



# Completion Report

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Project Number: 36005  
Loan Number: 2050  
August 2014

## India: Chhattisgarh State Roads Development Sector Project

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Asian Development Bank

## CURRENCY EQUIVALENTS

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

		<b>At Appraisal</b> (30 October 2003)	<b>At Project Completion</b> (31 December 2011)
Re1.00	=	\$0.021	\$0.019
\$1.00	=	Rs45.50	Rs53.10

## ABBREVIATIONS

ADB	–	Asian Development Bank
CSC	–	construction supervision consultant
EA	–	executing agency
EIRR	–	economic internal rate of return
EMMP	–	environmental management and monitoring plan
ESMU	–	Environment and Social Management Unit
FYP	–	Five-Year Plan
GOC	–	Government of Chhattisgarh
IEE	–	initial environmental examination
PCR	–	project completion review
PIU	–	project implementation unit
PWD	–	Public Works Department
SRP	–	short resettlement plan
TA	–	technical assistance

## NOTES

- (i) The fiscal year of the government ends on 31 March.
- (ii) In this report, "\$" refers to US dollars.

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## BASIC DATA

### A. Loan Identification

1.	Country	India
2.	Loan Number	2050-IND
3.	Project Title	Chhattisgarh State Roads Sector Development Project
4.	Borrower	India
5.	Executing Agency	Public Works Department, Government of Chhattisgarh
6.	Amount of Loan	\$180.0 million
	Net Loan Amount	\$160.41 million
7.	Project Completion Report Number	PCR: IND 1462

### B. Loan Data

1.	Appraisal	
	– Date Started	1 September 2003
	– Date Completed	15 September 2003
2.	Loan Negotiations	
	– Date Started	13 November 2003
	– Date Completed	14 November 2003
3.	Date of Board Approval	15 December 2003
4.	Date of Loan Agreement	14 December 2004
5.	Date of Loan Effectiveness	
	– In Loan Agreement	14 March 2005
	– Actual	14 January 2005
	– Number of Extensions	0
6.	Closing Date	
	– In Loan Agreement	31 July 2009
	– Actual	09 April 2012
	– Number of Extensions	2
7.	Terms of Loan	
	– Interest Rate	LIBOR-based lending facility
	– Commitment Charges	0.75%
	– Maturity (number of years)	25
	– Grace Period (years)	5
	– Front-end Fee	0.5%
8.	Terms of Relending (if any)	None

#### 9. Disbursements

##### a. Dates

Initial Disbursement	Final Disbursement	Time Interval
14 November 2006	9 April 2012	65 months
Effective Date	Original Closing Date	Time Interval
14 January 2005	31 July 2009	55 months

## b. Amount (\$)

Category	Original Allocation	Last Revised Allocation	Amount Increased (canceled)	Amount Disbursed	Undisbursed Balance
1. Civil Works	148,000,000	173,000,000	25,000,000	154,654,602	18,345,398
2. Equipment	8,000,000	0	(8,000,000)		
3. Consulting Services	7,000,000	7,000,000		5,765,135	1,234,865
4. Unallocated	17,000,000	0	(17,000,000)		
<b>Total</b>	<b>180,000,000</b>	<b>180,000,000</b>	<b>0</b>	<b>160,419,737</b>	<b>19,580,263</b>

Notes: (i) The last loan reallocation was made on 11 September 2009.

(ii) The undisbursed amount was canceled at loan account closing on 9 April 2012.

10. Local Costs (Financed): 0

## C. Project Data

## 1. Project Cost (\$ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	199.52	188.09
Local Currency Cost	86.18	93.48
<b>Total</b>	<b>285.70</b>	<b>281.57</b>

## 2. Financing Plan (\$ million)

Cost	Appraisal Estimate	Actual
Implementation Costs		
Borrower Financed	85.70	111.18
ADB Financed	180.00	160.42
<b>Total</b>	<b>265.70</b>	<b>271.60</b>
IDC Costs and other Financial Charges		
Borrower Financed	20.00	9.97
ADB Financed	0.00	0.00
<b>Total</b>	<b>20.00</b>	<b>9.97</b>

ADB = Asian Development Bank, IDC = interest during construction.

## 3. Cost Breakdown by Project Component (\$ million)

Component	Appraisal Estimate	Actual
A. Base Cost		
1. Right-of-way (utility shifting and resettlement)	0.00	6.85
2. Civil works	221.00	257.24
a. Civil works for core project roads (Konta–Jadgalpur)	16.00	0.00
b. Civil works for remaining project roads (about 1,600 km)	205.00	257.24
3. Equipment	5.00	0.00
a. Pavement management system	2.50	0.00
b. Bridge management system	0.50	0.00
c. Falling weight deflect meter	0.40	0.00
d. Car-mounted bump integrator	0.20	0.00
e. Management and operation	1.00	0.00
f. Road safety	0.40	0.00
4. Construction supervision consultants	5.00	5.77

5. Reform consultants	1.70	0.00
6. Project management and road safety	3.00	1.74
7. Road safety consultants	0.30	0.00
<b>Subtotal (A)</b>	<b>236.00</b>	<b>271.60</b>
B. Physical Contingencies	15.00	
C. Price Contingency	14.70	
D. Front-End Fee	1.00	0.90
E. Interest during Construction and Commitment Charge	19.00	9.07
<b>Total (A+B+C+D+E)</b>	<b>285.70</b>	<b>281.57</b>

#### 4. Project Schedule

Item	Appraisal Estimate	Actual
A. Civil Works for Phase1 Roads		
Procurement	Q4 2003–Q2 2004	Q3 2004–Q1 2007
Implementation	Q4 2004–Q4 2006	Q3 2006–Q4 2011
B. Civil Works for Phase 2 Roads		
Procurement	Q2 2004–Q4 2005	Q2 2006–Q4 2007
Implementation	Q1 2005–Q1 2009	Q4 2007–Q3 2011 <sup>a</sup>
C. Construction Supervision for Phase 1		
Consultant recruitment	Q2 2004–Q4 2004	Q3 2004–Q2 2006
Implementation	Q4 2004–Q4 2006	Q2 2006–Q4 2011 <sup>a</sup>
D. Construction Supervision for Phase 2		
Consultant recruitment	Q2 2004–Q3 2005	Q4 2004–Q3 2006
Implementation	Q4 2004–Q1 2009	Q3 2006–Q4 2011
E. Institutional Reform and Capacity Building		
Consultant recruitment	Q1 2004–Q2 2004	Q3 2004–Q2 2006
Implementation	Q3 2004–Q4 2006	Q2 2006–Q3 2009

<sup>a</sup> The Government of Chhattisgarh used its own funds to complete the works after loan closing on 31 July 2011.

#### 5. Project Performance Report Ratings<sup>a</sup>

Implementation Period	Ratings <sup>a</sup>	
	Development Objectives	Implementation Progress
From 15 December to 31 December 2003	Satisfactory	Satisfactory
From 1 January to 31 May 2004	Satisfactory	Satisfactory
From 1 June to 31 December 2004	Satisfactory	Unsatisfactory
From 1 January to 31 December 2005	Satisfactory	Satisfactory
From 1 January to 31 December 2006	Satisfactory	Satisfactory
From 1 January to 31 December 2007	Satisfactory	Satisfactory
From 1 January to 31 December 2008	Satisfactory	Satisfactory
From 1 January to 31 December 2009	Satisfactory	Satisfactory
From 1 January to 31 December 2010	Satisfactory	Satisfactory
From 1 January to 31 December 2011 <sup>b</sup>	On track	On track
From 1 January to 9 April 2012 <sup>b</sup>	On track	On track

<sup>a</sup> Project performance report ratings are based on a different method than that used for the project completion report.

<sup>b</sup> Based on new ratings for project performance in the E-operations

**D. Data on Asian Development Bank Missions**

<b>Name of Mission</b>	<b>Date</b>	<b>No. of Persons</b>	<b>No. of Person-Days</b>	<b>Specialization of Members</b>
Fact-finding	20 May–2 Jun 2003	6	72	b, b, c, c, j, y
Appraisal	1– 5 Sep 2003	6	90	b, c, h, i, j, y
Contact	22–26 Mar 2004	3	15	b, c, e
Inception	11–15 Oct 2004	2	10	c, e
Review	24–26 Jan 2005	1	3	c
Review	20–24 Nov 2006	3	15	a, b, c
Review	26 Feb–3 Mar 2007	3	18	a, b, c
Review	31 Aug–6 Sep 2007	5	35	a, b, c, j, m,
Special loan administration	3–5 Jan 2008	1	3	c
Review	28 Mar–4 Apr 2008	3	21	a, b, c
Review	16–22 Sep 2008	3	21	a, b, c
Review	27 May–4 Jun 2009	4	36	a, c, j, m
Midterm review	23 Nov–1 Dec 2010	5	45	b, c, j, m, p
Review	12–19 Jul 2011	5	40	a, b, c, j, m
IED review	30 Apr–1 May 2012	3	6	c, f, h
Project completion review	21–28 Aug 2013	1	8	h

a = analyst; b = transport specialist; c = project specialist; d = social development specialist; e = infrastructure specialist; f = evaluation specialist; g = operations assistant; h = consultant; i = counsel; IED = Independent Evaluation Department, Asian Development Bank; j = environmental specialist; k = transport economist; l = senior programs officer; m = resettlement specialist; n = financial specialist; p = procurement; y = young professional.



## **I. PROJECT DESCRIPTION**

1. On 15 December 2003, the Asian Development Bank (ADB) Board of Directors approved a loan of \$180.0 million from ADB's ordinary capital resources for the Chhattisgarh State Roads Development Sector Project. The project's main objective was to support economic growth and reduce poverty by providing improved connectivity and accessibility to development opportunities and social services, including health and education. The project was also to support initiatives of the Government of Chhattisgarh (GOC) to improve state management of the road sector by improving effectiveness and efficiency.<sup>1</sup>

2. At appraisal, the project, through the sector lending modality, was to finance improvement of about 1,700 kilometers (km) of state roads in Chhattisgarh. The project would improve the connectivity of the road network, and of priority road links with national highways, state highways, and rural roads to improve accessibility of rural and underdeveloped populations to the mainstream economy and development opportunities. The project would defer huge reconstruction costs that would result if improvement and rehabilitation were not undertaken immediately. The project included consulting services to assist the GOC's Public Works Department (PWD) in preparing and implementing road improvement subprojects, construction supervision, and capacity building and training in project management and quality control. The consulting services included assistance to the GOC in detailing and implementing the institutional reforms, and building the required policy and institutional capacity for state road management. PWD was the executing agency (EA) and an existing project implementation unit (PIU) within PWD was responsible for day-to-day project implementation.

3. The main quantifiable benefits of the project were anticipated to be (i) savings in vehicle operating costs, which service providers would pass on to the rural poor; and (ii) savings in travel time. Nonquantifiable benefits would be realized through improved access to markets and social services for the agricultural population and rural poor; and lower transport costs and better access to schools, medical clinics, and employment centers.

## **II. EVALUATION OF DESIGN AND IMPLEMENTATION**

### **A. Relevance of Design and Formulation**

4. At appraisal, PWD, with its existing institutional and technical capability, was reaching its limit for effective sector management and efficient management of investments in state roads. This, and the inherited 10 years of neglect of investment in road improvement and maintenance, had caused serious deterioration of most state roads. The riding quality of most state roads ranged from poor to very poor. Poor road quality had increased transport capacity bottlenecks, and meant poorer transport services for the entire economy, especially the rural poor and tribal populations. Better management of the road sector was crucial to support the GOC policy initiatives to improve this situation. It would also help ensure that investments in road sector development would be successfully implemented.

5. To improve state roads, the GOC prepared the 10-Year Master Plan for Road Sector Development, 2003–2012. Based on the master plan, the GOC prepared and approved a priority investment program for the improvement, rehabilitation, strengthening, and widening of about 5,000 km of state roads.

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<sup>1</sup> ADB. 2003. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to India for the Chhattisgarh State Roads Development Sector Project*. Manila.

6. Given the potential lending scale for the road sector in India, ADB developed a programmatic approach to the development of projects in a sequential and progressive manner to fulfill long-term policy objectives of fostering an enabling environment for efficient and sustainable development of roads to meet public needs for increased mobility and efficient freight movement. This overall lending strategy was implemented through coordinated lending to road projects. The proposed project was the second ADB intervention in the state road sector following the Madhya Pradesh State Roads Sector Development Program approved in 2002.<sup>2</sup> The Chhattisgarh project was designed to improve the connectivity of the state road network and ultimately to support economic growth and reduce poverty in the project area. The project would also provide a vehicle through which Chhattisgarh could establish a transparent and conducive environment for more competition and increased private sector participation in the road sector. The project preparatory technical assistance (TA) was well designed and relevant to the preparation of the project.<sup>3</sup> However, TA implementation was delayed due to poor performance of the consultants (para. 22). To help achieve the project objective and at the request of the GOC, in 2006 ADB approved an increase in funding of \$1.6 million to enhance the ongoing TA for institutional strengthening and capacity building for sector management.<sup>4</sup> The TA was successfully implemented.

7. During and after implementation, the project was assessed *relevant* to the government's objectives and policies, as well as to ADB's country strategy, in its design and formulation (para. 30 and 31). At completion, 1,187.56 km of state roads had been improved, which significantly improved connectivity in the state (para. 32). The institutional development component was implemented through the associated TA (para. 22). Remarkable socioeconomic impact was generated during and after project implementation (para. 41). While the project experienced delays (para. 18), the project impacts and outcomes were as anticipated at appraisal. The project framework with results is in Appendix 1. The results demonstrate that the project's outcome effectively contributed to meeting the GOC objectives. Subsequent to project completion in 2011, ADB approved a second loan for the state.<sup>5</sup>

## **B. Project Outputs**

### **1. Road Improvement**

8. At appraisal, the project was expected to finance improvement of about 1,700 km of state roads in Chhattisgarh; one sample subproject (the 100.3 km Konta–Jadgalpur road with an estimated cost of \$16 million [\$0.16/km]) had been appraised and approved. The project envisaged that the improvement of the remaining 1,600 km would be undertaken through the provision of \$205 million (\$0.13 million/km). Identification, selection, preparation, and approval of subprojects was to be undertaken in accordance with the selection criteria and approval procedures agreed under the project. However, during implementation on 27 February 2004, the sample subproject (Konta–Jadgalpur road) was declared a national highway, and excluded from the project scope.

<sup>2</sup> ADB. 2002. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to India for the Madhya Pradesh State Roads Sector Development Program*. Manila.

<sup>3</sup> ADB. 2002. *Technical Assistance to India for Preparing the Chhattisgarh State Roads Sector Development Program*. Manila.

<sup>4</sup> ADB. 2006. *Technical Assistance to India for Preparing the Chhattisgarh State Roads Sector Development Program, Proposed Increase in Technical Assistance Amount and Enhancement of Scope*. Manila.

<sup>5</sup> ADB. 2012. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Technical Assistance Grant to India for the Chhattisgarh State Roads Sector Project*. Manila.

9. During implementation, the subprojects were selected, prepared, and approved in two phases based on the project's selection criteria and approval procedure. Phase 1 included the rehabilitation and improvement of 810.12 km of state roads and phase 2 included 438.53 km. The 28 road sections, with an overall length of 1,248.65 km and an overall contract price of Rs11,008 million (\$242 million equivalent), resulted in a cost of \$0.19 million per km (para.13). Upon completion, 1,187.56 km of roads were rehabilitated and improved. Rehabilitation and improvement works on 61.09 km could not be completed due to security problems and disruptions by Naxalite (a local political group) on these road sections. The road rehabilitation and improvement involved widening and strengthening the roads from single- or intermediate-lane roads to intermediate- or two-lane standards with bituminous pavement and included repair, strengthening, and/or construction of bridges and culverts. During construction, minor engineering revisions were incorporated for some of the roads to enhance their durability and performance, and included raising subgrade and revising the pavement composition, increasing the number of pipe and box culverts, constructing a few small bridges as per site requirements, and providing cement concrete pavement in built-up sections and waterlogged areas.

10. During the defect liability period, no serious quality issues were reported.<sup>6</sup> The project, on a pilot basis, required that the PWD enter into arrangements with the contractors under the project to undertake periodic maintenance of the works for not less than 6–8 years after completion of works. However, based on the justification provided by PWD during implementation, it was agreed that PWD would ensure proper maintenance after completion of the works, through appropriate economic and cost-effective contractual arrangements. The loan agreement was amended to reflect this in July 2007. ADB's project completion review (PCR) mission in August 2013 visited some sections of the project roads and observed that the roads were of good quality enabling a comfortable ride, and that substantial safety and environment protection facilities were provided along the roads.<sup>7</sup> During the first full year of operation, the movement of people and goods on the upgraded roads is estimated at 2,270,199 average daily vehicle-km. A summary of the improved roads is in Appendix 2.

## **2. Institutional Reform and Capacity Building**

11. At appraisal, project implementation was anticipated to follow the sector reform plan to achieve policy objectives, to improve governance and accountability of road sector management, to identify alternative asset management systems, and to build capacity through training in modern sector management and operation. Most of the institutional reform and capacity-building measures were implemented through assistance by the associated TA, which included (i) assistance to PWD in transforming the institutional arrangements and enhancing PIU capacity; (ii) a pilot study on road monitoring and programming; (iii) preparation of manuals and handbooks on procurement procedure, quality control, service outsourcing, road management equipment, road safety, maintenance planning, and social and environmental safeguards; (iv) support to the PIU for maintaining computerized accounts; (v) hands-on and classroom training; (vi) design of interactive tools for road maintenance funding; (vii) review of road transport system and suitable recommendations; and (viii) development of a human resource plan for PWD staff. In addition, two out-of-country training sessions were organized. The details of TA implementation are in paras. 22–23.

<sup>6</sup> The defects liability period is 1 year after civil work completion as per the civil works contracts under the project.

<sup>7</sup> The international roughness index of the project roads was in the range of 2–5, as measured by the supervision consultants.

12. At appraisal, \$8.0 million of the project financing was allocated for procuring equipment for road asset management and road safety. Subsequently, PWD considered outsourcing of these activities to be more efficient. The amount was reallocated to the civil works category.

### C. Project Costs

13. At appraisal, the project cost including contingencies and financial charges was estimated at \$285.7 million equivalent, comprising \$199.52 million in foreign exchange and \$86.18 million in local currency. The estimated cost of the sample subproject (Konta–Jadgalpur road) was \$16 million (\$0.16 million/km) and a provision of \$205 million (\$0.13 million/km) was made for improving the remaining 1,600 km under the project's sector loan modality. During implementation, the sample subproject (Konta–Jadgalpur) was dropped from the project scope (para. 8). During implementation, civil works contracts for rehabilitation and improvement of 1,248.65 km with an overall contract price of Rs11,008 million (\$242 million equivalent) were awarded after selection, preparation, and approval in accordance with the selection criteria and approval procedure under the project (para. 9). The appraisal provision of \$0.13 million/km was low as the actual cost for the awarded contracts based on field surveys and engineering design was \$0.19 million/km. The awarded cost was also higher because of price escalation since the appraisal. Under the sector loan modality, the precise scope of work that can be accommodated under the project can be only determined during implementation, based on field surveys and engineering design. The cost of civil works contracts at completion was Rs11,676 million (\$257.24 million equivalent) for works completed on 1,187.56 km (\$0.217 million/km) or roads indicating a marginal increase of 11.8% due to variations and inflation-driven price escalation.

14. The allocation of \$1.7 million for consulting services for institutional reforms was not utilized, as this was funded through an increase in the ongoing TA amount. During implementation, a cost of \$6.85 million for utility shifting, tree cutting and plantation, and resettlement was incurred, which was not anticipated at appraisal. The cost for the consulting services for construction supervision increased by \$0.77 million (15.3%) due to the extended consulting services. The interest during construction and commitment charges for the loan were \$9.07 million and much lower than the appraisal estimate of \$19 million. Upon completion, the actual project cost was \$281.57 million equivalent.<sup>8</sup> Appendix 3 compares the details of the project costs at appraisal and at completion.

15. Under the financing plan envisaged at appraisal, the project would be financed by the ADB loan of \$180.0 million (63% of the total project cost) and government funds of \$105.7 million equivalent (37% of the total cost). Some changes during implementation led to a revision in the project's financing plan. Due to project implementation delays, the government financed the costs for the civil works after loan closing. At loan closing, the undisbursed loan amount was canceled. At completion, ADB financing decreased to 56.97%, and government financing increased to 43.03%. The detailed comparison of the financing plan at appraisal and at completion is in Appendix 3.

### D. Disbursements

16. The loan was approved on 15 December 2003, signed on 14 December 2004, and became effective on 14 January 2005. The loan proceeds were disbursed in accordance with ADB's *Loan Disbursement Handbook* (January 2001, as amended from time to time) and *Interim Guidelines for Disbursement Operations, LIBOR-Based Loan Product* (July 2002).

<sup>8</sup> The conversion of actual project costs in Rs to \$ equivalent uses average exchange rates.

17. On 11 September 2009, the loan allocation was revised, upon the request of the government, to reallocate \$8 million under the equipment category and the unallocated amount of \$17 million to the civil works category (see Project Data). The loan account was kept open beyond the loan closing date to complete disbursement of expenditures incurred prior to loan closing on 9 April 2012. At loan closing, \$160,419,737 (89.1% of the loan amount) was disbursed and the remaining undisbursed loan amount of \$19,580,262.78 (10.9% of the loan amount) was canceled. The report and recommendation of the President did not include any disbursement schedule. The annual disbursement projections made by the EA each year and the actual disbursement are in Appendix 4.

## **E. Project Schedule**

18. At appraisal, the project was envisaged to be implemented over 5 years, inclusive of subproject appraisal and approval, procurement, and preconstruction activities, with completion by January 2009. To expedite project implementation, ADB approved advance procurement of civil works for the sample subproject. During implementation, the sample subproject was dropped from the project scope (para. 8). The preparation, appraisal, and approval for all the candidate subprojects were undertaken during implementation. Initial delays were due to inadequate PIU staffing and weak capacity for project preparation and procurement. The contract with the firm engaged under the TA to update the master plan for road sector development, including identifying priority investment needs, was terminated due to poor performance in May 2004. This delayed project preparation and works for the phase 2 roads, as these roads were to be selected based on the updated master plan. The delays in finalizing design reports and subproject appraisal and approval, as well as procurement activities, delayed the award of the civil works contracts until July 2006 for the phase 1 roads and December 2007 for phase 2 roads. The completion period of these contracts was 24 months. The implementation delays continued during construction. Only two civil work contracts for the phase 1 roads and three civil works contracts for the phase 2 roads were completed within the contract period. The delay during implementation was mainly due to (i) weak planning and site management capacity of some contractors; (ii) design revisions during construction; (iii) delay in obtaining forest clearance from the Ministry of Environment and Forest; (iv) frequent disruption of works by the Naxalites;<sup>9</sup> and (v) late mobilization of the phase 2 contracts. Considering such delays, ADB approved the first extension of the loan closing date for 11 months upon the request of the government. ADB missions, the PIU, the supervision consultants, and the contractors regularly discussed implementation issues and prepared contract-by-contract action plans to expedite and complete the civil works within the agreed time frames. Based on the action plans, the contractors undertook a series of measures, including mobilizing additional resources. Some of the civil work contracts were not completed by the extended loan closing date (para. 27). To ensure the completion of civil work contracts, ADB approved the second extension of loan closing by 13 months to 31 July 2011. While all the civil works contracts were substantially completed by July 2011 (the loan closing date after the second extension), one contract for the phase 1 roads (package 7A), which was affected by Naxalite attacks, could not be completed. The government decided not to seek any further extension and to complete the works with its own resources. The civil works were substantially completed by the end of 2011, about 35 months later than anticipated at appraisal. The actual implementation schedule compared with the schedule at appraisal is in Appendix 5, and a chronology of the main events is in Appendix 6.

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<sup>9</sup> Naxalite, a local political group, also damaged some of the plant and machinery of the contractors.

## **F. Implementation Arrangements**

19. As envisaged at appraisal, PWD was the EA for the project. PWD established a PIU in 2003, considering it to be an early form of the proposed agency for road development. The PIU was to be responsible for day-to-day implementation and management of the project. On 10 September 2004, the GOC established a road management committee to oversee project implementation, provide policy support, and ensure coordination between related government agencies. Initially the PIU had very limited capacity for project implementation. ADB provided technical support to start the project implementation activities. Subsequently a technical expert was provided under the TA to assist PWD with project preparation and procurement. The PIU was also strengthened during implementation by recruiting additional technical staff, including for social development, environmental safeguard, and procurement. The PIU, with assistance from the supervision consultants and TA consultants, implemented all aspects of project management, including project preparation and design, procurement, contract management, financial management and audit, construction supervision and quality control, environmental and safeguard measures, institutional strengthening, and loan covenant compliance. According to the project requirements, a separate financial account for the project was established at the PIU for loan disbursement and related financial management. During implementation, PWD and the PIU gained substantial experience in project management and knowledge in modern road development practices.

20. As envisaged at appraisal, three construction supervision consultants (CSCs) were recruited to assist with project implementation. The CSCs were assigned the powers of the engineer in accordance with the Fédération Internationale Des Ingénieurs-Conseils (FIDIC) conditions of the contracts except for a few exceptions requiring prior approval of the EA. (para. 26). The institutional framework for the project implementation is in Appendix 7.

## **G. Conditions and Covenants**

21. The EA complied with most loan covenants for the project, which enabled the state to carry out the project with due diligence and efficiency, and in conformity with sound administrative, financial, engineering, and environmental practices. The EA provided adequate oversight, coordination, and financial support required for project implementation. The PIU was established and is fully operating with adequate staff and resources. The procurement of all civil works contracts and engagement of consultants was carried out in accordance with ADB guidelines and procedures. Measures for environmental and social aspects were implemented. Road maintenance is being undertaken through zonal contracts or work crews depending on the assessment of maintenance needs and amount, considering the overall cost effectiveness. The institutional reform and capacity-building component was implemented with the assistance of the TA consultants. The project reports were prepared as required and submitted to ADB on a timely basis. However, the covenant on establishing the agency for road development and then transforming it to the dedicated road authority was partly complied with. The covenant related to implementing a community road safety program was also partly complied with. The status of compliance with key loan covenants of the project is summarized in Appendix 8.

## H. Related Technical Assistance

22. ADB approved the project preparatory TA on 21 November 2002 to assist in preparing the project and improving the GOC's institutional capacity.<sup>10</sup> The Government of the United Kingdom provided \$800,000 to finance the TA. Because of the poor performance of the TA consultants, their services were terminated and a team of newly recruited consultants updated the master plan for road sector development. The TA assisted PWD and ADB in reviewing project preparation, project appraisal and approval of candidate subprojects under the project, and procurement of civil works contracts.

23. During implementation, the government requested ADB for TA for the project's institutional reform and capacity-building component. On 3 March 2006, ADB approved an increase of \$1,600,000 in the TA amount to enhance the TA scope to include the component. The TA closing date was extended to 30 April 2009. At the time of TA enhancement, PWD was designated as the EA for the TA, and its use of procedures allowed under the project to select consultants was also approved. A consulting firm was engaged in April 2006 to implement the tasks on institutional reform and capacity building. Implementation commenced on 5 June 2006 and was scheduled to be completed in May 2009. During implementation, the contract period was extended to the end of August 2009. Upon completion, the consultants submitted several reports in 12 areas, conducted extensive in-country training and workshops, and arranged two groups of international study tours. The TA established a more effective and efficient state road sector management system in Chhattisgarh. It realized its objectives of assisting the GOC in implementing institutional reform in the road sector and building its capacity. The TA is rated *successful*. The TA completion report is attached in Appendix 9.

## I. Consultant Recruitment and Procurement

24. As envisaged at appraisal, three CSCs were recruited in accordance with ADB's *Guidelines on the Use of Consultants* (2002, as amended from time to time). CSC recruitment followed quality- and cost-based selection procedures. The request for proposals for the phase 1 CSC was issued to the short-listed firms in February 2005. After ADB approval of the evaluation results, a CSC was selected and the contract signed in June 2006.<sup>11</sup> The request for proposals for the phase 2 CSCs was issued to the short-listed firms in September 2005. Two CSCs were selected and contracts were signed in June and July 2006.<sup>12</sup> Due to delays in implementing the civil works, the CSC contracts were extended until the works were completed. The increased cost of consulting services was not significant as the time extensions were managed by rearranging the deployment of experts within the teams. As envisaged at appraisal, recruitment of a consultant for institutional development and capacity building under the project was initiated in July 2004. At the request of the GOC, the funding for the consulting services was arranged through the \$1.6 million increase in the amount of the ongoing TA (para. 23). The contract was signed on 24 April 2006 under the TA.

25. Civil works procurement under the project followed international competitive *bidding procedures and was undertaken* in accordance with ADB's *Procurement Guidelines* (1999, as amended from time to time). To expedite project implementation, ADB approved advance

<sup>10</sup> ADB. 2002. *Technical Assistance to India for Preparing the Chhattisgarh State Roads Sector Development*. Manila (financed by the Government of the United Kingdom).

<sup>11</sup> Renardet S.A. in association with Themes Engg. Services.

<sup>12</sup> For batch A: Carl Bro (Denmark), EMA Unihorn (India), Unihorn BV (Netherlands) JV. For batch B: SMEC International (Australia) in association with SMEC India.

procurement of civil works for the sample subproject. The sample subproject was, however, dropped from the project scope in February 2004 (para. 8). To expedite procurement, and considering that the nature of most civil works of the subprojects may be similar, in accordance with the loan documents, prequalification of contractors was initiated in August 2004 based on contract size: \$5 million, \$7.5 million, \$10 million, \$12.5 million, \$15 million, \$22.5 million, \$25 million, and \$30 million. The prequalification remained valid for 18 months after the conclusion of prequalification evaluation in August 2005. Due to delays in finalizing the design reports and bid documents, the invitation to bid was issued in October–November 2005 for 14 packages. During the bidding process, packages 7 and 8 were combined as package 7A and packages 10 and 14 were combined as package 10A due to inadequate response and lack of qualified bidders. After ADB approval of the evaluation results, the contracts for 11 civil works packages were awarded during July–December 2006, and 1 contract (for package 10A) was awarded in March 2007. Under phase 2, ADB approved 13 roads in June 2007, which were selected and appraised in accordance with the loan agreement. For the phase 2 roads, procurement was initiated under 11 civil works packages. A supplementary prequalification was initiated in April 2006 to obtain more up-to-date information and increase competition. The bids were invited in May and received on June 2007. After ADB approval of the evaluation results in November 2007, the contracts for 9 packages of the phase 2 roads were awarded in December 2007. The contracts for packages 1 and 2 were not signed because the bidder (i) did not comply with requirements stated in the letter of acceptance; and (ii) requested the GOC to award the packages solely to the minor partner in their joint venture. Eventually, the two packages were excluded from the project for implementation by the state using its own resources. All the project contract packages are listed in Appendix 10.

## **J. Performance of Consultants and Contractors**

26. The overall performance of the consultants is rated *satisfactory*. At appraisal, 1,358 person-months of consulting services were anticipated for institutional reform, subproject selection and preparation, construction supervision and management, project implementation monitoring and evaluation, and training (1,278 person-months for construction supervision and 80 person-months for institutional reform). During implementation, three CSCs were engaged and nominated as the engineer in accordance with contract conditions (para. 20). The CSCs undertook the tasks specified in the terms of reference, including subproject preparation, project monitoring and management, quality control, construction supervision, measurement and payment assistance, project performance monitoring and evaluation, environmental monitoring, and preparation of progress reports. However, the project performance monitoring reports were not well prepared. Due to overall delay in the completion of civil works contracts, the contract periods of the CSCs were extended and the services were completed in November 2011 for the phase 1 roads and in October 2011 for the phase 2 roads. Upon completion, 105.7 person-months of international and 8,241.4 person-months of national consultant services had been provided for construction supervision and management. During implementation, the consulting services for institutional reform were funded through the increased TA funding (para. 22).

27. The overall performance of the civil works contractors is rated *satisfactory*. The civil works were implemented under 21 contract packages: 12 packages for the phase 1 roads and 9 packages for the phase 2 roads (para. 25). The contracts were to be completed in 24 months. The initial delays in executing the civil works were primarily caused by inadequate mobilization of resources and weak planning and site management capacity of some contractors. Regular supervision, review, and monitoring by the PIU, the supervision consultants, and the ADB missions, along with necessary corrective actions by the contractors, were helpful in resolving such issues and improving contractor performance. Five civil works contracts were completed



within the contract period of 24 months. Completion of other contracts was delayed. To facilitate the completion of civil works, the loan closing date was extended twice. Overall, taking into account the planning and contract management capability and deployment of resources, the performance of contractors at contract completion was satisfactory for most contractors. The performance of the contractor for package 5 under phase 1 roads was not *satisfactory*.

#### **K. Performance of the Borrower and the Executing Agency**

28. The overall performance of the Borrower and the EA is rated *satisfactory*. The Borrower of the loan was India and the EA was PWD of the GOC. The related government agencies, including the Department of Economic Affairs of the Ministry of Finance actively participated in the coordination and monitoring of project implementation during the tripartite portfolio review meetings. The government provided more counterpart funding for the project than envisaged at appraisal (para. 15). Most of the loan and project covenants related to institutional development, road sector development, financial support, and social and environmental safeguards were complied with. The institutional reform and capacity-building component was implemented by PWD through the ADB-financed TA project. Considering that the project was the first in its kind in Chhattisgarh, the difficulties posed by poor performing contractors, and the security concerns in Chhattisgarh, the performance of the EA and the PIU is rated *satisfactory*.

#### **L. Performance of the Asian Development Bank**

29. The performance of ADB is rated *satisfactory*. ADB delegated administration of the project to its India Resident Mission on 1 January 2004, soon after project approval. During implementation, ADB was closely involved in identifying and resolving issues through tripartite portfolio review meetings and regular fielding of project review missions. ADB conducted 12 review missions, including the inception mission in 2004, a special loan administration mission in 2008, and a midterm review in 2010. ADB provided substantial inputs to the PIU in preparing detailed action plans for expediting progress by the contractors. Approval of documents at both the processing and implementation stages was timely. All claims for payment were processed and disbursed on a timely basis. Based on the government's request, ADB extended the loan closing date twice to facilitate implementation and completion of the project. In addition, ADB provided training on many aspects, which ensured successful project implementation. In general, the government recognized the role of the ADB missions in providing timely advice on technical and contract administration matters.

### **III. EVALUATION OF PERFORMANCE**

#### **A. Relevance**

30. The project is rated *relevant* at appraisal and at completion, as it was an integral part of the government's strategy for economic growth and poverty reduction through the development of highways and roads. The government's 11th Five-Year Plan (FYP), 2007–2012, articulates the need for adequate, cost-effective, and high-quality infrastructure as a prerequisite to sustaining growth. The plan set the ambitious target of increasing the total investment in infrastructure from about 5% of gross domestic product in the 10th FYP to 9% in the 11th FYP. Chhattisgarh, a newly formed state, is one of the poorer states in India.<sup>13</sup> According to the 2011 national census, Chhattisgarh has a population of 25,540,196 (2.11% of India's population). Since roads are the predominant mode of transport services in the state, road development will

<sup>13</sup> Chhattisgarh state was formed on 1 November 2000; it was formerly part of Madhya Pradesh.

substantially benefit all sectors, including agriculture, mining, tourism, education, and health care. In the current FYP, the GOC is making significant efforts to enhance road development, including ADB-assisted state road projects.

31. ADB's country partnership strategy, 2009–2012 for India was designed to support government efforts to address some of the constraints identified in the 11th FYP. These include strengthening infrastructure development in poor states, promoting private sector participation in infrastructure development, supporting climate change adaptation and mitigation, and encouraging innovative financing modalities to increase the leverage of ADB operations. At the end of 2013, ADB had provided 49 loans to transport in India for a total of \$9,867.75 million, accounting for about 33.62% of total ADB lending to the country. Overall, the project is *relevant* to the government's development objectives and plan, as well as ADB's country partnership strategy and lending policy. The project was the first loan to a state road project in Chhattisgarh. Given its success, ADB approved a second loan to assist road development in the state.

## **B. Effectiveness in Achieving Outcome**

32. The project is rated *less than effective* in achieving its purposes and outcomes. Despite some implementation delays, the objectives and outcomes of the project were achieved. On the project roads, average vehicle speeds have increased to 40–60 km/hour, from 20–30 km/hour before the project; vehicle operating costs have decreased by an average of 23%. This has led to a substantial reduction in passenger and freight transport costs. EA officials explain that travel times on project roads have decreased by about 40%–50%; access to social services such as primary health care centers, schools, colleges, and markets has substantially improved; and land values along the project roads have appreciated significantly. The project roads and roadside amenities have effectively improved connectivity in rural areas and brought huge socioeconomic benefits. Local public transporters use the project roads to provide transport services to local residents, including the poor. The project provided good support for rapid socioeconomic development in the project area.

33. The institutional reform and capacity-building component, implemented through the associated TA, has significantly improved the effectiveness and efficiency of the state road sector management system.

## **C. Efficiency in Achieving Outcome and Output**

34. The project is rated *efficient* given the traffic growth and results of economic reevaluations. However, project implementation delays adversely affected its efficiency.

35. After completion of works on the project roads, the project's CSCs carried out traffic surveys on the phase 1 and phase 2 roads; the traffic counts were compared with the preproject traffic. Traffic on project roads increased significantly, by an average of 9.5% annually for phase 1 roads during 2006–2010 and by 9.0% annually for the phase 2 roads during 2007–2011, in particular for small passenger and agricultural vehicles. During the ADB PCR mission, the traffic growth rates at appraisal were revised to reflect the faster socioeconomic development, improvement of road networks, rapid increase in registration of motorized vehicles in the project area, and enhanced capacity of road management. The revised traffic forecast also takes into account the traffic analysis conducted for ADB's second loan to a state road project in Chhattisgarh. The analysis estimates that the average annual traffic growth on the project roads would be 7.8% up to 2015, 6.9% in 2016–2020, 6.2% in 2021–2025, and 5.5% from 2025 onward. The revised traffic forecast is used in the economic reevaluation of the project.

36. The ADB PCR mission evaluated the economic internal rate of return (EIRR) for the project roads using methodology similar to that used at appraisal and the updated data. The EIRR is calculated at 18.9% for the whole project, which is comparable with that for the sample road at appraisal.<sup>14</sup> The EIRR for the whole project was not available at appraisal as the subprojects were prepared, appraised, and approved at various stages during implementation. The EIRR is above the ADB-recommended discount rate of 12%. The project is therefore considered to be economically viable. The sensitivity analysis results indicate that the project would continue to be economically viable for all scenarios. If a 20% maintenance cost increase were to be combined with a 20% benefit reduction, the EIRR would be 13.3% for the whole project. The sensitivity analysis also indicates that the EIRR is more sensitive to changes in benefits. Therefore, the GOC needs to pay sufficient attention to socioeconomic development in the project area, foster transport services, and increase incomes for rural road users. Appendix 11 presents the economic reevaluation.

#### **D. Preliminary Assessment of Sustainability**

37. The project is rated *likely sustainable*. A discussion on some issues related to project sustainability follows.

38. **Road maintenance.** PWD's divisional offices in Chhattisgarh are responsible for the maintenance of state roads. At the time of the ADB PCR mission, all the project roads had been handed over to PWD divisions. PWD has a well-developed institutional framework and budget for road maintenance. Road maintenance, including routine, annual repair, and periodic maintenance, is mainly undertaken through outsourcing contracts. PWD's divisional offices and subdivisional offices regularly inspect road conditions, make maintenance plans, carry out contract procurement, and supervise maintenance activities. PWD allocates about 20% of its annual budget for maintenance: an average of about Rs2,800 million until 2010/11 and Rs5,675 million in 2012/13. The budget allocation for road maintenance is assessed to fully meet the maintenance needs. In May 2012, an ADB mission led by the Independent Evaluation Department visited two project roads.<sup>15</sup> It noted that even after 2.5 years from completion, the riding quality and the condition of the project roads were excellent and far better than the nearby national highway. However, PWD needs to implement modern road maintenance concepts and tools to increase the efficiency of road maintenance. The GOC needs to prepare an adequate annual budget to ensure project road maintenance is conducted on a timely basis and properly.

39. **Road safety.** The project incorporated significant road safety measures including traffic signs and safety facilities, and conducted several road safety campaigns and activities. However, with the improved road condition, some vehicles tend to exceed the speed limit, while pedestrians and mixed traffic of motorcycles, nonmotorized vehicles, and animal-driven carts continue to use the project roads, particularly near residential and commercial areas. Road accidents are increasing, particularly fatalities (Appendix 12). Road safety campaigns, driver training, and identification of potential accident black spots are needed to address the increased vehicle speeds in mixed traffic conditions. Pedestrian facilities are needed, such as pedestrian lanes in residential and commercial areas.

40. **Rural socioeconomic development.** Improvement of the roads has effectively

<sup>14</sup> At appraisal, the EIRR was estimated at 17.5% for the sample road.

<sup>15</sup> ADB India Resident Mission. 2012. ADB back-to-office report, 2 May. Mission to Support Independent Evaluation Department (IED) Team to Chhattisgarh (30 April–1 May 2012).

increased connectivity and mobility in the project area. However, the area is based primarily on agriculture. Formulation and implementation of proper policies to stimulate rural socioeconomic development by local administrations will generate more traffic on the project roads and increase the benefits of the project roads, particularly for the poor.

## **E. Impact**

### **1. Socioeconomic Impacts**

41. The project has substantially improved connectivity in the project area, which has had a huge impact on socioeconomic development: (i) vehicle registrations increased substantially from 200,477 units in 2007/08 to 330,264 units in 2010/11, resulting in an annual growth rate of 18%; (ii) the number of cars and jeeps grew by a significant 30% annually during the period; (iii) vehicle travel time on the project roads decreased by about 40%–50%, and farmers can travel more easily to larger markets and get higher prices for agriculture products; (iv) adequate passenger transport services are operating, mainly minibuses and large jeeps; and bus service frequency has improved to 10–30 minutes on most project roads; (v) land prices along the project roads have escalated (about 3–4 times) due to the improved project roads, and this trend is continuing; (vi) connectivity and accessibility to various social and other service centers, such as for education, hospitals, banking services, and grain markets, have improved significantly; and (vii) many local skilled and unskilled laborers were employed in construction of the project roads. Project construction generated 34,850 person-years of direct employment opportunities, including 11,497 person-years for unskilled laborers and 3,451 person-years for women. Mandatory cautionary and information road signs installed along the project roads have contributed to safer road travel. However, the fatality rate has increased and needs to be addressed (para. 39). The overall impact of the project is *significant*.

### **2. Environmental Safeguards**

42. The approved environment category of the project is B. The initial environmental examination (IEE) report was prepared for a sample subproject in accordance with ADB's Environment Policy (2002) and Environmental Assessment Guidelines (2003), and included an environmental management and monitoring plan (EMMP) for the proposed road subprojects. The summary IEE report was disclosed on the ADB website. The proposed works were not expected to pass through or be in the vicinity of environmentally and ecologically protected and sensitive areas, or close to archaeologically and historically protected monuments. The IEE report for the sample subproject did not envisage any irreversible, significant, or adverse environmental impacts. It outlined key aspects of the proposed investments, environmental benefits, and moderate negative impacts that were construction site-specific and temporary in nature. With construction activities limited to improvement of the existing road sections, environmental impacts were mainly associated with dust emissions due to earthwork, setting-up of construction plant and equipment yard, and movement and storage of construction materials. Most environmental impacts during operation were related to vehicle emissions and, in some road sections, to embankment erosion. To address the potential moderate environmental impacts identified, an EMMP was developed as an integral part of the IEE report. During processing, consultations with affected people and other local communities reported their support for the proposed works, as these were expected to benefit the area in terms of improved connectivity, faster access, and some employment opportunities. An environmental assessment and review procedure was agreed for subprojects to be selected and taken up under the project. The environmental assessment and review procedure outlined the eligibility criteria, environmental assessment approach, approval procedures, and institutional

requirements for subprojects identified during project implementation. The mitigation measures related to the construction activities specified in the EMMP were to be incorporated into the civil works contracts. To address environmental concerns related to the project, PWD was required to establish an environment and social management unit (ESMU) within the PIU. The ESMU was responsible for (i) ensuring regulatory compliance, internal monitoring, and quality control; (ii) supervising activities pertaining to safeguards, and reporting on their implementation to PIU management and ADB; and (iii) ensuring strict adherence to ADB's safeguard policy.

43. Subsequently for each of the subprojects financed under this loan, PWD prepared the IEE reports including EMMPs in accordance with the environmental assessment and review procedure; ADB reviewed and approved the reports. The EMMPs were made a part of the civil works contracts. The ESMU staff, in coordination with other PIU staff and the CSCs, monitored implementation of the mitigation measures. Any noncompliance was recorded and reported for urgent attention of the contractors, who were advised to take immediate corrective actions. Implementation of such corrective measures was closely followed up by ESMU staff. ADB conducted orientation workshops and site-specific briefings on environmental safeguards for ESMU and project staff. The monitoring results, as part of the project progress reports, indicate that the project did not cause any significant adverse environmental impacts. Based on desk review of the available environmental documentation, the project is assessed as having been generally implemented in accordance with the environmental safeguard requirements. Measures directed to traffic, safety, camp-site management, good maintenance at labor quarters, and redevelopment of borrow areas as water ponds were some of the positive aspects. The ADB PCR mission observed that the completed project generally improved the environmental quality. It also observed that with adequate drainage arrangements, water logging was avoided at many locations, reducing soil erosion problems. The planting of trees and shrubs was well implemented, with sufficient and timely maintenance. The EA confirmed that all statutory environmental and forest approvals as applicable under national, state, and local environmental regulations were obtained prior to commencing with works in those relevant areas. However, for some subprojects these were not issued in a timely manner, mainly on account of inadequate coordination between related government agencies, which delayed project implementation. It also confirmed that all terms and conditions associated with these approvals were complied with; and the relevant approvals were renewed subsequently as required. The EA also confirmed that no complaints were received from the local community regarding environmental aspects for any of the activities carried out under the project. Based on the nature of the activities undertaken, and the available environmental records and monitored data, implementation of environmental mitigation measures is rated *generally effective*.

### **3. Land Acquisition and Resettlement**

44. At appraisal the project roads were not anticipated to entail land acquisition. Involuntary resettlement would be limited to the dismantling of a few structures in encroachments at a few locations. PWD prepared a resettlement plan and a resettlement policy framework for the sample project road. PWD was required to prepare a short resettlement plan (SRP) for each project road and submit it to ADB for approval before awarding civil works contracts. The ESMU was to be responsible for assessments of social impact, including (i) monitoring implementation of resettlement plans and social mitigating measures for projects, (ii) implementing measures to mitigate social and resettlement impacts, and (iii) building PWD capacity.

45. During the design of subproject road improvements during implementation, a concern emerged that compliance with the safety requirement and design standards might cause some land acquisition. Accordingly, the related clause in the loan agreement was amended (Schedule

6, para. 7(d) and para. 11) to allow land acquisition. In 2006, the consultants prepared SRPs for the phase 1 roads and in 2008 for the phase 2 roads in accordance with ADB's Involuntary Resettlement Policy (1995). The PIU was assisted by two nongovernment organizations in implementing resettlement activities in accordance with the SRPs, including institutional arrangements, consultations with affected persons and other stakeholders, public disclosure, grievances redress mechanism, compensation and assistance disbursement, and income restoration. The nongovernment organizations prepared micro plans with substantial public consultations and disclosure. A two-tier grievances redressal mechanism was institutionalized with panchayat (village council) committees and grievance redressal committees, comprising representatives of the PIU, the nongovernment organizations, the affected persons, and the panchayats. According to the monitoring reports, 145 families would be affected by the phase 1 roads and 48 by the phase 2 roads. All the impacted households were not titleholders, including illegal encroachers, and small shop owners. In accordance with the agreed entitlement matrix, all affected persons were given resettlement assistance to compensate for the loss of income and structures, and help restore their shops. Upon completion, a total compensation of Rs3,083,489 was disbursed to the affected persons. Overall, the affected households, including vulnerable groups, restored their preproject status in terms of commercial and residential aspects. In addition, the project roads opened up new opportunities to roadside inhabitants. People perceived that improved road conditions would enhance economic and employment opportunities for all sections of society.

#### IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

##### A. Overall Assessment

46. The project is rated *successful*. The project is relevant for the government's overall development objectives and ADB's country partnership strategy. The project has effectively and efficiently achieved the outcomes and outputs anticipated at appraisal. The improved state roads have significantly improved connectivity in the project area and significantly supported regional socioeconomic development. The project has had remarkable socioeconomic impacts for local residents, particularly the poor. The economic reevaluations indicate that the project is viable. The project, through the related TA, supported institutional reform and capacity building of PWD. However, project implementation experienced substantial delays, which postponed the anticipated benefits. To enhance sustainability, the GOC should work to formulate and efficiently implement policies to improve road maintenance, traffic safety, and public transport services.

##### B. Lessons

47. **Project implementation delays.** Project implementation experienced significant delays. The initial delay was caused by insufficient project readiness, inadequate dedicated staff assigned by PWD, delays in finalizing the design reports and bid documents, and time needed to obtain environment and/or forest clearance for tree cutting. During construction, the delays were caused by poor performance of some contractors and Naxalite attacks. To avoid implementation delays, project preparation should be undertaken before approval. A PIU with adequate staff should be in place before approval. Other projects also identify these lessons and corrective actions have been incorporated. Coordination with other government agencies for forest and environmental clearance should be enhanced. ADB has been providing training to the PIU on procurement, safeguards, and contract management.

48. **Performance of contractors.** During implementation, the significant delay in completion of the works was caused by poor performance of some contractors. For future projects, the

qualification criteria for contractors should be strengthened. The contractual provisions related to contractor performance, such as mobilization, staffing, and deployment of equipment and funds, need to be strengthened to minimize the possibility of poor performance by the contractors.

49. To improve the environmental performance of projects, the following measures are suggested: (i) a systematic and continuous approach in developing awareness, and periodic capacity enhancement of project staff regarding ADB's environment policy, procedures, and requirements; (ii) ensuring timely mobilization and continuation of environment experts by the executing agency, consultants, and contractors until closure of a project as appropriate; (iii) systematic supervision, monitoring, data mapping, and reporting mechanisms on implementation of environmental safeguards; and (iv) periodic reviews by environment experts associated with the project to undertake timely corrective actions, if any. These measures will be particularly relevant, given the magnitude of air and noise emissions from road operation and community safety impacts, which may increase due to the likely increase in traffic growth rates.

## **C. Recommendations**

### **1. Project Related**

50. **Future monitoring.** The project was well implemented and completed; PWD is implementing the follow-up road sector project with ADB assistance. Combined with the second ADB-financed road project in the state, the government should reassess project performance about 5 years after project completion, when the full benefits of the project will be apparent.

51. **Further action or follow-up.** Measures for keeping the project sustainable should be strengthened. The institutional reform and capacity-building programs should be continued. The master plan for road development needs to be updated from time to time. The GOC should ensure adequate and timely maintenance funding. Road safety should be enhanced through campaigns, engineering interventions, and adequate pedestrian facilities.

52. **Timing of the project performance evaluation report.** The project performance evaluation report may be prepared in 2016 or later when the second road sector project is substantially complete. Consequently, the traffic, maintenance, and physical condition benefits attained, and impacts on poverty can be better assessed.

### **2. General**

53. **Expediting project delivery.** To achieve early delivery of projects, it should be ensured that the institutional set-up for project implementation is in place, preparatory activities are initiated well in advance, project readiness is high, and the performance of consultants and contractors is closely monitored.

## PROJECT FRAMEWORK

Design Summary	Performance Targets/Indicators	Project Achievements
<b>Impact</b> To promote economic and social development, and reduce poverty and isolation of disadvantaged groups in Chhattisgarh	Increased per-capita income of the state Reduced poverty and unemployment in rural areas  Improved access of disadvantaged groups to health, education, and other essential social services	Average household income increased by 10%–11% in the project area Project implementation generated about 34,850 person-years of direct employment Access to social services is significantly improved in the project area
<b>Outcome</b> 1. To reduce transport costs and travel times on state roads      2. To improve access of the rural poor to social services, markets, and other economic activities   3. To reduce road accidents, injuries, and deaths  4. To provide effective and efficient management of state and major district	Increased traffic from the current low levels to the projected traffic levels, at 6% growth/year  Reduced VOC Reduced travel times between all locations in the state  Lower freight and passenger transport charges (in real terms)  Increased volume of marketed agricultural products  Increased motor vehicle ownership in tribal and economically deprived areas  Increased public transport services in rural areas  Increased population or number of habitations accessed by all-weather, year-round roads Reduced travel times to health, education, and other essential services Reduced accidents, death, and injury rates  Establishment of a road management committee to be responsible for road sector	Traffic increased annually by an average of 9.5% for phase 1 roads during 2005–2010 and 9.0% for phase 2 roads during 2006–2011 VOC reduced by 23% after the project The improved and rehabilitated road network has reduced travel time within the state Transport charges reduced from Rs1.45/ton-km to Rs0.45/ton-km for freight, and Rs2.00/km to Rs0.90/km for passengers in 2006–2011 Transport services to more distant areas allows farmers to sell their products at better prices The number of motor vehicles increased by 65% during 2007–2011  Bus service frequency improved to about 10–30 minutes on most project roads Increased population and habitations have access to all-weather, year-round roads Travel time to social services reduced by an of average 50% in the project area Deaths per 100 accidents during 2006–2011 increased from an average of 10 to 16 people on the phase 1 roads; the GOC must continue road safety measures to reduce accidents, deaths, and injuries The GOC established the RMC on 10 September 2004 to be responsible for overseeing project implementation,



Design Summary	Performance Targets/Indicators	Project Achievements
roads	<p>management and coordination of road sector agencies and external stakeholders</p> <p>Establishment of a separate unit—the Agency for Road Development—in PWD, responsible for the management of state and major district roads</p> <p>Introduction of modern management procedures for road planning, project implementation, operation, and maintenance</p> <p>ARD is adequately equipped with a computerized management information system, financial accounting systems, and operating systems, including transport and technical facilities</p> <p>ARD staffed with qualified and trained personnel</p> <p>Sustained adequate funding for road operation and maintenance</p>	<p>providing policy support, and ensuring coordination of related government agencies</p> <p>PWD's PIU (the embryonic form of ARD) was responsible for day-to-day project implementation; responsibility for the management of state and major district roads was not handed over because of institutional and policy changes during project implementation</p> <p>As a part of the master plan for road sector development, a road database was created on a geographic information system platform; computer tools were used for the road planning and maintenance analysis</p> <p>The PIU is adequately equipped with a computerized information system, financial accounting system, and required operating system, such as a tendering and procurement system</p> <p>The PIU's approximately 70 staff at headquarters and field offices were well trained for implementing the ADB project</p> <p>Adequate state budget is allocated to road works, including for road maintenance</p>
<b>Outputs</b> A. Road Improvement 1. Improvement of state roads  B. Institutional Reform and Capacity Building 1. Improvement of road maintenance funding and management	<p>Improvement of 700 km of priority state roads, to be completed by December 2006</p> <p>Improvement of the remaining 1,000 km of subprojects roads to be completed by December 2008</p> <p>Introduction of the road management manual prepared for Madhya Pradesh Public Works Department with necessary modifications for use in Chhattisgarh by December 2005</p> <p>Jointly review in February each year the needs assessment for road maintenance and budget proposal for Cabinet budget discussion and consideration</p>	<p>During phase 1, 749.0 km priority state roads, under 14 sections, were improved by December 2011; and during phase 2, 438.5 km of state roads, under 14 sections, were improved by July 2011</p> <p>Under the institutional reform TA, manuals and handbooks were prepared for procurement procedures, quality control, service outsourcing, equipment for road management, road safety, maintenance planning, and social and environmental safeguards</p> <p>PWD and ADB jointly reviewed, on a regular basis, the needs assessment and proposed budgetary allocation for road maintenance</p>

Design Summary	Performance Targets/Indicators	Project Achievements
2. Establishment of a road management committee	<p>Permanent road management committee, comprising concerned heads of GOC departments and representatives of external stakeholders, formed by March 2004</p> <p>Committee chaired by the chief secretary</p> <p>Committee programs to support implementation of Road Policy and other road sector initiatives by June 2004</p>	<p>Established on 10 September 2004, the RMC comprises representatives from various government agencies</p> <p>The RMC is chaired by chief secretary of the GOC</p> <p>The RMC supported the institutional reform and capacity-building program in the state</p>
3. Establishment of ARD with integrated responsibility for state roads management	<p>ARD management positions fully established by June 2004</p> <p>ARD expanded to full capacity with transfer from PWD of personnel, offices, and equipment by June 2006</p> <p>Decision and action to transform ARD into the dedicated road authority by December 2006</p>	<p>Due to institution and policy changes during implementation, this was not implemented</p>
4. Effective management systems in place for road planning, procurement, construction, operation, and maintenance	<p>Procedures and computer systems are established by June 2005 for road and bridge inventory, planning and programming, environmental and social assessment, project preparation, procurement, contract administration, project management, operation and maintenance, and financial accounting</p>	<p>Under the institutional reform and capacity building TA, a road database was created on a geographic information system platform and road inventory data were collected in 2008; HDM-4 software was purchased in 2007 and installed as a planning tool for PWD; a road maintenance management system was designed with a handbook and training for PWD engineers at various locations</p>
5. Staff training and capacity building in all essential road management functions	<p>Training needs assessment and plan completed by June 2004</p> <p>Training provided to ARD staff by December 2004</p> <p>Permanent training program completed by December 2005</p>	<p>Under the TA, institutional capacity was assessed and a human resource development plan proposed</p> <p>Substantial training was provided by the TA and supervision consultants to PWD and PIU staff</p>
6. Increased private sector participation in road planning, construction, and maintenance	<p>Established outsourcing of road maintenance to contractors and community groups, and of engineering services to consulting firms</p>	<p>Currently, most of the road maintenance works, including routine and periodic maintenance, are undertaken by outsourcing in the state</p>
7. Road safety program with coordinated engineering, enforcement, and education components in place	<p>Adoption of the community road safety program for implementation on all state roads by December 2004</p>	<p>Reasonable efforts were made under the institutional reform TA, including road safety awareness workshops for PWD, concerned government departments, educators, and other interested road user groups</p>

Design Summary	Performance Targets/Indicators	Project Achievements
8. Sustained funding for road operation and maintenance established and in place	<p>Road safety audit on all state roads started immediately</p> <p>Develop an initial road safety plan by June 2005</p> <p>Road accident database and initial road safety audit completed by June 2005</p> <p>Road safety engineering program established in ARD by July 2005</p> <p>Budget allocation for FY2004/05 road maintenance will not fall below the increase given in FY2003/04</p> <p>Baseline requirements for adequate routine and periodic maintenance identified by December 2004, and included in FY2005/06 and subsequent budgets</p> <p>Funding options reviewed by December 2004, and the GOC's decision on assured funding mechanism by June 2005</p>	<p>Road safety audit was carried out for the project roads</p> <p>The TA consultants proposed a road safety action plan in 2009; it was discussed in a workshop</p> <p>The TA consultants conducted a safety audit for some project roads in 2008</p> <p>A road safety manual was supplied to PWD in 2009 to assist PWD engineers check road designs</p> <p>The state budget for road works has been increasing regularly and is assessed to fully meet the maintenance needs of the state highway network</p> <p>Policies for road maintenance funding and requirements were assessed under the TA; and recommendations on road funding planning and management were provided</p> <p>The GOC has annual budget allocations for road works, including for road maintenance</p>
<b>Inputs</b> Civil works Equipment and software Construction supervision Institutional reform technical assistance Project management	<b>Original Cost</b> (million) Civil works \$221.00 Equipment \$5.00 Supervision \$5.00 Institutional reform \$2.00 Project management \$3.00 <b>Total \$236.00</b>	<b>Actual Cost</b> (million) Right-of-way \$6.85 Civil works \$257.24 Supervision \$5.77 Project management \$1.74 Financial charges \$9.97 <b>Total \$281.57</b>

ADB = Asian Development Bank, ARD = Agency for Road Development, PIU = project implementation unit, PWD = Public Works Department, RMC = road management committee, TA = technical assistance.

Note: The design summary and performance target/indicators are from ADB. 2003. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to India for the Chhattisgarh State Roads Development Sector Project*. Manila.

Source: ADB project completion review mission.

## SUMMARY OF PROJECT OUTPUTS

Package	Subproject Road	Road Section	Road Sections (number)	Length (km)	Bridge	Culvert
<b>A. Civil Contracts under Phase 1 Roads</b>				<b>749.03</b>	<b>33</b>	<b>858</b>
1.	Rajnandgaon–Mohla Road	Rajnandgaon (km 0.00) to Mohla (km 72.40)	1	72.40	3	77
2.	Mohla–Maharashtra Border Road	Mohla (km 72.40) to Maharashtra border (km 110.6)	1	26.50	1	30
3.	Rajnandgaon–Kukamera Road	Rajnandgaon (km 0.00) to Kukamera (km 62.00)	1	62.00	6	36
4.	Kukamera–Kawardha Road	Kukamera (km 62.00) to Kawardha (km 114.90)	1	52.58	4	58
5.	Bilaspur–Mungeli Road	Bilaspur (km 0.00) to Mungeli (km 51.00)	1	51.00	5	57
6.	Mungeli–Pondi Road	Mungeli (km 51.00) to Pondi (km 106.00)	1	55.00	0	58
7A.	Bhanupratappur–Narayanpur–Kondagaon Road	Bhanupratappur (km 0.00) to Narayanpur Kondagaon (km 141.90)	1	94.50	0	58
9.	Ambikapur–Semersot Road	Ambikapur (km 4.00) to Semersot (km 65.00)	1	61.00	2	119
10A.	Kapsara–Hathidad Road; Rajkheda–Dhanwar Road; Ramanujganj–Wadrafnagar Road	Kapsara (km 38.00) to Hathidad (km 62.00); Rajkheda (km 83.00) to Dhanwar (km 110.60) road; Ramanujganj (km 0.00) to Wadrafnagar (km 53.80)	3	105.40	2	117
11.	Gariyaband–Bardula Road	Gariyaband (km 86.78) to Bardula (km 145.60)	1	58.82	5	94
12.	Kumhari–Bemetara Road	Kumhari (km 0.00) to Bemetara (km 67.39)	1	67.39	3	91
13.	Bemetara–Mungeli Road	Bemetara (km 67.39) to Mungeli (km 109.83)	1	42.44	2	63
<b>B. Civil Contracts under Phase 2 Batch A Roads</b>				<b>232.64</b>		<b>317</b>
3.	Hasaud–Sarsiwa–Saraipali–Orissa Border Road	Hasaud (km 0.00) to Sarsiwa (km 16.00); Sarsiwa (km 0.00) to Saraipali (km 35.50); Saraipali (km 0.00) to Orissa border (km 20.15)	3	71.65	1	75
4.	Nandghat–Mungeli Road	Nandghat (km 0.00) to Mungeli (km 36.32)	1	36.32	0	33
5.	Balodabazar–Hathband–Simga Road	Baloda Bazar (km 0.00) to Hathband (km 35.80) to Simga (km 51.07)	2	51.07	3	80
6.	Amleshwar–Funda Road	Amleshwar (km 22.40) to Funda (km 0.00)	1	22.40	0	55
9.	Basna–Bilaigarh Road	Basna (km 0.00) to Bilaigarh (km 51.20)	1	51.20	0	74
<b>C. Civil Contracts under Phase 2 Batch B Roads</b>				<b>205.89</b>		<b>230</b>
7.	Abhanpur–Rajim–Gariyaband Road	Abhanpur (km 27.00) to Rajim (km 45.00) to Gariyaband (km 90.22)	2	63.22	5	90
8.	Rajim–Fingeshwar–Mahasamund Road	Rajim (km 0.00) to Mahasamund (km 39.12)	2	39.12	8	39
10.	Dhamtari–Nagri Road	Nagari (km 64.72) to Dhamtari (km 0.00)	1	64.72	14	48
11.	Dhamtari–Gunderdehi Road	Dhamtari (km 0.00) to Gunderdehi (km 38.83)	1	38.83	10	53
<b>Total</b>			<b>28</b>	<b>1,187.56</b>	<b>74</b>	<b>1,405</b>

Source: The project implementation unit, Public Works Department, Government of Chhattisgarh.

## PROJECT COST AND FINANCING

**Table A3.1: Project Costs**  
(\$ million)

Items	Appraisal Estimate			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
A. Base Cost						
1. Right-of-Way (utility shifting and resettlement)	0.00	0.00	0.00	0.00	6.85	6.85
2. Civil Works	148.07	72.93	221.00	172.35	84.89	257.24
a. Civil works for core project roads (Konta–Jadgalpur)	10.72	5.28	16.00	0.00	0.00	0.00
b. Civil works for remaining project roads (about 1,600 km)	137.35	67.65	205.00	172.35	84.89	257.24
3. Equipment	5.00	0.00	5.00	0.00	0.00	0.00
a. Pavement management system	2.50	0.00	2.50	0.00	0.00	0.00
b. Bridge management system	0.50	0.00	0.50	0.00	0.00	0.00
c. Falling weight deflect meter	0.40	0.00	0.40	0.00	0.00	0.00
d. Car-mounted bump integrator	0.20	0.00	0.20	0.00	0.00	0.00
e. Management and operation	1.00	0.00	1.00	0.00	0.00	0.00
f. Road safety	0.40	0.00	0.40	0.00	0.00	0.00
4. Construction Supervision Consultants	4.00	1.00	5.00	5.77	0.00	5.77
5. Reform Consultants	1.60	0.10	1.70	0.00	0.00	0.00
6. Project Management and Road Safety	0.00	3.00	3.00	0.00	1.74	1.74
7. Road Safety Consultants	0.30	0.00	0.30	0.00	0.00	0.00
<b>Subtotal (A)</b>	<b>158.97</b>	<b>77.03</b>	<b>236.00</b>	<b>178.11</b>	<b>93.48</b>	<b>271.60</b>
B. Contingencies (physical and price)	20.55	9.15	29.70			
C. Front-End Fee	1.00	0.00	1.00	0.90	0.00	0.90
D. Interest during Construction and Commitment Charge	19.00	0.00	19.00	9.07	0.00	9.07
<b>Total</b>	<b>199.52</b>	<b>86.18</b>	<b>285.70</b>	<b>188.09</b>	<b>93.48</b>	<b>281.57</b>

Source: Asian Development Bank. 2003. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to India for the Chhattisgarh State Roads Development Sector Project*. Manila; Asian Development Bank loan financial information system; and the Project Implementation Unit, Public Works Department, Government of Chhattisgarh.

**Table A3.2: Project Financing**  
(\$ million)

Source	At Appraisal				Actual			
	Foreign Exchange	Local Currency	Total Cost	% of Total Cost	Foreign Exchange	Local Currency	Total Cost	% of Total Cost
ADB	179.52	0.48	<b>180.00</b>	63.00	160.42	0.00	<b>160.42</b>	56.97
Government	20.00	85.70	<b>105.70</b>	37.00	27.67	93.48	<b>121.15</b>	43.03
<b>Total</b>	<b>199.52</b>	<b>86.18</b>	<b>285.70</b>	100.00	<b>188.09</b>	<b>93.48</b>	<b>281.57</b>	100.00

ADB = Asian Development Bank.

Source: ADB. 2003. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to India for the Chhattisgarh State Roads Development Sector Project*. Manila; ADB loan financial information system; and the Project Implementation Unit, Public Works Department, Government of Chhattisgarh.

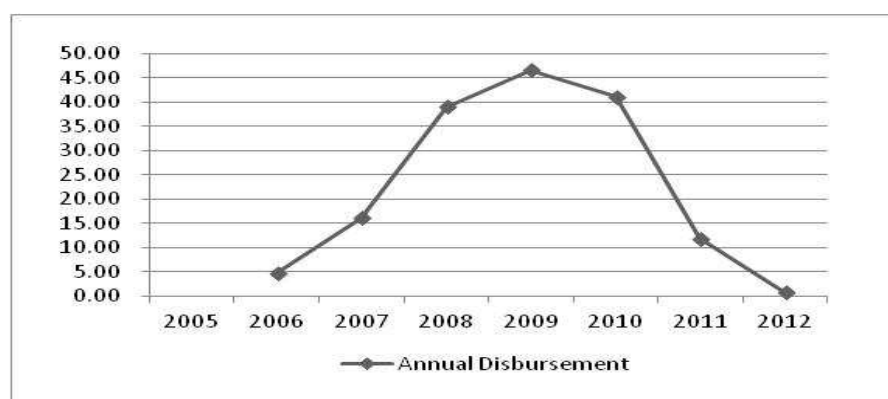
### DISBURSEMENT OF ADB LOAN PROCEEDS

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

Year	Annual Disbursement			Cumulative Disbursement	
	Amount		% of Actual Total	Amount	% of Total
	Projected	Actual			
2005	0.30		0.00	0.00	0.00
2006	14.30	4.82	3.00	4.82	3.00
2007	28.70	16.13	10.05	20.95	13.06
2008	41.00	39.06	24.35	60.01	37.41
2009	40.00	46.67	29.09	106.67	66.50
2010	42.00	41.14	25.65	147.82	92.14
2011		11.82	7.37	159.64	99.51
2012		0.78	0.49	160.42	100.00
<b>Total</b>		<b>160.42</b>	<b>100.00</b>		

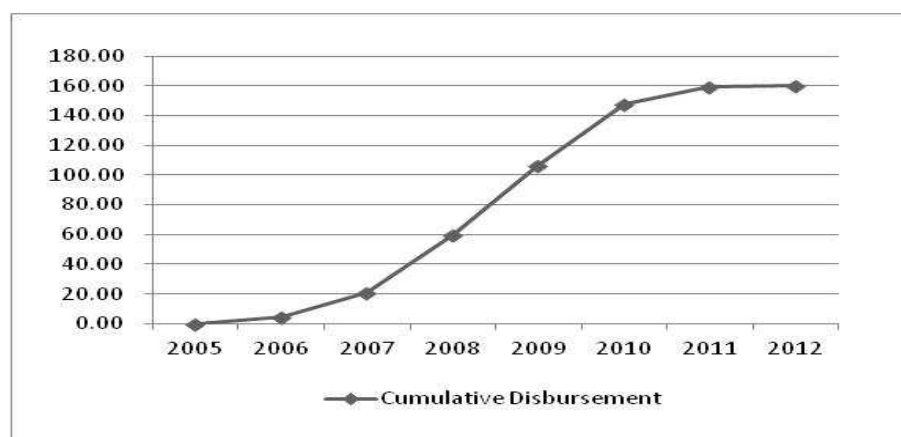
ADB = Asian Development Bank.  
Source: Asian Development Bank.

**Figure A4.1: Annual Disbursement of ADB Loan Proceeds (\$ million)**



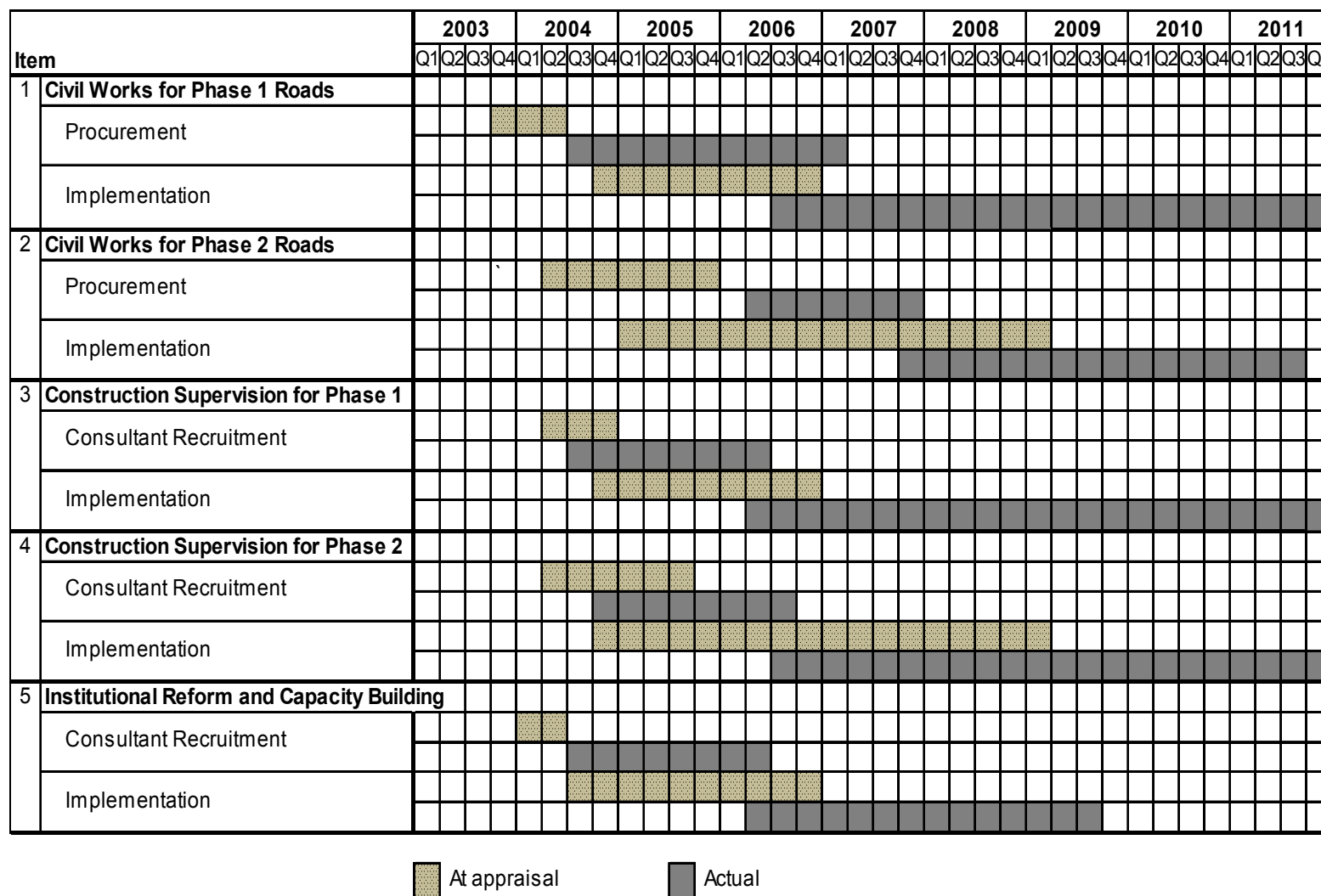
ADB = Asian Development Bank.  
Source: Asian Development Bank.

**Figure A4.2: Cumulative Disbursement of ADB Loan Proceeds (\$ million)**



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

## APPRAISAL AND ACTUAL IMPLEMENTATION SCHEDULES COMPARED



Source: Project Implementation Unit, Public Works Department, Government of Chhattisgarh; and Asian Development Bank project completion review mission.



## CHRONOLOGY OF MAJOR EVENTS

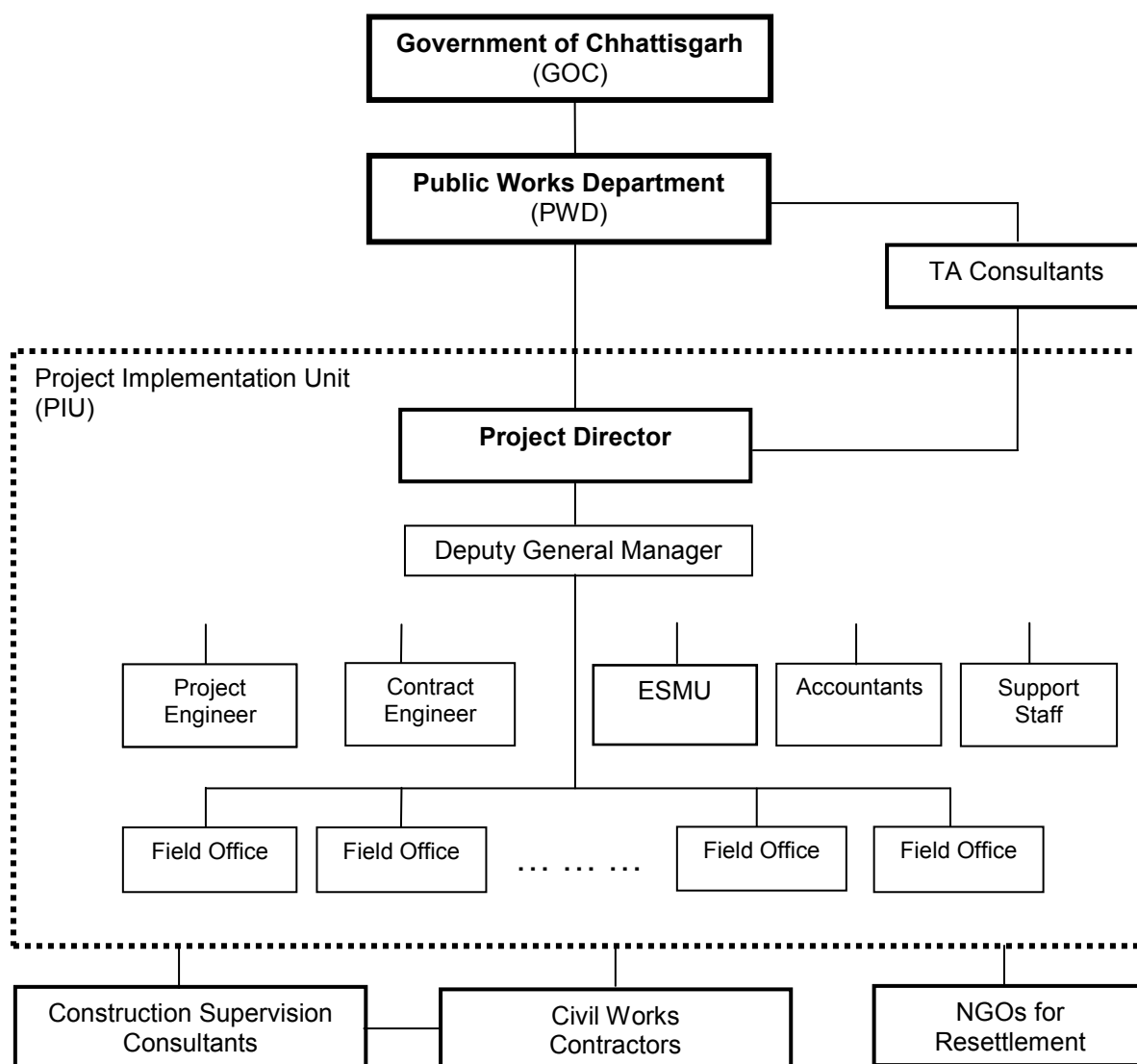
Date	Main Event
<b>2002</b>	
21 Nov	ADB approved project preparatory technical assistance: Institutional Strengthening and Capacity Building for the Chhattisgarh State Road Sector Development Project
<b>2003</b>	
10–12 Jan	ADB project contact mission
22 Apr	Technical assistance consultants mobilized
20 May–2 Jun	ADB project fact-finding mission
16 Jul	ADB management review meeting and approval of advance procurement action
1–15 Sep	ADB project appraisal mission
21 Sep	PIU for Chhattisgarh State Road Sector Development Project established
13–14 Nov	Loan negotiations
15 Dec	Loan approval
<b>2004</b>	
22–26 Mar	ADB project contact mission
11–15 Oct	ADB project inception mission
14 Dec	Loan signing
<b>2005</b>	
14 Jan	Loan effectiveness
24–26 Jan	ADB project review mission
<b>2006</b>	
3 Mar	ADB approved the increase in TA amount, enhancement of scope, and extension of TA closing date to 30 April 2009
13 Jun	Supervision consultant for phase 1 works engaged
14 Jun	Supervision consultant for phase 2, batch B engaged
18 Jul	Supervision consultant for phase 2, batch A engaged
20 Jul–29 Dec	Award of civil works contracts under phase 1, except package 10A
20–24 Nov	ADB project review mission
<b>2007</b>	
26 Feb–3 Mar	ADB project review mission
13 Mar	Award of civil works contracts under phase 1 package 10A
31 Aug–6 Sep	ADB project review mission
17–19 Dec	Award of civil work contracts under phase 2
<b>2008</b>	
3–5 Jan	ADB special loan administration mission
28 Mar–4 Apr	ADB project review mission
30 July	Completion of package 4 of phase 1

<b>Date</b>	<b>Main Event</b>
30 August	Completion of package 2 of phase 1
16–22 Sep	ADB project review mission
<b>2009</b>	
25 Mar	ADB approval of first extension of loan closing date by 11 months to 30 June 2010
27 May–4 Jun	ADB project review mission
31 Aug	TA and consultancy services completion date
<b>2010</b>	
30 Jun	ADB approval of second extension of loan closing date by 13 months to 31 July 2011
22 Oct	Completion of all civil work contracts for phase 1, except packages 11 and 7A
23 Nov–1 Dec	ADB project midterm review mission
<b>2011</b>	
30 Apr–1 May	ADB project review mission
12–19 Jul	ADB review mission by the Independent Evaluation Department
31 Jul	Completion of package 11 (completion of all phase 1 roads except package 7A)
31 Jul	Loan closing date
31 Oct	Completion of consulting services for phase 2
30 Nov	Completion consulting service for phase 1
11 Dec	Completion all civil work contracts for phase 2
<b>2012</b>	
9 April	Loan account closing
<b>2013</b>	
21–28 Aug	ADB project completion review mission

ADB = Asian Development Bank, TA = technical assistance.

Source: ADB project completion mission.

## ORGANIZATION STRUCTURE FOR PROJECT IMPLEMENTATION



ESMU = environmental and social management unit, NGO = nongovernment organization

Source: The Project Implementation Unit, Public Works Department, Government of Chhattisgarh.

### STATUS OF COMPLIANCE WITH MAIN LOAN COVENANTS

Covenant	Reference in Loan Agreement	Status of Compliance
<b>Project Executing Agency</b> PWDGOC shall be the Project Executing Agency and shall be responsible for the overall supervision and executing of the Project.	Schedule 6, para. 1	<b>Complied with.</b> The GOC's PWD, as the executing agency for the project, was responsible for overseeing and coordinating project implementation.
<b>Implementation Agency</b> The ARD shall initially be the implementing agency and shall be responsible for the day-to-day implementation of the Project. Once the DRA is established and becomes fully operational, in accordance with the reform measures adopted by the State on 10 November 2003 in a Time-bound Policy Action Plan (the Action Plan), the DRA shall duly take over the responsibilities with respect to the implementation of the Project.	Schedule. 6, para. 2	<b>Partly complied with.</b> The PIU (the embryonic form of ARD) was responsible for day-to-day project implementation. The GOC established an SPV for the development and maintenance of a significant part of the state road network. It served the essential purpose of establishing the DRA. During project implementation, the GOC decided not to transfer the responsibility for project administration to the SPV, as the PIU had gained sufficient experience. The PIU is also implementing the second ADB-financed state road project.
<b>Project Implementation Units</b> (a) The PIU, already established by the State, shall be based within PWDGOC and maintained throughout the Project implementation period with adequate staffing and other resources, as may be agreed between the State and ADB. The PIU shall have field offices at key locations, as may be agreed between the State and ADB, to assist the PIU in implementation activities. (b) The PIU shall be headed by a fully-time Project Director at the level of Chief Engineer, as agreed between the State and ADB. The Project Director shall be responsible for day-to-day management of the Project and shall, to the extent possible, remain in the service of the PIU throughout the Project Implementation Period in order to maintain continuity.	Schedule 6, para. 3	<b>Complied with.</b> The PIU, established within PWD, was maintained throughout project implementation and is implementing the second ADB-financed state road project. During implementation, the PIU was adequately staffed at headquarters and in the 16 field offices. An environment and social management unit was established.  The PIU was headed by a full-time project director responsible for day-to-day project management. To the extent possible, the continuity of the project director was maintained.
<b>Road Management Committee</b> (a) The Borrower shall cause the State to establish a Road Management Committee (RMC) by 31 March 2004 to oversee Project Implementation, provide policy support, ensure coordination among key agencies involved in Project Implementation for timely implementation of the institutional reforms and assist in effective monitoring of the Project performance, including use of the Loan proceeds and the counterpart funds allocated for the Project. (b) RMC shall be chaired by the Chief Secretary of the State, or his designate, and comprise representatives of PWDGOC and the GOC's Financial Department, Planning Department, Home (Police) Department, Rural Engineering Services, Chhattisgarh Infrastructure Development Corporation and selected external road stakeholders. RMC shall meet at the state level every two months. Other agencies of the State, such as the Forestry and Environment Department of the GOC, agencies in charge of resettlement issues and the consultants recruited for the Project may also be asked to participate in the RMC meetings, as and when needed, to assist in the implementation of the Project.	Schedule 6, para. 4.	<b>Complied with.</b> The GOC established the RMC, on 10 September 2004, to be responsible for overseeing project implementation, providing policy support, and ensuring coordination between related government agencies.  The RMC is chaired by the chief secretary of the GOC and comprises representatives of various government agencies including PWD, the Financial Department, the Environment and Forest Department, and the Transport Department. The RMC had meetings as needed to discuss issues related to project implementation. Some consultants participated in the meetings.

Covenant	Reference in Loan Agreement	Status of Compliance
<p><b>Selection, Evaluation and Approval of Subprojects</b>  PWDGOC will select, review, evaluate and rank the subprojects in accordance with the Loan Agreement and obtain ADB approval. PWDGOC will not award any civil works contract for any proposed subproject before ADB approves the selection of subproject.  The resettlement plans, indigenous peoples development plans and the initial poverty and social assessments with respect to the Subprojects, are prepared and carried out in accordance with the Resettlement Framework and Indigenous Peoples Framework prepared for this Project. Such plans and the assessments shall be submitted to ADB for approval prior to award of any civil works contract under the Subprojects.</p>	Schedule 6, para. 5, 6, and 7.	<p><b>Complied with.</b>  ADB approved all subprojects proposed by PWD following loan agreement stipulations. During project implementation, some resettlement impacts were identified for some road sections. Subsequently, the PIU prepared 17 SRPs for road sections under phases I and 2; ADB approved these.</p>
<p><b>Sector Reforms</b>  <b>Dedicated Road Agency.</b> The Borrower shall cause the State to ensure that state road sector management responsibility and authority are effectively integrated and vested initially in the ARD, and later transferred to the DRA once it is duly established by the State by 31 December 2006.</p> <p><b>Reform Measures.</b> The Borrower shall also cause the State to implement the measures stipulated in the Action Plan within the time frame set forth therein.</p>	<p>Schedule 6, para. 8</p> <p>Schedule 6, para. 9</p>	<p><b>Partly complied with.</b> The PIU, with responsibility for project implementation, is an early version of the ARD. The GOC subsequently established an SPV for construction, operation, and maintenance of a significant part of the state road network other than the project. If this initiative is successful, it would be extended to the entire state road network. The essential purpose of establishing the DRA is to separate the policy and planning and implementation functions to establish clear accountability. The SPV meets the essential requirement for the related loan covenant, i.e., establishing DRA.</p> <p><b>Complied with.</b> Activities under the Policy Action Plan for institutional reform were restructured to address the changed scenario, keeping its objectives unchanged. Implementation of institutional reform was completed under Technical Assistance for Preparing the Chhattisgarh State Roads Sector Development.</p>
<p><b>Capacity Building</b>  The Borrower shall cause the State to ensure that:</p> <p>(a) The capacity building and training programs for PWDGOC staff are carried out and evaluated effectively under the Project, to the satisfaction of ADB and the State; and</p> <p>(b) Necessary measures are adopted to endeavor that the trained staff remain in service for at least 2 consecutive years after the completion of such training.</p>	Schedule 6, para. 10	<p><b>Complied with.</b>  Substantial training was provided to PWD staff by institutional reform consultants under the TA. Two international study tours on road management practices were organized with 17 PWD staff participants. A workshop on management of change, a few training sessions on human resources for middle management officers, and technical training for 450 new recruited were conducted.</p> <p>Most of the PIU staff remained in service for more than 2 years after participating the training.</p>
<p><b>Land Acquisition and Involuntary Resettlement</b>  The Borrower shall cause the State to ensure that:</p> <p>(a) Technical design for the road rehabilitation works under the Project does not require land acquisition and/or widening of the existing rights of way, and each civil works contract package is closely screened by the</p>	Schedule 6, para. 11	<p><b>Complied with.</b>  In view of the project requirement during implementation, the loan agreement was amended in July 2007 to include road sections requiring land acquisition and major</p>

Covenant	Reference in Loan Agreement	Status of Compliance
<p>State and PWDGOC, prior to award of such contract, to exclude those road segments which may require land acquisition and/or widening of the existing rights of way;</p> <p>(b) Involuntary resettlement is minimized and only those road segments with insignificant resettlement impact or no negative impact are selected;</p> <p>(c) All compensation payments and resettlement assistance are provided to the affected people prior to displacement; and;</p> <p>(d) The relevant resettlement plans are updated and modified to incorporate changes, if any, that may be necessitated by the detailed engineering designs prepared for the Subprojects in accordance with the requirements specified in paragraph 7(d) here above.</p>		<p>resettlement. Technical design for the road rehabilitation works ensured that land acquisition and resettlement impacts were minimized during implementation.</p> <p>During implementation, involuntary resettlement was minimized.</p> <p>All affected persons were given compensation payment and resettlement assistance in accordance with the approved resettlement plan.</p> <p>SRPs were prepared for eight phase 1 roads and nine phase 2 roads.</p>
<p><b>Environmental Concerns</b></p> <p>The Borrower shall cause the State to ensure that:</p> <p>(a) The Project is carried out, and all Project facilities are designed, constructed, operated, maintained and monitored in compliance with the existing environmental laws and regulations of the Borrower and the State, and the Environmental Assessment Guidelines (2003) of ADB, as may be amended from time to time;</p> <p>(b) All environmental mitigation measures identified in the IEEs and the EMMPs prepared for the Subprojects are incorporated in such Subprojects' design and are duly carried out during construction, operation and maintenance of the Subprojects;</p> <p>(c) Local communities and other stakeholders are duly consulted during the Project implementation of the subprojects on such mitigation measures;</p> <p>(d) An environmental and social management unit (ESU) is established within ARD ,and consequently in DRA to be responsible for preparation of the IEEs and EMMPs for the Subprojects, environmental management including environmental monitoring, implementation of the EMMPs including the mitigation measures with respect to adverse environmental impacts, preparation of the social impacts assessments and, when required, resettlement plans and indigenous people development plans for the Subprojects, monitoring implementation of such resettlement plans and the health and safety programs referred to in paragraph 13(i) of this Schedule;</p> <p>(e) PWDGOC designs and conducts appropriate training programs for the ESU staff on topic on related to the areas of responsibility of such staff as stated in the previous paragraph;</p> <p>(f) The Subprojects do not include road segments passing through national parks or sanctuaries, and the clearances required by the Borrower's Forest Act (1991) and Environment Protection Act (1986) with</p>	<p>Schedule 6, para. 12</p>	<p><b>Complied with.</b></p> <p>The project was carried out in compliance with existing environment laws and regulations of the Borrower and the state, and ADB's Environmental Assessment Guidelines (2003).</p> <p>All environmental mitigation measures identified in the IEEs and the EMMPs were incorporated in the road design and carried out during implementation.</p> <p>Local communities and other stakeholders were duly consulted during the design stage and project implementation, as required.</p> <p>An environmental and social management unit was established in 2007 within the PIU. Two existing PIU staff were given additional duties for monitoring implementation of the EMMP and SRPs.</p> <p>Training programs for all newly recruited PWD staff were carried out in late 2008 and early 2009 by the consultants. Safeguards staff of the India Resident Mission conducted orientation programs on ADB's safeguards requirement.</p> <p>No subprojects included any road segment through any national parks or sanctuaries. All forest clearances from the Environment and Forest Department were obtained prior to</p>

Covenant	Reference in Loan Agreement	Status of Compliance
<p>respect to segments passing through reserve forests are obtained in a timely manner prior to commencement of construction at such segment;</p> <p>(g) No construction is undertaken on any of the Project roads before the required statutory clearances are obtained when needed.</p>		<p>commencement of construction on the selected subprojects.</p> <p>No construction was undertaken on any of the project roads before the required statutory clearances were obtained.</p>
<p><b>Social Measures</b> The Borrower shall cause the State to ensure that:</p> <p>(a) Civil works contractor employed under the Project are required to undertake appropriate health and safety programs to, among others, disseminate information to the construction workers on human immunodeficiency virus/acquired immunodeficiency syndrome and preventive measures;</p> <p>(b) Civil works contractors comply with all applicable labor laws of the Borrower and the State, and do not employ child labor for construction and maintenance activities;</p> <p>(c) Employment targets, acceptable to ADB, are set for women in road construction activities;</p> <p>(d) Civil works contractors do not differentiate between wages of men and women workers for work of equal value; and</p> <p>(e) Appropriate child-care facilities are provided at or around the construction campsites.</p>	Schedule 6, para. 13	<p><b>Complied with.</b> Appropriate provisions were incorporated in the contract documents for the civil works. The contractors were asked to encourage women to be active in road construction activities.</p> <p>Compliance by the contractors was monitored and confirmed by PWD.</p>
<p><b>Road Safety</b> The Borrower shall cause the State to ensure that the community road safety program developed under the Rural Roads Project is duly adopted and implemented with respect to the state roads and the program measures are applied, in particular, at or around accident prone zones near urban areas and large settlements.</p>	Schedule 6, para. 14	<p><b>Partly complied with.</b> Community road safety programs under the ADB-funded Rural Roads Project 1 was at the draft stage and further due diligence was required before the program was available for national and/or state implementation. Other reasonable efforts were made under the institutional reform and capacity building TA, including road safety awareness workshops for PWD, concerned government departments, educators, and other interested road user groups.</p>
<p><b>Road Maintenance</b> (a) Without prejudice to the general provisions of Section 4.02 of the Loan Agreement, the Borrower shall cause the State to ensure that adequate budgetary allocations of required counterpart funds for road maintenance are made for, and released in a timely manner to, the PWDGOC for each year of the Project implementation period.</p> <p>(b) In order to ensure quality of construction and sustainability of maintenance on the Project roads, the Borrower shall cause the State to ensure that PWDGOC enters into arrangements with the civil works contractors employed under the Project so that they undertake the periodical maintenance of the same scope of works for a term not less than six (6) to eight (8) years after completion of such works. The cost of such maintenance shall be borne by the State, in accordance with arrangements acceptable to the Borrower.</p>	Schedule 6, para. 15	<p><b>Complied with.</b> During project implementation, adequate budgetary allocations of required counterpart funds for road maintenance were made and released to PWD in a timely manner.</p> <p>Based on justification provided by PWD, ADB agreed that PWD would ensure proper maintenance of the project roads after completion through arrangements that are economical and effective. The loan agreement was amended in July 2007. Completed roads have been progressively handed over to regular divisions of PWD for operation and maintenance through contracts by zone on an annual basis depending on assessment of maintenance needs and amount, considering overall cost effectiveness.</p>
<p><b>Project Performance Monitoring and Evaluation</b> The Borrower shall cause the State to ensure that, within</p>	Schedule 6,	<b>Complied with.</b> The supervision consultants

Covenant	Reference in Loan Agreement	Status of Compliance
<p>six (6) months of the effective date, PWDGOC, with the assistance of the consultants recruited under the Project, develops a comprehensive project performance management system (PPMS), including the respective procedures and plans, in accordance with the Project Performance management System Handbook of ADB. The Borrower shall cause the State to ensure that PWDGOC (i) establishes baseline indicators and target values at the commencement of the Project and; (ii) undertake quantitative and qualitative project performance monitoring for each component of the Project by using PPMS to enable the Borrower to evaluate the delivery of the planned facilities and the Project benefits accrued. Performance indicator values shall be observed during Project implementation, at Project completion, one year after Project completion and four years thereafter.</p>	para.16	<p>conducted the project benefit monitoring. Annual data were collected for the monitoring indicators designed at appraisal. The monitoring reports were submitted to ADB. PWD's completion report provides a summary of the impact indicators for some of the indicators.</p>
<p><b>Project Reviews</b></p> <p>(a) The Borrower shall cause the State to undertake regular, special and midterm reviews of the Project, jointly with ADB, to assess its progress.</p> <p>(b) The mid-term review shall be carried out by 31 December 2006 at which the State shall (i) evaluate the Project's scope, design and implementation arrangements; (ii) evaluate the progress of the Project; (iii) identify changes needed in any of the areas reviewed; (iv) assess implementation performance against agreed performance indicator targets; (v) identify critical issues and constraints, if any, and (vi) if needed, recommend adjustments to the Project design and/or implementation arrangements. The mid-term review shall focus on the agreed measures for policy changes and institutional reforms, funding requirements for road maintenance and related budget allocations, updating the State's Master Plan for Road Sector Development and improving quality management.</p> <p>(c) Project reviews shall also include (i) review of the Project progress reports to be prepared by PWDGOC with the assistance of the contractors, including the health and safety programs referred to in paragraph 13(i) of this Schedule, and the consultants recruited for construction supervision.</p> <p>(d) Without limiting the generality of the foregoing, PWDGOC shall, jointly with ADB, review the needs assessment and proposed budgetary allocation for road maintenance in February of each year of the Project implementation period to ensure that the required funding is adequately updated and duly included in PWDGOC's submission of its budget proposal prior to the finalization of the State budget for the following fiscal year.</p>	Schedule 6, para. 17	<p><b>Complied with.</b></p> <p>The GOC and ADB jointly conducted 12 loan reviews for the project, including at project inception in 2004, a special loan review in 2008, and a midterm review in 2010.</p> <p>A midterm review conducted during 23 November–1 December 2010 covered many aspects of project implementation, including implementation progress, contractor's performance, updated project cost and loan disbursement, critical issues and constraints, environment and social safeguards, maintenance arrangements, and loan covenant compliance.</p> <p>Appropriate provisions were incorporated in the contract documents. Contractors were asked to encourage women to be involved in road construction activities. These were reviewed during the review missions.</p> <p>During project implementation, adequate budgetary allocations of required counterpart funds for road maintenance were made and released to PWD in a timely manner.</p>
<p><b>Others</b></p> <p>The State shall furnish to ADB, or cause to be furnished, quarterly reports on the execution of the Project and on the operation and management of the Project facilities.</p>	PA Section 2.08(b)	<p><b>Complied with.</b> Progress reports were submitted by PWD on a regular basis.</p>
<p>The State shall (i) maintain separate accounts for the Project and for its overall operations; (ii) have such accounts and PWDGOC's financial statements (balance</p>	PA Section 2.09 (a)	<p><b>Partly complied with.</b> Government auditors audited the project accounts and related financial statements. The audited reports were</p>



Covenant	Reference in Loan Agreement	Status of Compliance
sheet, statement of income and expenses, and related statements, sources of application of funds statement) audited annually, in accordance with appropriate auditing standards consistently applied, by independent auditors whose qualifications, experience and terms of reference are acceptable to ADB; and (iii) furnish to ADB, promptly after their preparation but in any event not later than nine months after the close of the fiscal year to which they relate, certified copies of such audited accounts and financial statements and report of the auditors relating thereto		submitted to ADB on a regular basis until the second extension of loan closure, i.e., 31 July 2011.

ADB = Asian Development Bank, ARD = Agency for Road Development, GOC = Government of Chhattisgarh, DRA = dedicated road authority, EA = executing agency, EMMP = environmental monitoring and management plan, IEE = initial environmental examination, PCR = project completion review, PIU = project implementation unit, PWD = Public Works Department, RMC = road management committee, SPV = special purpose vehicle, SRP = short resettlement plan.

Source: ADB project completion review mission.

## TECHNICAL ASSISTANCE COMPLETION REPORT

Division: India Resident Mission

<b>Technical Assistance (TA) No. and Name</b> TA 3995-IND: Chhattisgarh State Roads Sector Development			<b>Amount Approved</b> Original: \$800,000 Revised: \$2,400,000	
<b>Executing Agencies:</b> (i) Chhattisgarh Infrastructure Development Corporation (ii) Public Works Department (PWD), Government of Chhattisgarh (GOC) – upon increase in TA amount		<b>Source of Funding</b> (i) Government of the United Kingdom <sup>a</sup> (ii) TASF, with effect from 26 June 2008 to TA closing	<b>TA Amount Undisbursed</b> \$384,870	<b>TA Amount Utilized</b> \$2,015,129
<b>Date:</b> <b>Approval</b> For original TA 21 Nov. 2002 For enhanced TA 3 March 2006			<b>TA Closing Date:</b> <b>Original</b> 31 Oct 2003 <b>Account Closing Date:</b> <b>Original</b> 31 Oct 2003	
<b>Award by ADB</b> 22 April 2003 24 April 2006			<b>Actual</b> 31 Aug 2009 <b>Actual</b> 18 Feb 2010	
<b>Fielding of Consultants</b> 23 April 2003 1 May 2006				

**Description**  
The Asian Development Bank (ADB) approved the technical assistance (TA) for Chhattisgarh State Roads Sector Development, with \$800,000 financing provided by the Government of the United Kingdom, on 21 November 2002. The TA was to help prepare the Chhattisgarh State Roads Development Sector Project for ADB financing. Its main components were project preparation and institutional strengthening and policy reform.

**Expected Impact, Outcome, and Outputs**  
Originally, the expected TA outputs included (i) a master plan for road sector development, including prioritized investment needs for new roads and upgrading of existing roads in the state; (ii) feasibility studies; engineering, environmental, and social impact studies; and bid documents for major upgrading works; and (iii) sector plans and an action plan to strengthen key sector institutions, promote private sector participation, and improve road safety and road maintenance.

During implementation of the project, approved by ADB on 14 December 2014, the government requested TA for the project's institutional reform and capacity building component (which was to be by the project). Accordingly, ADB approved an increase of \$1,600,000 in the TA amount on 3 March 2006 to enhance the TA scope to include the component.<sup>b</sup> The TA closing date was extended to 30 April 2009. At the time of TA enhancement, PWD was designated as the executing agency for the TA and ADB approved PWD's use of procedures allowed under the project for selecting consultants.

The goal of the additional component was to (i) strengthen state road management by establishing an agency for road development within PWD, (ii) introduce and implement effective and efficient road management processes, (iii) improve skills of PWD employees, and (iv) establish a sustainable mechanism to ensure adequate funding for road maintenance. Achieving this goal would significantly increase GOC capacity to accomplish other social and economic development targets.

**Delivery of Inputs and Conduct of Activities**  
An international consulting firm (CPCS Transcom, Canada) and a team of individual consultants were engaged in 2003 to implement the original TA. They prepared sector analyses and action plans, and undertook a feasibility study, together with environmental and social impact studies, for 100 kilometers of road as the sample road for the investment project. But due to poor performance, the contract with this consulting firm was terminated effective 7 May 2004.

Consequently, a team of consultants was engaged in 2004 to update the master plan, including prioritization of investment needs for new roads and upgrading of existing roads. The consultants

submitted the draft final report in June 2005. As a part of the master plan, a road database was created on a geographic information system platform. The performance of the consultants was satisfactory. In addition, an individual consultant was engaged in June 2005 to assist PWD and ADB in reviewing project preparation, project appraisal, and the approval of candidate subprojects under the investment project, and the procurement of civil works contracts. The individual consultant provided very valuable assistance to PWD for project preparation and procurement activities.

For the enhanced TA, a firm (Louis Berger Group, India) was engaged to focus on (i) reviewing road sector development and institutional capacity; (ii) helping PWD implement institutional reforms under the project; (iii) helping PWD establish the proposed social and environmental monitoring unit; and (iv) providing domestic and international training programs. The consulting services were carried out from June 2006 through August 2009 with total consulting inputs of 152 person-months, including 28 person-months of international and 124 person-months of domestic consultants. The performance of the consultants was satisfactory.

The performance of PWD was satisfactory. PWD provided counterpart support and financing, and worked closely with the consultants. ADB's supervision of the TA was satisfactory. ADB monitored TA implementation through review missions and review of consultants' inputs.

### **Evaluation of Outputs and Achievement of Outcome**

Under the original TA, the consultants (CPCS Transcom) assisted PWD in undertaking a feasibility study, together with environmental and social impact studies, for the sample road under the investment project; and undertaking sector analysis. The output of the consultant was not considered satisfactory and additional ADB staff resources had to be deployed for the approval of the project. The services of the consultants were terminated due to poor performance and it affected project implementation, as the phase 2 roads under the project were to be finalized based on the updated master plan for road sector development. The updating of the master plan was undertaken through the recruitment of a team of consultants. Under the enhanced TA, the consultants (Louis Berger Group) implemented the tasks required in the terms of reference, including (i) audit the institutional framework of PWD, and review road policies in the state; (ii) conduct a pilot study on road monitoring and programming; (iii) prepare guidance, manuals, and handbooks on procurement procedure, quality controls, service outsourcing, equipment for road management, road safety, maintenance planning, and social and environmental safeguards; (iv) support the PIU to maintain computerized accounts; (v) provide hands-on and classroom training; (vi) design interactive tools for road maintenance funding; (vii) review and provide recommendations for improving road transport services; and (viii) develop a human resource plan for PWD staff. In addition, two international training sessions were organized: one in Australia in August 2007 with 14 PWD officials and one in the United States in May 2008 with 3 PWD officials. Upon completion, the consultants submitted a final report, five independent subreports, and large number of technical reports and papers. Extensive in-country training sessions and workshops were conducted to discuss and disseminate the TA outputs.

### **Overall Assessment and Rating**

Implementation of this TA has assisted the preparation and implementation of the investment project, and established a more effective and efficient state road sector management system in Chhattisgarh. The assistance provided by the consultants helped the government comply with the loan covenants under the project. The TA realized its objectives of assisting the GOC and PWD in implementing institutional reform in the road sector and building its capacity. The TA is rated *successful*.

### **Major Lessons**

The major lessons from TA implementation are (i) successful implementation of a reform program requires strong commitment and support from the government; (ii) adequate facilities and budget for regular training for all new or adjusted institutional arrangements is necessary; (iii) modern management techniques, organizational structures, policy guidance, regulatory interventions, and planning and programming tools should be adopted to ensure full program delivery; and (iv) strong monitoring and evaluation systems should be adopted to ensure the desired and sustainable outcomes are achieved.

**Recommendation and Follow-Up Actions**

Policy dialogue should be continuously incorporated in ongoing and future projects financed by ADB, and the progress and outcomes monitored and evaluated on a regular basis.

<sup>a</sup> Through the memorandum of understanding between the Government of the United Kingdom of Great Britain and Northern Ireland and the Asian Development Bank on the Establishment of a Cooperation Fund for Technical Assistance. Administered by the Asian Development Bank.

<sup>b</sup> Since the Government of the United Kingdom financing was exhausted by June 2008, the undisbursed balance of \$990,000 under the TA was reallocated to be financed by the Technical Assistance Special Fund with effect from 26 June 2008.

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In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

## SUMMARY OF CONTRACT PACKAGES

Package		Contractor/ Consultant	Procurement Method	Contract Amount		Cost at Completion	
				Currency	Amount	Amount	\$ Equivalent <sup>a</sup>
Civil Works							
A.	Phase 1 Roads						
1	Rajnandgaon–Mohla Road	Nagarjuna Construction	ICB	Rs	651,490,482	700,409,855	15,665,148
2	Mohla–Maharashtra Border Road	Maytas Infra	ICB	Rs	291,584,394	222,348,994	5,308,183
3	Rajnandgaon–Kukamera Road	BSBK	ICB	Rs	486,487,683	388,312,775	8,797,637
4	Kukamera–Kawardha Road	IVRCL Infrastructures & Projects	ICB	Rs	465,123,994	590,542,283	14,142,021
5	Bilaspur–Mungeli Road	Rani Construction	ICB	Rs	500,212,359	524,624,492	11,352,899
6	Mungeli–Pondi Road	IVRCL Infrastructures & Projects.	ICB	Rs	434,043,479	508,993,343	11,363,609
7A	Bhanupratappur–Narayanpur–Kondagaon Road	M/S Progressive Constructions	ICB	Rs	1,070,958,225	644,380,769	14,445,142
9	Ambikapur–Semersot Road	Gayatri Projects	ICB	Rs	651,785,010	747,049,279	16,058,643
10A	Kapsara–Hathidad Road; Rajkheda–Dhanwar Road; Ramanujganj–Wadrafnagar Road	Gayatri - GDC - Joint Venture	ICB	Rs	1,180,733,435	1,354,060,017	30,458,393
11	Gariyaband–Bardula Road	IVRCL Infrastructures & Projects	ICB	Rs	408,246,224	590,542,283	13,080,135
12	Kumhari–Bemetara Road	Mudajaya BSBK (J V.)	ICB	Rs	525,484,935	581,076,972	12,726,655
13	Bemetara–Mungeli Road	Reddy Veeranna Constructions	ICB	Rs	305,099,029	353,567,257	7,799,954
B.	Phase 2 Batch A Roads						
3	Hasaud–Sarsiwa–Saraipali–Orissa Border Road	KMC Construction	ICB	Rs	554,366,649	648,935,798	13,716,953
4	Nandghat–Mungeli Road	KMC Construction	ICB	Rs	232,536,960	258,186,593	5,604,943
5	Balodabazar–Hathband–Simga Road	KMC Construction	ICB	Rs	448,167,736	530,081,871	11,440,057
6	Amleshwar–Funda Road	Amar Builders, Engineers, Contractors	ICB	Rs	224,789,860	242,918,919	5,334,340
9	Basna–Bilaigarh Road	S.M.S. Infrastructure	ICB	Rs	476,490,338	625,617,912	13,447,882
C	Phase 2 Batch B Roads						
7	Abhanpur–Rajim–Gariyaband Road	Sadbhav Engineering	ICB	Rs	583,867,355	513,155,026	10,994,370
8	Rajim–Fingeshwar–Mahasamund Road	Sadbhav Engineering	ICB	Rs	406,212,600	336,607,270	7,142,810
10	Dhamtari–Nagri Road	Telecommunication Consultants India	ICB	Rs	584,608,739	673,206,378	14,497,599
11	Dhamtari–Gunderdehi Road	S.M.S. Infrastructure	ICB	Rs	526,322,687	641,115,152	13,857,895
C. Consulting Services							
	Construction Supervision for Phase 1	Renardet S.A. in association with Themes Engg. Services	ICB (QCBS)	Rs	104,131,700	128,210,009	2,891,031
				\$	669,840	832,136	832,136
	Construction Supervision for Phase 2 Batch B	SMEC International (Australia) in association with SMEC India	ICB (QCBS)	Rs	62,468,440	49,025,070	1,093,553
				\$	104,000		
	Construction Supervision for Phase 2 Batch A	Carl Bro (Denmark) -EMA Unihorn (India) - Unihorn BV (Netherlands) JV	ICB (QCBS)	Rs	50,872,000	30,983,195	684,803
				\$	351,375	263,612	263,612
				Total			263,000,402

ICB = international competitive bidding, QCBS = quality- and cost-based selection.

<sup>a</sup> Converted from the cost in Rs to \$ by using average exchange rates during the project implementation.

Source: The ADB loan financial information system; project implementation unit, Public Works Department, Government of Chhattisgarh , ADB project completion review mission

## ECONOMIC REEVALUATION

1. The Asian Development Bank (ADB) project completion review (PCR) mission conducted an economic reevaluation of the project using similar methodology as at appraisal and the updated data. The without-project case assumes that the original state of the roads would be retained. In the with-project case, the roads are improved so that vehicles could drive at higher speeds with lower operating costs and reduced travel time. Economic benefits are calculated by comparing the with- and without-project cases. Consequently, the economic internal rate of return (EIRR) is calculated and assessed for the project, and sensitivity tests completed.

### A. Traffic Analysis

2. After opening of the project roads, the project supervision consultants carried out traffic surveys on both the phase 1 and phase 2 roads. The traffic counts were compared with the preproject traffic.<sup>1</sup> The traffic on the project roads increased significantly, by an average of 9.5% annually for phase 1 roads during 2006–2011 and 9.0% for the phase 2 roads during 2007–2011. During the ADB PCR mission, the appraisal traffic growth rates were revised in view of faster socioeconomic development, improvement of road networks, rapid increase in registration of motorized vehicles in the project area, and enhanced capacity for road management. The revised traffic forecast also took into account the traffic analysis conducted for ADB's second loan to the road sector in Chhattisgarh. It estimated that average annual traffic growth on project roads would be 7.8% up to 2015, 6.9% in 2016–2020, and 6.2% in 2021–2025, and 5.5% onward. The revised traffic forecast is used in the economic reevaluation of the project (Tables A11.1 and A11.2).

**Table A11.1: Actual Traffic on the Project Highway**  
(annual average daily traffic)

Item	Two Wheeler	Car, Jeep	Mini-Bus	Bus	LGV	2-Axle	3-Axle	Multi-Axle	Tractor	Total
Phase 1 Roads										
2005	580	152	22	69	101	64	20	6	32	1,046
2010	879	225	42	115	185	108	35	11	49	1,649
Phase 2 Roads										
2006	609	168	25	80	123	76	24	5	39	1,149
2011	901	239	46	140	208	126	41	9	56	1,766

Spell out abbreviations in alphabetical order.

Source: Project implementation unit, Public Works Department, Government of Chhattisgarh.

**Table A11.2: Annual Traffic Growth Rates (%)**

Item	Two Wheeler	Car, Jeep	Mini-Bus	Bus	LGV	2-Axle	3-Axle	Multi-Axle	Tractor	Average
2011–2015	7.5	5.9	11.1	10.1	9.6	8.8	7.4	7.8	8.0	7.8
2016–2020	6.7	4.9	10.1	9.7	7.1	6.8	6.7	6.6	6.8	6.9
2021–2025	6.1	3.5	9.6	9.2	5.7	6.2	5.9	4.9	6.7	6.2
2026–2030	5.4	3.3	9.1	9.0	4.5	3.9	5.1	4.6	5.7	5.5

LGV =

Source: Project Implementation Unit, Public Works Department, Government of Chhattisgarh.

### B. Economic Costs

3. In the economic reevaluation, the project costs comprise capital and maintenance costs. Actual annual investment costs for the project, excluding the loan financial charges, are used as the capital cost in the economic reevaluation. For routine maintenance cost, local average cost for

<sup>1</sup> The traffic survey was conducted in 2010 for the phase 1 roads and in 2011 for the phase 2 roads.

routine maintenance and annual repair of the state roads is used in the analysis and a 3% annual increase is considered given the increase in traffic and road condition deterioration. The periodic maintenance cost is assumed to be 20% of the civil works cost of the project and to be undertaken every 5 years; it is also treated as capital cost. All economic costs are estimated in 2013 prices. The financial costs for capital and maintenance are converted into economic costs by using an average conversion factor of 0.90 adopted at appraisal.

### C. Economic Benefits

4. Using a similar methodology as used at appraisal, the main sources of economic benefits are (i) savings in vehicle operation cost (VOC), (ii) savings in passenger travel time costs, and (iii) other nonquantified benefits. The VOC savings are recalculated using unit VOC data by road roughness at appraisal with price adjustments.<sup>2</sup> The VOC savings in Rs per vehicle-kilometer are estimated at 1.1 for car, 1.6 for minibus, 2.9 for bus, 1.7 for light truck, 4.6 for medium-sized truck, and 5.0 for heavy truck. Average passenger vehicle speeds are assumed at 40–60 km/hour for the with-project case and 20–30 km/hour for the without-project case. Passenger travel time cost savings are recalculated for different types of passenger vehicles. The passenger time cost is derived from the net state gross product (NSGP) of Chhattisgarh in 2010/11.<sup>3</sup> Passenger time costs are assumed to increase annually by 5%–6% during 2011–2015 and 3% onward. Other factors taken into account in calculating passenger time cost savings include average vehicle loads, percentage of work-related trips, time costs by different road users, and travel speeds for different types of passenger vehicles. Due to data unavailability, 10% was added to the VOC and time cost savings to reflect other benefits such as socioeconomic development in the project area, poverty reduction, and maintenance cost savings. The benefit calculation results show that the VOC savings were about 56% of the total benefits in 2012, but passenger time cost benefits increase significantly along with socioeconomic development and income increases, from 35% in 2012 to 52% of total benefits in 2030.

### D. Economic Reevaluation and Sensitivity Test

5. Based on these estimations of the economic costs and benefits, the economic internal rate of return (EIRR) for project roads is calculated at 18.9% for the whole project. This is comparable with the EIRR of 17.5% estimated for the sample subproject at appraisal. The EIRR for the whole project at appraisal is not available as all the subprojects were prepared, appraised, and approved at various stages during implementation. The EIRR is above the ADB recommended discount rate of 12%. The project is therefore considered to be economically viable. The detailed EIRR calculations for the project are in Table A11.4.

6. The EIRR was subjected to sensitivity analysis to test different scenarios of costs and benefits. The sensitivity analysis results indicate that the project continued to be economically viable for all scenarios. If a 20% maintenance cost increase would be combined with a 20% benefit reduction, the EIRR would be still 13.3% for the whole project. The sensitivity analysis also shows that the EIRR is more sensitive to changes in benefits. Therefore, the government needs to pay enough attention to socioeconomic development in the project area, foster local transport services, and increase incomes for rural road users. The results of the sensitivity tests are in Table A11.3.

<sup>2</sup> The roughness of the project roads was about 8.6–9.3 before the project and 2–5 at completion.

<sup>3</sup> Government of Chhattisgarh. 2012. Statistical Pocket Book of Chhattisgarh, 2010/11. Raipur.

**Table A11.3: Sensitivity Test**

<b>Scenario</b>	<b>EIRR (%)</b>	<b>ENPV (Rs million)</b>
<b>Base Case</b>	<b>18.9</b>	<b>14,083.3</b>
Sensitivity Tests		
1. Maintenance cost 10% higher	17.4	11,983.8
2. Maintenance cost 20% higher	16.2	9,884.2
3. Benefits 10% lower	17.3	10,575.4
4. Benefits 20% lower	15.6	7,067.6
5. Benefits 10% higher	20.4	17,591.2
6. Benefits 20% higher	21.8	21,099.0
7. Maintenance cost 10% higher and benefits 10% lower	15.9	8,475.9
8. Maintenance cost 20% higher and benefits 20% lower	13.3	2,868.5

EIRR = economic internal rate of return, ENPV = economic net present value.

Source: Asian Development Bank project completion review mission.



**A11.4: Economic Reevaluation**  
(Rs million)

Year	Costs			Benefits				Net Benefit	ENPV
	Capital	Maintenance	Total	VOC	Time Cost	Others	Total		
2006	591.1		591.1					(591.1)	(1,306.8)
2007	1,648.8		1,648.8					(1,648.8)	(3,254.4)
2008	2,759.9		2,759.9	89.8	53.9	14.4	158.0	(2,601.9)	(4,585.4)
2009	2,924.3		2,924.3	269.4	161.7	43.1	474.1	(2,450.1)	(3,855.3)
2010	2,522.0	10.7	2,532.7	701.1	484.9	118.6	1,304.6	(1,228.1)	(1,725.3)
2011	663.8	32.1	695.9	897.8	539.0	143.7	1,580.5	884.6	1,109.6
2012		64.1	64.1	973.2	615.9	158.9	1,748.0	1,683.9	1,886.0
2013		106.9	106.9	1,055.0	704.1	175.9	1,935.0	1,828.1	1,828.1
2014		110.1	110.1	1,143.9	805.0	194.9	2,143.8	2,033.7	1,815.8
2015		113.4	113.4	1,240.5	920.6	216.1	2,377.3	2,263.9	1,804.8
2016	2,101.6	106.9	2,208.5	1,330.2	1,022.2	235.2	2,587.6	379.1	269.8
2017		110.1	110.1	1,426.7	1,135.3	256.2	2,818.2	2,708.1	1,721.0
2018		113.4	113.4	1,530.5	1,261.4	279.2	3,071.1	2,957.7	1,678.3
2019		116.8	116.8	1,642.1	1,402.1	304.4	3,348.6	3,231.8	1,637.3
2020		120.3	120.3	1,762.2	1,559.0	332.1	3,653.3	3,533.0	1,598.2
2021	2,101.6	106.9	2,208.5	1,875.1	1,721.3	359.6	3,956.0	1,747.5	705.8
2022		110.1	110.1	1,995.8	1,901.3	389.7	4,286.8	4,176.7	1,506.2
2023		113.4	113.4	2,124.8	2,101.0	422.6	4,648.4	4,535.1	1,460.2
2024		116.8	116.8	2,262.7	2,322.8	458.6	5,044.1	4,927.3	1,416.5
2025		120.3	120.3	2,410.3	2,569.1	497.9	5,477.4	5,357.1	1,375.0
2026	2,101.6	106.9	2,208.5	2,545.4	2,828.0	537.3	5,910.7	3,702.2	848.5
2027		110.1	110.1	2,689.1	3,114.1	580.3	6,383.6	6,273.5	1,283.7
2028		113.4	113.4	2,841.8	3,430.7	627.2	6,899.7	6,786.4	1,239.8
2029		116.8	116.8	3,004.3	3,780.9	678.5	7,463.7	7,346.9	1,198.4
2030	(8,707.4)	120.3	(8,587.1)	3,177.2	4,168.5	734.6	8,080.2	16,667.3	2,427.5

Economic Net Present Value: 14,083.3

**Economic Internal Rate of Return: 18.9%**

Discount Rate: 12%

( ) = negative value, ENPV = economic net present value, VOC = vehicle operating cost.

Source: Asian Development Bank project completion review mission.

## SUMMARY OF THE SOCIOECONOMIC IMPACTS

### A. Socioeconomic Development in Chhattisgarh

1. Chhattisgarh State was formed on 1 November 2000 with the division of Madhya Pradesh State. According to the 2011 census, the total population was 25.5 million, the population density 189 per square kilometer. It is one of the poorest states in India, with about 38% of its inhabitants living below the official poverty line.<sup>1</sup> In the last decade, socioeconomic development has been robust. In 2010/11, the net state domestic product (NSDP) totaled Rs1,102,434 million (at current prices) with the annual increase rate of 11.8%.<sup>2</sup> However, NSDP per capita was just Rs43,164 (about \$832 equivalent), about 75% of the national average. Agriculture is predominantly traditional and largely dependent on the monsoon. Agriculture contributed 14% of the state's aggregate economic outputs. The overall objectives of the state's 11th Five-Year Plan (2007–2012) were to achieve improved quality of life for citizens and contribute to the larger national goals of socioeconomic development.<sup>3</sup> The main objectives of the plan include the following:

- (i) Achieve overall growth of 7.6%. Agriculture and allied sectors are anticipated to contribute 5%, industry 10%, and the service sector 8%.
- (ii) Reduce poverty from 38% of the population to 25%.
- (iii) Reduce the school dropout rate from 46.8% in 2003/04 to 20% by 2011/12.
- (iv) Develop a strong power infrastructure to provide adequate and improved quality of power to all villages and meet peak demand.
- (v) Provide a minimum single connectivity by all-weather bituminous roads to all villages with populations or more than 1,000 in general and over 500 in tribal areas.
- (vi) Encourage the use of information and communication technologies.

### B. Road Sector Development

2. Roads comprise the predominant mode of transport services in the state. Major initiatives for road development in recent years have substantially benefited all sectors, including agriculture, mining, tourism, education, and health care. As of 2010/11, the total length of the PWD roads in the state was 33,448 kilometers (km), including 2,226 km of national highways, 5,240 km of state highways, 10,539 km of major district roads, and 14,443 km of rural roads. In the current 5-year plan, the Government of Chhattisgarh (GOC) is making significant efforts to enhance road development by providing connectivity by all-weather roads to villages with populations at a certain scale. It has been increasing the state budget for road development and maintenance.

3. Along with road improvement and rapid socioeconomic development in the state, vehicle registrations have increased substantially. The number of registered vehicles in the state totaled 200,477 in 2007/08, increasing to 330,264 in 2010/11 with an average annual growth rate of 18%. The number of cars and jeeps grew by a significant average of 30% annually.

<sup>1</sup> India's official poverty line is Rs368 per person-month for rural areas and Rs560 per person-month for urban areas (2005/06 standard).

<sup>2</sup> Government of Chhattisgarh, Directorate of Economics and Statistics. 2012. *Statistical Pocket Book of Chhattisgarh, 2010/11*. Raipur.

<sup>3</sup> Government of Chhattisgarh; Planning, Economic and Statistics Department. 2007 Draft Eleventh Five Year Plan, 2007–2012 and Annual Plan, 2007–2008. <http://www.cg.gov.in/spb/fiveyearplan/>

**Table A12.1: Vehicle Registrations in Chhattisgarh State**  
(number of vehicles)

Year	Two Wheeler	Car, Jeep	Taxi, 3-wheeler	Bus	Goods Vehicle	Tractor	Total
2007/08	157,169	11,539	2,146	3,196	12,810	13,617	<b>200,477</b>
2008/09	192,574	14,063	2,138	3,688	10,354	15,575	<b>238,392</b>
2009/10	219,091	17,529	2,362	4,018	9,131	16,372	<b>268,503</b>
2010/11	268,160	25,321	3,743	3,798	10,688	18,554	<b>330,264</b>

Source: Government of Chhattisgarh. 2012 *Statistical Pocket Book of Chhattisgarh 2010/11*. Raipur.

### C. Connectivity Improvement by the Project

4. At project completion, 1,187.56 km, of state roads in 28 sections were rehabilitated and improved by widening and/or strengthening. On the project roads, vehicles can travel an average of 40–60 km/hour as compared with 20–30 km/hour before the project, leading to a substantial reduction in passenger and freight transport costs and timesavings. In May 2012, an ADB mission led by the Independent Evaluation Department (IED) visited two project roads.<sup>4</sup> It noted that even 2.5 years from completion, the riding quality and the condition of the project roads were excellent; and far better than the nearby national highway. The mission noted that most of the project roads are in good condition and adequate maintenance arrangements are in place. The traffic surveys under the project indicate that traffic volume increased by about 9.5% per annum on the phase 1 roads during 2005–2010 and 9.0% per annum on the phase 2 roads during 2006–2011. The traffic volume for cars and jeeps grew much faster than the average rate. Vehicle travel time on project roads was reduced by about 40%–50%; and access to social services such as primary health care centers, schools, colleges, and markets was substantially improved. During 2006–2011, transport charges (in real terms) reduced from Rs1.45/ton-km to Rs0.45/ton-km for freight, and Rs2.00/km to Rs0.90/km for passengers. Many minibuses and jeeps use the project roads to provide transport services to local residents, including the poor. The project roads have effectively improved connectivity in rural areas of the state and brought huge socioeconomic benefits.

### D. Socioeconomic Impacts of the Project

5. **Agricultural and land development.** Land prices along the project roads have escalated many times due to the improved roads, and this trend is continuing. Prior to the road improvements, the region was not considered very attractive for economic activities. Improved roads are giving farmers access to better and larger markets and higher profit margins. Improved access is also helping local youth remain in rural areas, thus contributing to the rise in agricultural land prices. These factors have contributed to the appreciation of land prices.

6. **Access to market and social services.** With the improved road conditions, agricultural traffic increased. After the project, farmers could travel easily to larger and distant markets. This stimulated the development of local transport services. Adequate passenger transport services, primarily minibuses and large jeeps are operating. The bus service frequency currently is about 10–30 minutes on most of the project roads. The connectivity to various social and other service centers has improved substantially, such as for education, hospitals, banking services, and

<sup>4</sup> India Resident Mission. 2012. ADB back-to office-report, 2 May. Mission to Support Independent Evaluation Department Team to Chhattisgarh (30 April–1 May 2012).

grain markets. Noteworthy impacts include the following:

- (i) Students, including girls, are able to travel to larger towns for higher education. Villagers can access better health facilities in larger centers. Doctors are now more willing to visit and treat patients in rural areas.
- (ii) Access to banks and rural financial institutions is improved.
- (iii) Farmers can travel to larger markets at greater distance to obtain better prices for their produce.
- (iv) The rural community is better informed about market conditions and other matters.

7. **Household income and poverty reduction.** Surveys carried out after project completion indicate that incomes of rural households increased by an average of 10%–11%. The higher incomes were mainly the result of better prices for agriculture products and opportunities for roadside businesses due to increased traffic. Many local laborers were hired by the project (para. 8) during its implementation. The use of local construction materials and services helped to increase incomes of local residents. These opportunities particularly helped those living below the poverty line. These positive impacts on the socioeconomic development of the project area are expected to be sustained.

8. **Employment generation.** Many local skilled and unskilled laborers obtained opportunities to work in constructing the project roads. Local construction material suppliers hired additional laborers to meet the project demand. Project construction generated 34,850 person-years of direct employment opportunities and 33,917 person-years of indirect employment opportunities. Among the directly employed local laborers, about 33% were unskilled laborers and 10% were women. The ADB PCR mission observed that local transportation services and roadside businesses were booming, which has generated additional working opportunities in and around the project area.

9. **Road safety.** Mandatory cautionary and information road signs were installed along the project roads. Blind spots on the road sections were given special attention during design and implementation of the project. Shoulder improvements, culvert and bridge construction, structural repairs, and other improvements contribute to safer road travel. Improved road safety measures helped to reduce traffic congestion, especially in the rainy season. However, some of the vehicles tend to exceed the speed limit due to the improved road condition. Many pedestrians and mixed traffic of motorcycles, nonmotorized vehicles, and animal-driven carts are on the project roads, especially in residential areas. The speeding of the vehicles, particularly in mixed traffic conditions, have caused significant road accidents and fatalities. According to the survey conducted by the supervision consultants, deaths per 100 accidents during 2006–2011 increased from an average of 10 people to 16 on the phase 1 roads.

**Table A12.2: Summary of Socioeconomic Impacts of the Project**

Contract Package	Name of Road	Road Length (km)	Travel Time Saved (%)	Land Value Increase (times)	Household Income Increase (%)	Employment Opportunity	
						Direct (person-year)	Indirect (person-year)
Phase 1 Roads		810.5				21,976	21,393
1.	Rajnandgaon–Mohla	72.4	25	2–3	5–7	2,133	2,060
2.	Mohla–Maharashtra Border	38.2	45	2–3	5–7	777	757
3.	Rajnandgaon–Kukamera	62.0	25	2–4	5–7	1,818	1,771
4.	Kukamera–Kawardha	52.9	25	2–4	5–7	1,542	1,502
5.	Bilaspur–Mungeli	51.0	33	3–4	8–10	1,495	1,457
6.	Mungeli–Pondi	55.0	33	2–3	7–8	1,613	1,578
7A.	Bhanupratappur–Narayanpur–Kondagaon	141.9	33	1–2	4–5	2,772	2,699
9.	Ambikapur–Semersot	61.1	33	2–3	5–7	1,789	1,742
10A.	Kapsara–Hathidad; Rajkheta–Dhanwar; Ramanujganj–Wadrafnagar	107.4	33	2–3	5–7	3,091	3,010
11.	Gariyaband–Bardula	58.8	33	2–4	8–10	1,725	1,680
12.	Kumhar–Bemetara	67.4	33	4–6	10–15	1,976	1,925
13.	Bemetara–Mungeli	42.4	33	6–8	10–15	1,245	1,212
Phase 2 Roads		438.4				12,874	12,524
3.	Hasaud–Sarsiwa; Sarsiwa–Saraipali; Saraipali–Orissa Border	71.6	60	3–4	10–12	2,269	2,046
4.	Nandghat–Mungeli	36.3	60	4–5	12–15	1,065	1,037
5.	Baloda Bazar–Hathband–Simga	51.1	60	4–5	15–20	1,498	1,459
6.	Amleshwar–Funda	22.4	60	4–5	18–20	502	640
9.	Abhanpur–Rajim–Gariyaband	51.2	33	5–6	18–20	1,854	1,806
7.	Rajim–Mahasamund	63.2	30	4–5	12–15	1,147	1,117
8.	Basna–Bilaigarh	39.1	60	2–3	8–10	1,502	1,462
10.	Nagari–Dhamtari	64.7	46	2–3	7–8	1,898	1,848
11.	Dhamtari–Gunderdehi	38.8	38	4–5	18–20	1,139	1,109
Total		1,248.9				34,850	33,917

Source: Public Works Department's project completion report.