806.8	1,436.6
2030		59.43	59.4	5,526.5	3,430.7	895.7	9,852.9	9,793.5	1,426.4
2031		59.43	59.4	5,932.9	4,046.6	998.0	10,977.5	10,918.0	1,419.8
2032		59.43	59.4	6,372.0	4,775.4	1,114.7	12,262.2	12,202.8	1,416.8
2033	(5,735.44)	59.43	(5,676.0)	6,846.6	5,638.3	1,248.5	13,733.3	19,409.3	2,012.1
								ENPV	**17,432.3**
								EIRR	**20.1%**
								Discount rate	**12.0%**

( ) = negative, EIRR = economic internal rate of return, ENPV = economic net present value, NPV = net present value, VOC = vehicle operating cost.
Source: Asian Development Bank project completion review mission.

Table A10.7: Economic Reevaluation for Assam (Rs million)

	Cost			Benefit				Net	
Year	Capital	Maintenance	Total	VOC	Time	Others	Total	Benefit	NPV
2008									
2009	616.47		616.5					(616.5)	(970.0)
2010	1,660.40		1,660.4					(1,660.4)	(2,332.7)
2011	1,581.98	1.8	1,583.8	162.2	18.5	18.1	198.7	(1,385.1)	(1,737.5)
2012	1,045.50	5.5	1,051.0	270.3	30.8	30.1	331.2	(719.8)	(806.2)
2013		9.1	9.1	432.4	49.3	48.2	529.9	520.7	520.7
2014		18.3	18.3	540.5	61.6	60.2	662.4	644.1	575.1
2015		18.3	18.3	588.3	74.2	66.3	728.8	710.5	566.4
2016		18.3	18.3	640.6	89.4	73.0	803.0	784.7	558.5
2017		18.3	18.3	697.9	107.6	80.6	886.1	867.8	551.5
2018	980.9	18.3	999.1	760.6	129.6	89.0	979.3	(19.9)	(11.3)
2019		18.3	18.3	829.3	156.2	98.5	1,084.0	1,065.8	540.0
2020		18.3	18.3	904.6	188.2	109.3	1,202.1	1,183.8	535.5
2021		18.3	18.3	971.1	224.7	119.6	1,315.3	1,297.1	523.9
2022		18.3	18.3	1,042.9	268.2	131.1	1,442.3	1,424.0	513.5
2023	980.9	18.3	999.1	1,120.6	320.3	144.1	1,585.0	585.9	188.6
2024		18.3	18.3	1,204.7	382.5	158.7	1,745.9	1,727.6	496.7
2025		18.3	18.3	1,295.6	456.8	175.2	1,927.7	1,909.4	490.1
2026		18.3	18.3	1,394.1	545.6	194.0	2,133.7	2,115.4	484.8
2027		18.3	18.3	1,500.8	651.7	215.2	2,367.7	2,349.5	480.7
2028	980.9	18.3	999.1	1,616.5	778.4	239.5	2,634.4	1,635.2	298.7
2029		18.3	18.3	1,741.9	929.8	267.2	2,938.9	2,920.6	476.4
2030		18.3	18.3	1,878.0	1,110.7	298.9	3,287.6	3,269.3	476.2
2031		18.3	18.3	2,025.7	1,326.9	335.3	3,687.9	3,669.6	477.2
2032		18.3	18.3	2,186.2	1,585.2	377.1	4,148.6	4,130.3	479.6
2033	(2,452.2)	18.3	(2,433.9)	2,360.5	1,894.0	425.4	4,679.9	7,113.8	737.5
								ENPV	**4,113.9**
								EIRR	**17.2%**
								Discount rate	**12.0%**

( ) = negative, EIRR = economic internal rate of return, ENPV = economic net present value, NPV = net present value, VOC = vehicle operating cost.
Source: Asian Development Bank project completion review mission.

Table A10.8: Economic Reevaluation for Orissa (Rs million)

	Cost			Benefit				Net	
Year	**Capital**	**Maintenance**	**Total**	**VOC**	**Time**	**Others**	**Total**	**Benefit**	**NPV**
2008	198.60		198.6					(198.6)	(350.0)
2009	1,922.06		1,922.1					(1,922.1)	(3,024.4)
2010	1,332.67		1,332.7					(1,332.7)	(1,872.3)
2011	620.37	2.9	623.3	111.3	18.5	13.0	142.8	(480.4)	(602.7)
2012	277.23	8.7	286.0	185.6	30.9	21.6	238.1	(47.9)	(53.6)
2013	70.59	14.6	85.2	296.9	49.4	34.6	380.9	295.8	295.8
2014		29.1	29.1	371.1	61.7	43.3	476.2	447.0	399.1
2015		29.1	29.1	416.3	76.7	49.3	542.3	513.2	409.1
2016		29.1	29.1	467.3	95.2	56.2	618.7	589.6	419.7
2017		29.1	29.1	524.7	118.3	64.3	707.3	678.1	431.0
2018	884.3	29.1	913.4	589.4	146.9	73.6	810.0	(103.5)	(58.7)
2019		29.1	29.1	662.4	182.5	84.5	929.4	900.3	456.1
2020		29.1	29.1	744.9	226.6	97.2	1,068.7	1,039.5	470.2
2021		29.1	29.1	804.9	270.7	107.6	1,183.2	1,154.0	466.1
2022		29.1	29.1	869.9	323.4	119.3	1,312.7	1,283.5	462.9
2023	884.3	29.1	913.4	940.4	386.4	132.7	1,459.6	546.1	175.8
2024		29.1	29.1	1,017.0	461.7	147.9	1,626.6	1,597.4	459.2
2025		29.1	29.1	1,100.0	551.7	165.2	1,816.9	1,787.8	458.9
2026		29.1	29.1	1,190.2	659.3	185.0	2,034.5	2,005.3	459.6
2027		29.1	29.1	1,288.1	787.9	207.6	2,283.6	2,254.5	461.3
2028	884.3	29.1	913.4	1,394.5	941.6	233.6	2,569.7	1,656.3	302.6
2029		29.1	29.1	1,510.1	1,125.4	263.5	2,899.0	2,869.8	468.1
2030		29.1	29.1	1,635.7	1,345.1	298.1	3,278.8	3,249.7	473.3
2031		29.1	29.1	1,772.2	1,607.8	338.0	3,718.0	3,688.9	479.7
2032		29.1	29.1	1,920.7	1,921.9	384.3	4,226.9	4,197.7	487.4
2033	(2,210.8)	29.1	(2,181.6)	2,082.3	2,297.5	438.0	4,817.7	6,999.3	725.6
								ENPV	**2,799.7**
								EIRR	**15.2%**
								Discount rate	**12.0%**

( ) = negative, EIRR = economic internal rate of return, ENPV = economic net present value, NPV = net present value, VOC = vehicle operating cost.
Source: Asian Development Bank project completion review mission.

Table A10.9: Economic Reevaluation for West Bengal (Rs million)

	Cost			Benefit				Net	
Year	Capital	Maintenance	Total	VOC	Time	Others	Total	Benefit	NPV
2008									
2009	529.12		529.1					(529.1)	(832.6)
2010	1,105.05		1,105.0					(1,105.0)	(1,552.5)
2011	376.41	1.2	377.6	224.8	32.4	25.7	282.9	(94.7)	(118.8)
2012	134.44	3.6	138.1	374.7	53.9	42.9	471.5	333.4	373.4
2013		6.0	6.0	599.5	86.3	68.6	754.4	748.3	748.3
2014		12.0	12.0	749.4	107.9	85.7	942.9	930.9	831.2
2015		12.0	12.0	802.1	125.1	92.7	1,019.9	1,007.9	803.5
2016		12.0	12.0	858.9	145.1	100.4	1,104.4	1,092.4	777.5
2017		12.0	12.0	920.1	168.4	108.8	1,197.3	1,185.3	753.3
2018	429.0	12.0	441.0	986.0	195.4	118.1	1,299.5	858.5	487.1
2019		12.0	12.0	1,057.1	226.7	128.4	1,412.2	1,400.1	709.3
2020		12.0	12.0	1,133.7	263.1	139.7	1,536.5	1,524.5	689.6
2021		12.0	12.0	1,199.2	299.8	149.9	1,648.9	1,636.8	661.1
2022		12.0	12.0	1,268.8	341.6	161.0	1,771.5	1,759.4	634.5
2023	429.0	12.0	441.0	1,342.8	389.3	173.2	1,905.4	1,464.3	471.5
2024		12.0	12.0	1,421.6	443.7	186.5	2,051.9	2,039.8	586.4
2025		12.0	12.0	1,505.4	505.8	201.1	2,212.3	2,200.3	564.8
2026		12.0	12.0	1,594.6	576.6	217.1	2,388.3	2,376.3	544.6
2027		12.0	12.0	1,689.5	657.4	234.7	2,581.6	2,569.6	525.8
2028	429.0	12.0	441.0	1,790.6	749.6	254.0	2,794.2	2,353.2	429.9
2029		12.0	12.0	1,898.2	854.9	275.3	3,028.3	3,016.3	492.0
2030		12.0	12.0	2,012.8	974.9	298.8	3,286.5	3,274.5	476.9
2031		12.0	12.0	2,134.9	1,111.9	324.7	3,571.6	3,559.5	462.9
2032		12.0	12.0	2,265.1	1,268.3	353.3	3,886.8	3,874.7	449.9
2033	(1,072.5)	12.0	(1,060.5)	2,403.8	1,446.9	385.1	4,235.7	5,296.2	549.0
								ENPV	**10,518.6**
								EIRR	**34.5%**
								Discount rate	**12.0%**

( ) = negative, EIRR = economic internal rate of return, ENPV = economic net present value, NPV = net present value, VOC = vehicle operating cost.
Source: Asian Development Bank project completion review mission.

SUMMARY OF THE SOCIOECONOMIC IMPACTS

A. Introduction

1. During implementation of the investment program, the technical support consultant (TSC) undertook a before and after study to gauge the project's socioeconomic impact. The surveys covered a sample of 45 habitations in 12 districts of the three states. [1] During the Asian Development Bank (ADB) project completion review (PCR) mission, a due diligence survey was conducted in November 2013, including a quick traffic survey and social impact analysis. All data and analysis for this appendix are derived from the socioeconomic impact assessment report for Assam, West Bengal, and Orissa prepared by the TSC in 2008[2] and the due diligence survey conducted in November 2013.

B. Socioeconomic Impacts

2. **Connectivity improvement**. In accordance with its main objective, roads developed under the Prime Minister's Rural Roads Program (PMGSY) 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 who live elsewhere. According to household surveys conducted in the 12 districts, the average distance to the workplace increased by about 2 kilometers (km), whereas the average time taken to reach the workplace decreased by 0.5 hours. This demonstrates that, with improved connectivity, inhabitants are able to expand the area where they seek employment and that travel time decreases although distance increases. During the due diligence survey in November 2013, villagers in Manoharpur Village in N 24 Pargana district in West Bengal reported that the journey time to the nearest railway station (5 km away) was about 1.5 hours by bicycle (more during the rainy season as the road use to be muddy and slippery) prior to connectivity. With improved connectivity, the journey takes about 15 minutes by motorcycle or 30 minutes by bicycle. Similarly for Nimidha village in Dhenkanal district in Orissa, the villagers reported that the journey time to reach the main road used to take about 2 hours but that it has reduced to 20 minutes by motorcycle. Villagers of Bathan village in Kamrup Rural district in Assam reported that it was not possible for a vehicle to come to their village as the road was a track before its construction. During the rainy season, it was even difficult to walk on the road and vehicles used to drop the villagers and essential commodities at the National Highway 52 junction about 5 km from the village. PMGSY roads also provide government workers—including health workers, teachers, and agriculture extension workers—with easier access to habitations to provide services and information to rural communities. The roads also promote greater social interaction between villagers and external residents, most evidently through an increase in the number of marriages that have taken place in communities since connectivity, especially with a partner who is a nonresident, and (on average) a tripling of the number of trips made for social interaction.

3. **Public transport service**. Buses, jeeps, vans, and three-wheelers provide reliable public transportation between newly connected villages and nearby towns and cities. In sample habitations, daily service to habitations increased from 14 to 29 vehicles per day for buses, and

[1] The survey in the 12 districts covered 45 sample habitations on the project roads; 100 households were selected randomly from each sample habitation, and about 450 people were interviewed. Of these, 248 (55.00%) were male, and 202 were female (45.00%). In addition, 45 separate focus group discussions were conducted.

[2] ADB. 2009. *Socio-economic Impact Assessment Report, Orissa, Assam, West Bengal – Rural Roads Sector II Investment Program.* Consultant's report. Manila. (ADB Loan 2248-IND).

from 375 to 958 vehicles per day for jeeps, vans, and three-wheelers. The study observed an overall increase in private ownership of motorized and non-motorized vehicles in project habitations. Most notably, the number of motorcycles has increased significantly. Motorcycles are nearly always operated by men, but in a few sample habitations women were using scooters or mopeds. Some female health workers were using scooters or mopeds to travel between habitations. The number of bicycles has decreased, but they are still the main mode of transportation used by students to go to school. There was occasional movement of bullock carts on the rural roads, but their numbers were negligible.

4. **Government service accessibility**. The central and state governments operate a variety of schemes and programs to deliver 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, livelihoods, education, health, training and employment, welfare, and governance. Based on the focus group discussions, prior to the increase in connectivity most rural inhabitants had difficulties obtaining information about various government assistance schemes and even more difficulties in accessing them. Because of 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.

5. **Livelihood improvement**. Improved connectivity has increased livelihood opportunities for rural inhabitants. The surveys showed that better access to markets has led to an average increase from Rs3503 to Rs5250, or by about 50.00% in income levels in the sample habitations. Improved links have also increased overall per capita expenditure levels. Average per capita monthly expenditure increased from Rs3174 to Rs4280, or by approximately 35.00%, in the sample habitations. Focus group discussions conducted during the project implementation revealed a high level of mobile phone use as well as some computer and internet use, indicating that the purchase of personal electronics is contributing to the increase in spending (per capita spending has increased by as much as 40.00%). Savings levels were noticed to have increased among all the socioeconomic groups. Focus group discussions indicated that among villagers the expensive purchases after the road development have been typically motorcycle and agricultural equipment. With better connectivity and access to nearby towns, service centers, and markets, the villagers believe that savings levels will increase in the long run.

6. **Agriculture development**. Agriculture is the main source of livelihood in project-affected areas. Transport improvements have helped farmers in two primary ways: (i) through better access to inputs such as knowledge, equipment, and materials, which improves yield and reduces risk; and (ii) reduced transport cost to markets. In the project states, the extension services offered by government agricultural extension officers and *gram sewaks* (local officers) to the habitations increased fivefold. The access to knowledge has led to more farmers using scientific approaches to farming, such as crop diversification and the incorporation of 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, which began in 2007. The proportion of farmers using crop diversification has increased from 16.4% to 18.83% since connectivity, and will likely continue to rise. Mechanization of farming was observed in some habitations. Tractors and threshing machines have led to a more efficient, time-saving, and profitable cultivation process. Farmers also indicated a change in cropping patterns—with the added efficiency and inputs, farmers are switching from food crops to cash crops such as

vegetables and sugar cane. Cropping intensity has also increased as a result of improved agricultural trade. The roads have allowed more farmers to visit *haats* (nearby markets). On average, the proportion of farmers who regularly visit *haats* increased from 36.7% to 51.4%. The average number of visits per month has doubled. Connectivity has also reduced transport costs to markets by increasing the amount of produce that can be transported and reducing the produce spoiled or damaged during transit. Previously, farmers and women used bullock carts to transport large loads or carry small loads, such as vegetables, on the back of a bicycle or on their heads while walking. After connectivity, farmers use three-wheeler tempos, tractors, and motorcycles to bring products to *haats* or the nearest connecting points quickly and efficiently. Farmers reported that the amount of produce that is spoiled, wasted, or damaged while in transit decreased by about 20.00%, with many more products able to reach the market. Some villagers of Manoharpur are able to transport their vegetable crops directly to Kolkata (about 150 km away) as the nearest railway station can be reached within 15–20 minutes from the village.

7. **Government employment programs**. Increased connectivity has improved the delivery and implementation of different types of schemes operated by the central and state governments. Qualified villagers were able to subscribe to the 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.[3] The project implementation used a large amount of local labor—a total of 1,167 million person-days, including 6,434 million person-days for women.[4] Most of the laborers were local residents. In addition, most habitations operated multiple self-help groups for women. These groups were either started by the government's *Swarnjayanti Gram Swarozgar Yojana* (SGSY) scheme or by nongovernment organizations (NGOs). The SGSY scheme's objective is to bring 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 women owned or operated microenterprises in the habitations or in providing midday meals for local schools.

8. **Female employment and gender empowerment**. Women have benefited greatly from improved connectivity. Road connectivity has increased their mobility as they can now travel alone in buses and on bicycles to and from nearby towns and cities. Focus group discussions revealed that, since connectivity, the number of women's self-help groups has increased and more women are working outside of the home as government workers, shopkeepers, and daily wage laborers. Construction of all-weather roads has helped women workers run NGO-based programs in rural areas—enabling them to visit beneficiaries regularly, improve their skills through hands-on training, and collect the finished products for sale (as reported by a group of women in Duni village, Darrang district, Assam). The role of women in local governance has also increased. Focus group discussions indicated that, throughout the project states, at least 23 out of 46 habitations had a woman as the *sarpanch* (the democratically elected head of a village statutory institution of local self-government). This is mostly driven by the legislated reservation of seats for women, but improved connectivity has allowed female and male public servants to perform their jobs more effectively through improved access to higher levels of government and information.

[3] Government of India. 2008. *NREGA Operating Guidelines.* New Delhi.
[4] Ministry of Rural Development, Government of India. http://nrega.nic.in.

9. Rural women from all socioeconomic backgrounds have benefited from the construction of all-weather roads. Most notably, access to health and education facilities for women has experienced an overall improvement. The journey time between habitations and government health facilities has fallen significantly, leading to a reduction in maternal and neonatal deaths. In terms of education, parents are 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 in nearby towns, as seen in Bathan village, Kamrup Rural district, Assam.

10. **Commercial activities**. The general level of commerce in rural habitations is low. The number of microenterprises at the habitation level has been low but is slowly increasing. In the project states, the survey estimates that new microenterprises at the habitation level increased from 18 to 22 microenterprises, or about 2.00%, mainly in the form of small general stores. To obtain goods and services, villagers living in small habitations preferred to visit commercial clusters in nearby towns and cities instead, where shops are established in a larger scale with a critical mass of customers. This includes grocery shops, tailors, motorcycle and bicycle repair shops, seed and fertilizer shops, barbers, and shoe repairers. In some sample habitations within 1–2 hours travel time to bigger towns (Bathan in Kamrup Rural district), poultry farming has grown significantly, taking advantage of the all-weather connected roads. Villagers have reliable access to financial services. For the purchase of motorcycles, most indicated that they use their own savings, but some said they take out a loan. For larger vehicles, such as a tractor, farmers can access financing plans through dealers or banks located in nearby towns or service centers.

11. **Education**. Prior to improved connectivity, the majority of habitations had good access to primary and middle schools, but higher secondary schools were on average 5 km away, posing transportation problems, particularly during the rainy season. Children walked an average of 5–6 km to access higher education facilities. Connectivity has impacted education in three ways: (i) the travel time to education facilities outside of habitations has been reduced, (ii) teacher attendance and the number of teachers in habitations have improved, and (iii) school enrollment has improved through safer travel.

12. Travel time to education facilities outside of habitations has decreased as a result of increased connectivity, and more young people are taking advantage of higher education opportunities in nearby towns and major cities. For example, in the habitation of Tamili in Rayagada District in Orissa, the number of young people pursuing secondary education outside of the habitation increased from two to six. The proportion of inhabitants who had completed grade 12 and above increased from 21.1% to 21.9%, and the proportion who had completed grades 10–12 also increased, from 41.3% to 42.9%. The proportion of inhabitants who had completed grades 5–10 increased from 33.34% to 35.01%; and the number of uneducated inhabitants fell from 45.5% to 42.12%. Increased connectivity has improved teacher attendance from 89.6% to 94.1% and increased the amount of time teachers spend in school. Villagers reported that prior to road construction teachers would show up to school during the rainy season but would arrive late and leave early, and this has not been reflected in the approximately 5.00% increase above. The number of teachers at the primary school level has also increased after the construction and/or upgrading of roads.

13. Improved transport has improved school attendance rates through safer travel and the implementation of government schemes. The survey revealed that women teachers comprise about 65.00% of all teachers up to grade 8 (middle school), and the improved transport has helped them to improve their school attendance. The percentage of unenrolled children dropped from 45.9% to 26.3%. Teachers reported that improved connectivity has led to an increase in

the number of girls in attendance. Most parents said they were now more confident about sending their daughters to schools unescorted. The government-sponsored midday meal scheme up to grade 8 was established in 1995. The program has helped improve student attendance rates and has contributed to increased employment for rural women, who typically are involved in organizing and cooking the midday meals.

14. **Health and medical care**. Prior to improved 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 spent very little time in each habitation because of long travel times. Transportation options for carrying sick people or pregnant women to health care institutions were by bullock cart or by hiring a tractor. Villagers of Raghunathpur in N24 Pargana district in West Bengal had to carry sick people on their shoulders as the road used to be full of mud, making it impassable even for a bullock cart. Connectivity has improved access to health care for rural communities. Travel time to health care facilities has decreased on average by 40 minutes (for the entire year) and by as much as 120 minutes during the rainy season in some habitations. The frequency of visiting a clinic or hospital increased by 5.00% for those visiting at least once a month.

15. Focus group discussions reported that multipurpose health workers were spending more time in each community as a result of the shortened travel time. Many now travel by motorcycle, moped, or bicycle in between the habitations they service. Improved connectivity has also helped implementation and delivery of the National Rural Health Mission, which aims to strengthen the Panchayati Raj institutions and promote access to improved health care through Accredited Female Health Activities. The scheme also strengthens existing primary health care centers and community health centers. Neonatal and maternal health has improved because of all-weather connectivity. Difficult pregnancies and deliveries have benefitted the most. The government implemented the Janani Suraksha Yojana Scheme and Sukhibhava Schemes in 2003, but without good connectivity, service delivery was reported to be very low. Villagers who are on average about 5 km from the health centers report the schemes are fully used, with almost 100.00% of births taking place in government health care facilities. Most villagers take full advantage of ambulatory services provided under the scheme, and ambulatory care was rated rapid and dependable.

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

17. **Land value and building materials**. Land price per hectares in the sample habitations increased on average by about five times in habitations with improved connectivity. 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) some nearby developing industries taking advantage of the government's industrialization policy, (iii) an increase in the habitation population (normally about 1.00% per annum), and (iv) villagers choosing to stay in the community instead of seeking employment outside after better connectivity. The demand for land increased dramatically in some habitations. Land values in connected rural habitations are forecast to continue to increase as a result of improved access coupled with increased demand.

18. The all-weather roads have facilitated the transport of materials required by the habitations to build permanent houses, such as bricks, laterite stones, concrete, and corrugated

tin. In some of the sample habitations, trucks were observed to have started moving along the newly connected roads to transport laterite stones (Nimidha in Dhenkanal district in Orrisa) that are locally available. Some villages had also started brick-making facilities to provide building materials to newly connected habitations.

C. Conclusion

19. Improved connectivity has impacted rural living conditions by giving communities more reliable and rapid 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, livelihoods, 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 for continued development in rural India.

20. 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 various external factors contribute to higher standards of living, such as the implementation of government schemes and other infrastructure projects, as well as industrial development in the area. The living conditions in connected habitations continue to improve, and the number of households living below the poverty line is forecast to continue to fall. The investment program is ADB's second intervention in rural roads in India, and the project has provided valuable lessons applicable to the design and implementation of subsequent rural roads projects which will help maximize socioeconomic gains. Most importantly, the project has provided key lessons for evaluating subsequent rural road projects.

21. Further evaluation of the impact of the project will be useful after additional time has passed to allow socioeconomic benefits to be realized. In addition, ADB and the Government of India should closely monitor any negative impacts that may develop, especially in the areas of road safety, illegal access and extraction of natural resources, outward migration, land affordability, and increased incidents of HIV/AIDS and human trafficking.

SUMMARY OF THE MULTITRANCHE FINANCING FACILITY – RURAL ROADS SECTOR II INVESTMENT PROGRAM

(as of October 2013)

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	
States	Assam, Orissa and West Bengal	Orissa	Assam and West Bengal	Assam, Orissa, and West Bengal	Chhattisgarh, Madhya Pradesh, Orissa, and West Bengal	
Road Length (km)						
Anticipated	3,144.00	1,200.00	1,670.00	3,111.62	4,708.44	**30,000.00**[a]
Actual/Revised	2,927.13	1,013.74		2,975.23		
Habilitations Impacted (no.)						
Anticipated	1,767.00	231.00		1,071.00		**19,000.00**
Actual	1,503.00	336.00		1,224.00		
Loan Amount						
Original	$180.00 million	$77.65 million	$130.00 million	$185.00 million	$222.20 million	**$750.00 million**
Actual/Revised	$173.90 million	$38.10 million	$127.00 million	$185.00 million	$222.20 million	**$746.20 million**
ADB Approval	31 July 2006	17 March 2008	26 September 2008	7 August 2009	6 July 2010	**20 December 2005**
Loan Agreement Signing	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	
Extended	30 June 2009	31 December 2010	30 June 2013	31 December 2012	30 June 2014	

ADB = Asian Development Bank, km = kilometer, MFF = multitranche financing facility.
Note: The data for project 1, 2, and 4 are actual.
[a] Original expectation of the investment program. The total anticipated road length of the five projects was adjusted to 13,834 km.
Source: Asian Development Bank. http://www.adb.org; ADB project completion review mission.

CORPORATE RESULTS FRAMEWORK INDICATORS

No.	Level 2 Result Framework Indicator	Target	Revised Target	Aggregate Output	Method and/or Comments
Transport					
1.	Use of roads built or upgraded (average daily vehicle-km in the first full year of operation)	No target provided at appraisal		A total of 499,265 vehicle-km in 2013 (163,654 vehicle-km in Assam, 154,331 vehicle-km in Orissa, and 181,280 vehicle-km in West Bengal)	A supplementary traffic survey was conducted during the PCR mission, including collecting the traffic data of the sample project roads in 2013 (the first year of project fully operation). Traffic analysis and forecast were made accordingly.
2.	Roads built or upgraded – provincial, district, and rural roads (km)	A total of 3,111.62 km of rural roads constructed or upgraded		A total of 700 rural roads with a total length of 2,975.23 km constructed (2,470.80 km) or upgraded (504.43 km) under the project, including 273 subprojects in Assam (914.27 km), 303 subprojects in Orissa (1,458.7 km), and 124 subprojects in West Bengal (602.26 km)	The civil works included construction or upgrading of rural roads to full single-lane cross-sections with a 3.50 meter roadway and 7.50 meter formation width with bitumen surface, strengthening of existing culverts and bridges, construction of new bridges and cross-drainage structures, and provision of road furniture and safety facilities.

km = kilometer, PCR = project completion review.
Source: Asian Development Bank project completion review mission.