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Report No: ICR00004803

IMPLEMENTATION COMPLETION AND RESULTS REPORT

ON A

CREDIT

IN THE AMOUNT OF SDR 105.6 MILLION

(US$160 MILLION EQUIVALENT)

TO THE

REPUBLIC OF INDIA

FOR THE

RAJASTHAN ROAD SECTOR MODERNIZATION PROJECT

October 10, 2019

Transport Global Practice
South Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective December 27, 2018)

Currency Unit =	Indian Rupee (INR)
INR 70.4 =	US$1
US$1.39 =	SDR 1

FISCAL YEAR
April 1 – March 31

ABBREVIATIONS AND ACRONYMS

DPR	Detailed Project Report
EIRR	Economic Internal Rate of Return
GOR	Government of Rajasthan
HDM-4	Highway Development and Management Model
HR	Human Resources
ICR	Implementation Completion and Results Report
IFMS	Integrated Financial Management System
iRAP	International Road Assessment Programme
IRI	International Roughness Index
IRR	Internal Rate of Return
ISR	Implementation Status and Results Report
ITS	Intelligent Transport Services
M&E	Monitoring and Evaluation
MDR	Major District Road
MIRR	Modified Internal Rate of Return
MMGSY	Mukhya Mantri Gram Sadak Yojana
MTR	Midterm Review
NGO	Nongovernmental Organization
NPV	Net Present Value
PAD	Project Appraisal Document
PAT	Performance Assessment Tool
PDO	Project Development Objective
PIU	Project Implementation Unit
PMC	Project Management Consultant
PMGSY	Prime Minister Gram Sadak Yojana
PPA	Project Preparation Advance
PPP	Public-Private Partnership

PS	Principal Secretary
PWD	Public Works Department
RAMS	Road Asset Management System
RF	Results Framework
RSMP	Road Sector Modernization Plan
SCDP	Safe Corridor Demonstration Program
SDC	System Defining Consultant
SH	State Highway
SHA	State Highway Authority
SPC	System Providing Consultant
VOC	Vehicle Operating Cost
VOT	Value of Time

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P130164	Rajasthan Road Sector Modernization Project
Country	**Financing Instrument**
India	Investment Project Financing
Original EA Category	**Revised EA Category**
Partial Assessment (B)	

Organizations

Borrower	Implementing Agency
Department of Economic Affairs, Ministry of Finance, Govt. of India	Rajasthan State Public Works Department

Project Development Objective (PDO)

Original PDO

The project development objective is to improve rural connectivity, enhance road safety and strengthen road sector managementcapacity of the state of Rajasthan.

FINANCING

	Original Amount (US$)	Revised Amount (US$)	Actual Disbursed (US$)
World Bank Financing			
IDA-53100	160,000,000	131,877,656	121,630,913
Total	**160,000,000**	**131,877,656**	**121,630,913**
Non-World Bank Financing			
Borrower/Recipient	67,000,000	56,000,000	56,000,000
Total	**67,000,000**	**56,000,000**	**56,000,000**
Total Project Cost	**227,000,000**	**187,877,656**	**177,630,913**

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
29-Oct-2013	10-Mar-2014	16-May-2016	31-Dec-2018	31-Dec-2018

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US$M)	Key Revisions
27-Jul-2017	92.51	Change in Results Framework Change in Components and Cost Reallocation between Disbursement Categories Other Change(s)

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Moderately Unsatisfactory	Moderately Unsatisfactory	Modest

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US$M)
01	22-Feb-2014	Satisfactory	Satisfactory	.60

02	30-Jul-2014	Satisfactory	Moderately Satisfactory	22.71
03	23-Jan-2015	Satisfactory	Moderately Satisfactory	23.33
04	04-Jun-2015	Satisfactory	Moderately Satisfactory	69.91
05	20-Nov-2015	Satisfactory	Moderately Satisfactory	75.55
06	21-Jan-2016	Satisfactory	Moderately Satisfactory	75.55
07	26-Aug-2016	Satisfactory	Satisfactory	89.79
08	05-Mar-2017	Satisfactory	Satisfactory	91.58
09	23-May-2017	Satisfactory	Satisfactory	91.58
10	26-Jul-2017	Moderately Satisfactory	Moderately Satisfactory	92.51
11	18-Dec-2017	Moderately Satisfactory	Moderately Satisfactory	105.12
12	10-Apr-2018	Moderately Unsatisfactory	Moderately Unsatisfactory	105.12
13	28-Dec-2018	Moderately Unsatisfactory	Moderately Unsatisfactory	112.59

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Transportation	**100**
Public Administration - Transportation	3
Rural and Inter-Urban Roads	97

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Private Sector Development	**10**
Public Private Partnerships	10
Urban and Rural Development	**100**
Rural Development	100
Rural Infrastructure and service delivery	100

ADM STAFF		
Role	**At Approval**	**At ICR**
Regional Vice President:	Philippe H. Le Houerou	Hartwig Schafer
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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. At project appraisal in 2013, Rajasthan—one of the largest states of India covering nearly 10 percent of total area of the country—had nearly 5 percent of the total population of India (5.2 percent as of today). Being one of the low-income states of India, its per capita income (US$943) was about 20 percent lower than the national average (US$1,185). About 75 percent of the state's population was rural and mainly depending on agriculture for its livelihood. It was identified that the state had good potential for growth in agriculture and agro-based industries, mining and minerals processing, tourism, and cottage industries, but this potential was underutilized due to inadequate road infrastructure and market links.

2. Considering the need for high-quality infrastructure and better rural connectivity, the Industrial and Investment Promotion Policy, adopted by the Government of Rajasthan (GOR) in 2010, and Eleventh Five Year Plan of India (2007–2012) both promoted the implementation of a number of initiatives to accelerate economic growth and facilitate sustainable socioeconomic development, including widening of state highways (SHs) and upgrading of secondary network. The Twelfth Five Year Plan (2012–2017) carried forward the achievements of the Eleventh Five Year Plan with the completion of 16 mega-highway projects and supporting works for improved connectivity of villages with population 250 and above. The target for economic growth under the Twelfth Five Year Plan had been revised to 7.7 percent compared to 6.5 percent under the previous plan—part of it expected to be generated from increased investments in the transport sector by (a) connecting all villages of 250 inhabitants and above, (b) upgrading all highways and district roads to all-weather roads, and (c) building missing links between other villages.

3. In 2013, Rajasthan had a state road network of 193,017 km, including 7,260 km of national highways, 10,953 km of SHs, 9,900 km of major district roads (MDRs), 25,033 km of other district roads, and 139,871 km of village roads. Road density in Rajasthan, as identified during preparation, was only about 60 km per 100 km^2, lower than the national average of 110 km per 100 km^2. Development costs and maintenance costs of the road network in Rajasthan kept increasing, with maintenance budget needs estimated at US$800 million overall, compared to US$278 million actually provisioned by the state. In terms of development of the rural road network, the Government of India Prime Minister Gram Sadak Yojana (PMGSY) allowed to increase the share of village roads with bitumen surfacing from 76 percent to 98 percent focusing on the connectivity of villages of more than 500 inhabitants and of villages of 250 people and more in desert and tribal areas. Providing all-weather access to all local roads under the PMGSY threshold became a priority of the GOR during the Twelfth Five Year Plan period. In terms of development of the primary and secondary networks, most highways and MDRs are in poor condition due to a lack of appropriate maintenance. To ensure economic growth by leveraging the provision of new access from rural areas to economic poles, investing in the highway network is critical as well.

4. Efforts in proper development and maintenance of the network were identified as being critical as traffic growth had dramatically increased, with a 14 percent compounded year-on-year increase in the number of cars and 5.8 million more vehicles overall (more than 75 percent being two-wheelers) registered in Rajasthan in 2012 compared to 2002. This led to an increase in road fatalities. Severity Index (number of persons killed per 100 accidents) of Rajasthan roads was about 40 compared to a national

average of 29, and the state ranked fifth in the total number of fatalities in 2011, contributing to 6.5 percent of all fatalities in India.

5. To ensure adequate management of the network and identified issues including the need for improved road safety management, the need for modernizing the Public Works Department (PWD) was stressed during project appraisal. Gaps in investment planning, engineering practices, and business processes were found to be hindering the overall capacity of the PWD to handle such large network. One major component was thus incorporated into the project, aiming at revamping the overall PWD structure, processes, and practices. Road sector modernization and institutional strengthening in Rajasthan were identified as the core focus of the project. The goal was to build the capacity of the PWD staff and provide adequate support to bring more efficiency in business procedures and asset management practices.

Theory of Change (Results Chain)

6. The Theory of Change was not a requirement at the time of project preparation and is being introduced for the purpose of the Implementation Completion and Results Report (ICR). Figure 1 shows the original Theory of Change, based on the project components, expected outputs and intermediate results, with longer-term outcomes the project was expected to contribute to beyond its closing date. The components were designed under the following assumptions: component A – the PIUs adequate capacity to implement good quality works, based on the experience from the PMGSY scheme in Rajasthan; components B and C – the buy-in and championship from a high-level official for institutional reforms and road safety; components B and C – adequate membership of the working groups and task forces.

Project Development Objectives (PDOs)

7. The Project Development Objective was to improve rural connectivity, enhance road safety and strengthen road sector management capacity of the state of Rajasthan.

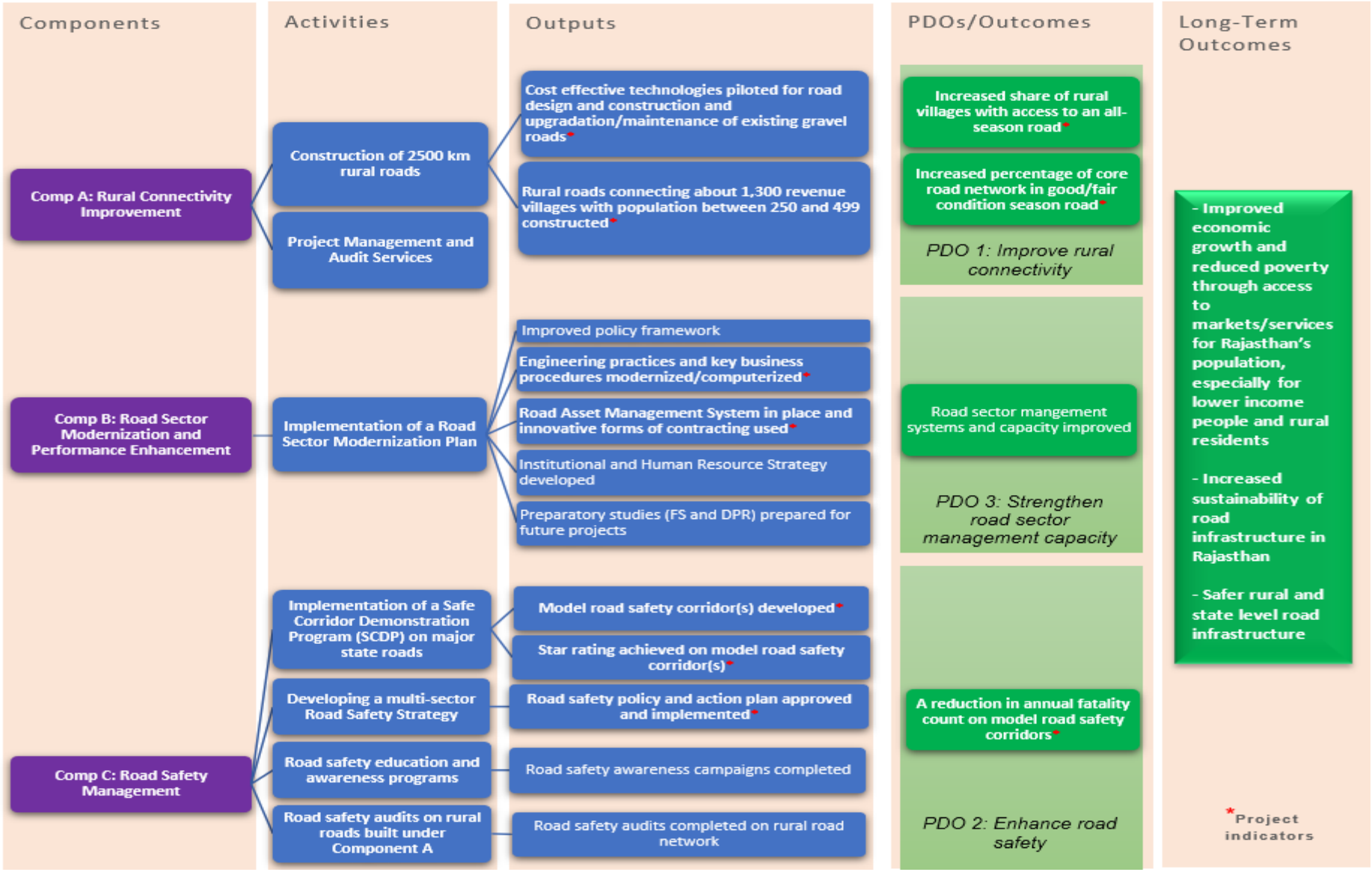
Key Expected Outcomes and Outcome Indicators

8. The project was expected to benefit around 1,300 small villages by providing them with all-season access to socioeconomic opportunities. Road users were expected to benefit from a safer transport system implemented on demonstration corridors. Lastly, modernization of the PWD was expected to significantly improve the overall sector management, thus benefiting indirectly all road users.

9. It had thus been agreed that the progress toward achievement of the PDO would be measured by the following outcome indicators. An outcome indicator linked to the third sub-objective (road sector modernization) was missing at the time of approval.

- **Connectivity:** Share of rural population with access to an all-season road (main)
- **Connectivity:** Number of rural people with access to an all-season road (supplemental)
- **Connectivity:** Percentage of core road network in good/fair condition as a share of the total classified network (main)
- **Connectivity:** Size of total classified network (supplemental)
- **Road safety**: A reduction in annual fatality count on model road safety corridors

Figure 1. Original Theory of Change



Components

10. The project had three main components, as presented below:

- **Component A -** Rural Connectivity Improvement (planned: US$197 million, including IDA credit US$138 million)

  This component was designed to support the construction of about 2,500 km of rural roads to provide connectivity to about 1,300 revenue villages with population between 250 and 499 in the areas of the state not covered by the PMGSY and introduce good practices of cost-effective low-volume technologies. The roads would predominantly be built to a bitumen surface standard and will include all necessary bridges and cross-drainage works to maintain year-round connectivity.

- **Component B -** Road Sector Modernization and Performance Enhancement (planned: US$11 million, including IDA credit US$7.75 million)

  This component was designed to support implementation of a Road Sector Modernization Plan (RSMP) that would help the PWD in establishing a dynamic and systematic mechanism for sector reforms. The RSMP was intended to be reviewed on a continuous basis and implemented in a phased manner based on subsets of key priority measures. It had been agreed that the implementation of the RSMP would go beyond the proposed project implementation period. The RSMP would target the following key areas:

  (a) Improvement of the policy framework;

  (b) Modernization of engineering practices and business procedures;

  (c) Sustainable asset management;

  (d) Institutional and human resources (HR) development;

  (e) Preparation of a pipeline of feasible projects for implementation;

  (f) Enhancement of governance and accountability in the PWD.

- **Component C -** Road Safety Management (planned: US$15 million, including IDA credit US$10.55 million)

  This component was designed to support the strengthening of road safety management systems in Rajasthan with the objective of reducing the number of fatalities and serious injuries from traffic accidents in the state. This was to be accomplished through:

  (a) Safe Corridor Demonstration Program (SCDP);

  (b) The establishment of a Road Safety Strategy;

  (c) Road safety education and awareness programs; and

  (d) Road safety audits.

Table 1. Project Cost Table at Approval (US$, millions)

Component	Costs Including Contingency	Bank Financing	% Bank Financing	GOR Financing
A - Rural Connectivity Improvement	**197**	**138.00**	**70**	**59.00**
(a) Civil Works (2,500 km)	195	136.60	70	58.40
(b) Project Management and Audit Services	2	1.40	70	0.60
B - Road Sector Modernization	**11**	**7.75**	**70**	**3.25**
C - Road Safety Management	**15**	**10.55**	**70**	**4.45**
Incremental Operating Costs	1	0.70	70	0.30
Subtotal Project Cost	**224**	**157.00**	**70**	**67.00**
Refinancing preparation advance	3	3.00	n.a.	0.00
Total Project Cost	**227**	**160.00**	**70**	**67.00**

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE)

11. The project was approved on October 29, 2013 and planned to close on December 31, 2018. The project was restructured once on July 27, 2017. Disbursement under the project as of May 31, 2017, was XDR 63.95 million (approximately US$88.5 million), which was 60.56 percent of the total loan amount of XDR 105.60 million. At that time, around 90 percent of the civil works were completed. The disbursement was lagging at about six months equivalent to around US$17 million. The main delays in project implementation were related to the implementation of both institutional strengthening components, Components B and C.

Revised PDOs and Outcome Targets

12. The PDOs remained unchanged, that is, to improve rural connectivity, enhance road safety and strengthen road sector management capacity of the state of Rajasthan, but changes were made to the key indicators and outcome targets. The details are in the revised Theory of Change (Annex 6).

Revised PDO Indicators

13. The progress toward the achievement of the PDOs was to be assessed through the following revised outcome indicators (the justification for revision is indicated in paragraph 19.b):

- **Connectivity:** Share of rural population with access to an all-season road (main)
- **Connectivity:** Number of rural people with access to an all-season road (supplemental)
- ***Connectivity:*** *Percentage of core road network in good/fair condition as a share of the total classified network (removed)*
- ***Connectivity:*** *Size of total classified network (main, instead of supplemental)*
- **Road safety:** A reduction in annual fatality count on model road safety corridors
- ***Road sector management capacity:*** *Road Asset Management System Operational (added)*

Revised Components

14. The scope of the main components was not revised.

Other Changes

15. In addition to the Results Framework (RF) revisions, other changes were made related to the financing plan, that is, the World Bank share of financing in the civil works component, and to the budget allocation between disbursement categories (and associated disbursement estimates per component).

16. There were no changes in the institutional and implementation arrangements and disbursement arrangements. No additional safeguard policy was triggered due to the proposed restructuring.

Rationale for Changes and Their Implication on the Original Theory of Change

17. As identified during the Midterm Review (MTR) (end of May 2016), the need for restructuring was identified in three areas:

(a) Adjusting the share of the World Bank's financing for expenditures related to civil works by retroactively increasing the World Bank's financing percentage from 70 percent to 80 percent;

(b) Revising monitoring and evaluation (M&E) indicators;

(c) Reallocating funds between categories.

18. The rationale for restructuring was as follows:

(a) **Increased World Bank share of financing in works components.** The costs of civil works included the agency fees, which were not eligible for World Bank financing. The World Bank's share of financing at 70 percent of civil works was applied only on the construction cost minus the agency fees, which yielded the actual World Bank's share to be only 62 percent versus what was planned at 70 percent. Therefore, the restructuring suggested the increase of the World Bank's financing percentage to 80 percent for civil works retroactively to ensure that the overall World Bank's share of financing was indeed kept at 70 percent.

(b) **Revising the RF to reflect some changes proposed to the outcome and intermediate indicators to** (i) improve rural connectivity, (ii) enhance road safety, and (iii) strengthen road sector management capacity of the state of Rajasthan. This meant adding three PDO-level indicators and dropping one PDO-level indicator; adding two intermediate indicators to properly monitor the achievements of the three sub-objectives; and ensuring links between the outcomes, activities, outputs of the three components. The project was indeed initially approved without a relevant outcome indicator capturing the third dimension of the PDO. Changes made to the indicators also allowed to remove indicators that proved to be difficult to measure (for example, share of roads in good/fair condition).

(c) **Reallocation between categories.** At the time of project preparation, the project received US$3 million as a Project Preparation Advance (PPA). Since the PPA was not fully used (disbursement of US$2,277) at the time of restructuring, the allocation in the loan to refinance

it (Category 2) remained unused. Therefore, the GOR proposed to reallocate the remaining amount to Category 1 activities.

19. Table 2 shows the revised project cost table after restructuring considering the refined costs estimates per component after initiating the procurement process for the relevant activities under the respective components. It is worth noting that both cost allocations for Components B and C increased after restructuring.

Table 2. Revised Project Cost Table (US$, millions)

Component	Costs Including Contingency	Bank Financing	% Bank Financing	GOR Financing
A - Rural Connectivity Improvement	**192.17**	**134.52**	**70**	**57.65**
B - Road Sector Modernization	**13.47**	**9.43**	**70**	**4.04**
C - Road Safety Management	**19.86**	**13.90**	**70**	**5.96**
Incremental Operating Costs	1.50	1.05	70	0.45
Subtotal Project Cost	**227.00**	**158.90**	**70**	**68.10**
Refinancing preparation advance	0.00	0.00	n.a.	0.00
Total Project Cost	**227.00**	**158.90**	**70**	**68.10**

20. The revised Theory of Change (Annex 6) takes into account the abovementioned changes made in the RF through the restructuring.

II. OUTCOME

21. Although the project had a restructuring with a change in key associated outcome indicators, the PDO or scope of components remained the same. Therefore, the split-rating method will not be used for this ICR. The achievement of the three dimensions of the PDO will be assessed based on the actual project-level outcomes.

A. RELEVANCE OF PDOs

Assessment of Relevance of PDOs and Rating

22. At the project closing date, the project remained highly relevant to the country's current development priorities and World Bank's engagement. The World Bank has been involved in the road sector in Rajasthan for over 10 years through various projects and programs such as the PMGSY as a response to a clearly identified need and the state government's priority to increase connectivity in rural areas throughout the state. One of the main objectives of this type of programs is to connect habitations in villages to main corridors and economic centers, through the provision of better-quality and safer road infrastructure. An expected long-term outcome is to diversify Rajasthan's local economy.

23. The FY18–22 Country Partnership Framework stipulates that the government continues to (a) pursue policies aimed at strengthening public sector institutions by improving implementation capabilities, (b) target connectivity constraints by supporting the development and maintenance of

national and state roads, and (c) prioritize leveraging of private sector financing by strengthening the framework for private sector participation using innovative PPP contracting and risk mitigation enhancement instruments.

24. This project approved in 2013 is thus still fully in line with the strategic directions, as it contributes mainly to the first two strategic pillars by providing infrastructure in good condition to facilitate all-season connectivity while contributing to a limited extent to the road sector modernization in Rajasthan. Therefore, the rating for relevance is High.

B. ACHIEVEMENT OF PDOs (EFFICACY)

Assessment of Achievement of Each Objective/Outcome

Outcome 1: Rural connectivity improved
Outcome achieved - rated Substantial

25. Two PDO-level indicators and two intermediate indicators of the project's RF support the first PDO outcome.

26. The outcome indicator 'Share of rural population with access to an all-season road - with the number of rural people with access to an all-season road' was satisfactorily achieved, reaching actual values of 80.8 percent and 33,490,396, respectively, compared with a target of 81 percent and 33,489,250. Besides, the indicator 'Size of total classified network' was achieved, with a final value of 135,788 km against a target of 135,935 km. About 70 percent of civil works were completed by January 2015, that is, within one year after contract signature, and about 90 percent of civil works were completed by March 2016, within a little over two years of project implementation.

27. The intermediate indicator 'Roads constructed' was mostly achieved, with 2,334 km of roads built compared to an initial target of 2,500 km. In Rajasthan, out of 19,945 unconnected villages in rural areas as identified during the preparation of the Eleventh Five Year Plan of India, 55 percent (10,995 villages) are eligible to be covered by the PMGSY program, and the remaining 8,950 unconnected habitations fall under the Mukhya Mantri Gram Sadak Yojana (MMGSY) program. Civil works completed under this project provided connectivity to around 1,300 habitations, thus having an actual impact on connectivity of remote rural areas as it represents a share of about 15% of the entire MMGSY program. The intermediate indicator 'Cost effective technologies piloted for road design and construction and upgradation/maintenance of existing gravel roads' was partially achieved with a result of 61 km completed at project closure, and 67 km completed at the time of the ICR, instead of 100 km.

28. Overall, it can be noted that almost all civil works under the project were completed as planned. The quality of civil works kept on improving throughout the duration of project implementation. The introduction of the Performance Assessment Tool (PAT) with relevant training for the Project Management Consultant (PMC) and PWD engineers was beneficial in getting management's attention toward better quality of works and in increasing frequency of senior engineers' site visits. The PAT also helped in ensuring better management of environmental and social safeguards and the health and safety of workers on site. The successful implementation of this component, in addition to the implementation of the rest of the MMGSY program funded by the state of Rajasthan and of the PMGSY program, led to a significant increase in connectivity of rural areas in the state.

Outcome 2: Road safety enhanced
Outcome not achieved - rated Negligible

29. One PDO-level indicator and three intermediate indicators of the project's RF support the second PDO outcome.

30. The outcome indicator 'A reduction in annual average fatality count of road users on model road safety corridors' was not achieved. The target of 30 (average fatality count on model road safety highway corridors) was even negatively exceeded, as the actual count in 2018 was 61. The increase in fatalities is due to the lack of proper safety measures and is inherently correlated to the increase in traffic over the years, which requires stricter safety management. In 2018, Rajasthan was ranked 9th out of 29 Indian states, with 15.1 deaths per lakh population (and 6th out of 29 in total number of deaths, with 10,320 total deaths in 2018).[1]

31. The intermediate indicator 'Model road safety corridor(s) developed' was not achieved. Based on the initial International Road Assessment Programme (iRAP) survey of various highways (about 700 km) and accident analysis carried out from February 2016, one corridor was selected as Demonstration Safe Corridor (and approved by the relevant Project Working Group headed by the Transport Commissioner) to pilot road safety interventions: the Deeg-Alwar-Behror section (114 km) of SH-14. Unfortunately, at project closure, the expected target of 100 km of corridor covered by road safety measures was not achieved. Relevant technical designs and specifications for Intelligent Transport Services (ITS) and mobile road safety equipment (including speed laser guns, automatic speed control systems, cameras for both speed detection and incident detection, and crash data collection and management system) intended for the Police and Transport Departments in Rajasthan were completed only a few months before project closure. These designed measures, expected to contribute to the increase in average iRAP star rating of the selected sections, could not be implemented within the life of the project. 'Average star rating on model road safety corridor(s)' was thus not achieved.

32. The intermediate indicator 'Road safety policy and action plan approved and implemented' was achieved. The Road Safety Policy was prepared by the Road Safety Cell created under the project and comprised representatives from different sectors/departments, including the Transport, Police, Medical, PWD, and Local Self Government Departments. It is worth underlining here that the political context with the existence of a Supreme Court Directive on Road Safety was a key factor driving the development and approval of the Road Safety Policy and action plan under the project. Efforts were thus made in developing the Road Safety Policy and implementing some of the priority actions highlighted in the action plan. A Road Safety Fund was set up allowing to channel more financing toward the implementation of road safety measures. Road safety audits were carried out for 1,025 km of project roads and roads of higher category linking the project roads. Awareness campaigns managed by the Transport Department targeting road users were successfully implemented by hired nongovernmental organizations (NGOs) in different subregions (Jaipur, Udaipur, and so on) a few months before project closure. More than 100,000 people participated in the campaigns. Training sessions related to accidents investigations were provided to the police. There was unfortunately no outcome indicator indicating the resulting trend in fatalities on project rural roads after completion of civil works and safety training or measures.

[1] Times of India.

33. Despite the proven efforts in executing part of the Road Safety action plan, the lack of commitment to ensure (a) the implementation of strategic road safety measures/works along the selected corridor and (b) the provision of adequate road safety equipment (with the introduction of ITS and enforcement equipment) for the Police and Transport Department services, under the SCDP, may explain the increase in road fatalities on the selected corridor. The SCDP was one of the key project activities aiming at demonstrating the positive impact of adequate and site-specific road safety measures to reduce road accidents and fatalities. As per the progress made at project closure and after project closure, the associated works and goods are yet to be procured and implemented. The PWD decided to take up and finance the implementation of the SCDP using state funds and has determined implementation arrangements. To avoid issues faced in 2018 during the bidding process, it is recommended that the civil works and the ITS equipment be procured separately considering the different expertise and contract period required for the maintenance phase. At the time of this ICR, PWD reported that some budget was allocated, and arrangements made to acquire mobile road safety equipment for the Police Department.

Outcome 3: Road sector management capacity of the state of Rajasthan strengthened
Outcome not achieved - rated Negligible

34. One PDO-level indicator and three intermediate indicators of the project's RF support the third PDO outcome.

35. The outcome indicator 'Road Asset Management System Operational' was not achieved. The expectation was that the Road Asset Management System (RAMS) would be developed, fully functional, and in use by project closure. While the system has been designed during project implementation, it still remains to be fully developed and implemented at the time of this ICR. Successful implementation of a new RAMS requires (a) continuous pedagogy toward relevant stakeholders (Finance Department, PWD, Project Implementation Units [PIUs], and so on) to ensure their buy-in and ensure that the introduction of the new system is not seen as an additional burden, which was the case for some of them, and (b) incremental implementation (design, system development, road network condition assessment, data compilation, relevant training for assimilation, piloting, and full deployment/system in use). Laying out these requirements shows that five years may not have been enough to achieve the initially expected outcome.

36. Based on the achievements made at project closure (and considering the progress made at the time of this ICR), out of three intermediate indicators two were satisfactorily achieved, namely the 'Training Plan and HR Policy & Procedures developed' and 'Sector Policy and Financing Framework developed'. The intermediate indicator 'Computerization of key business processes in PWD' was not satisfactorily completed.

37. The main issue to be tackled by the project, as identified during project preparation, was related to the current gap in the road sector institutional development in Rajasthan. The PWD institutional structure and procedures are not efficient enough and adequate to manage the growing state road network. Proper asset management practice is nonexistent. In addition, most standard operating procedures are manually driven, and there are gaps in communication between the PWD divisions, which tend to work in silos. The proposed activities to strengthen the road sector institutional capacity in Rajasthan in view of the latest industry practices were thus justified. But the component scope was rather ambitious or required more ground preparation/upstream discussions.

38. The proposed activities, which were led by the Road Sector Modernization Task Force headed by the Principal Secretary (PS), can be classified in five categories:

(a) **Development and implementation of a Road Sector Policy and Financing Strategy.** As per the project's related indicator, the Road Sector Policy was revised, and the Financing Strategy developed. Nevertheless, the Policy/Strategy has yet to be approved by the Cabinet.

(b) **Development and deployment/operationalization of a sound RAMS** to ensure sustainability of the investments through strategic financing decisions. The Contract Agreement with the System Defining Consultant (SDC), responsible for the system design, was signed on December 28, 2015 and mobilized on January 13, 2016. The contract for the System Providing Consultant (SPC), responsible for the development of the system, was signed on August 2, 2018, a few months before project closure. Data collection services (network condition assessment required for the system development and use) are still to be procured. The development and deployment of the RAMS are thus not completed at the time of this ICR.

(c) **Adoption and implementation of new road engineering and business procedures.** A report/gap analysis was completed by Deloitte in September 2017, which provided recommendations for business procedures modernization. The proposed actions (for example, e-measurement book/e-billing, online procurement and contract management manuals, change in institutional structure), which represented a key opportunity to effectively make the PWD's services more efficient in the management of the road network, have not been prioritized and not been implemented during the project period. One achievement that can be reported is the implementation of an Integrated Financial Management System (IFMS) for the state as a whole. In terms of institutional structure, it had been agreed that a separate State Highway Agency would be more relevant to manage the state highway network. Deloitte also prepared sample Detailed Project Reports (DPRs) showcasing the use of innovative engineering/cost-effective techniques. The state will consider these recommendations using the state budget. Piloting of a new software for works management is ongoing. Donors' support in the future to streamline these processes could be a plus.

(d) **Development of institutional and human resources.** A report on HR policies and procedures was developed in March 2017. Key recommendations are under discussion, but their implementation has not been approved yet.

(e) **Improvement of road safety management practices.** Refer to the Road Safety Management component.

39. **Example of the need for adequate preparation or preliminary studies.** Improving asset management practices in Rajasthan is particularly critical considering that several actors are involved in the decision-making process regarding the financial resources allocated to maintenance works and the selection of road sections to be treated. The current process for maintenance budget allocation is carried out by the Finance Department on a yearly basis without long-term planning. Furthermore, while the Finance Department makes the overall decision at the state level, Local Governments (elected bodies at the local level) are the budget holders and responsible for the management of maintenance works locally. Despite the criticality of the issue, it took over a year after Board approval to reach an agreement with relevant stakeholders to pursue implementation of the RAMS. This illustrates the difficulty and resistance

often faced when new institutional mechanisms are being put in place. Figure 2 summarizes the major implementation gaps relative to this component, that is, what was achieved relative to the expectations.

Figure 2. Road Sector Modernization and Reforms Needs

Note: Blue denotes achieved under the project; grey denotes expected outputs.

Justification of Overall Efficacy Rating

40. For this ICR, the assessment of achievement of efficacy takes into account the three dimensions of the PDO, namely (a) to improve rural connectivity, (b) to enhance road safety, and (c) to strengthen road sector management capacity of the state of Rajasthan, and is measured based on the actual project-level outcomes against the expected outcomes.

41. The above analysis indicates that the project did make a substantial contribution to improving the operating conditions of the state rural roads, with presumed increased riding conditions of the project roads (even though the International Roughness Index [IRI] was not assessed for all project roads at project closure), and to improving the level of connectivity throughout Rajasthan. Nevertheless, the

project was not successful in enhancing overall road safety, as measured by network fatalities which increased by more than 30 percent in 2018 compared to 2013, considering that road safety design interventions on the selected model corridor were not implemented. Besides, the project was not able to achieve the main outcome related to road sector modernization, as most activities under this component were either not initiated or partially completed. More specifically, the RAMS was not fully developed (system production is ongoing and not completed at the time of this ICR). The RAMS was thus not implemented nor operationalized by project closure. Accordingly, the overall efficacy is rated Modest.

C. EFFICIENCY

Assessment of Efficiency and Rating

42. **Component 1 - quantitative assessment.** Although both the construction costs and maintenance costs increased about 20 percent, the benefits of Value of Time (VOT) saving decreased about 20 percent, and the benefits generated by additional employment decreased 3.33 percent; the drastically increased vehicle operating cost (VOC) saving of almost 80 percent and increased income per capita of almost 50 percent due to rural road connectivity resulted in better returns of the investment. Both internal rate of return (IRR) and net present value (NPV) at the ICR phase are greater than expected at the appraisal phase. The updated valuation shows that at the ICR phase, the investment in rural roads is efficient, with an IRR of 15.87 percent.

Table 3. Economic Evaluation Results (INR per Road)

	Project Appraisal Document (PAD) (2013)	ICR (2019)
NPV (12%)	740,607	1,639,837
IRR (%)	14.11	15.87
MIRR (%)	12.82	13.49
NPV/cost	1.27	1.36

43. **Components 2 and 3 - qualitative assessment.** Components 2 and 3 accounted for 12 percent of the total project cost at approval. While civil works were successfully achieved, it is important to note that the expected outcomes from the investments made in improving road safety management and in strengthening the institutional framework to modernize the sector were not achieved, negatively affecting the overall efficiency of the project.

44. Based on the above and on the full economic analysis presented in annex 4, the efficiency rating is Substantial.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

45. Based on the ratings for PDOs' Relevance, Efficacy, and Efficiency, the overall outcome is rated Moderately Unsatisfactory (Table 4). This overall outcome rating is in line with the assessment made in the last Implementation Support Mission. Despite achieving many successes, primarily with the completion of all civil works, the overall project outcome is still considered Moderately Unsatisfactory nine months after project closure, considering that issues or activities identified as pending at project closure have not been all satisfactorily addressed at the time of the ICR.

Table 4. Overall Outcome Rating

Relevance of PDO	High
Efficacy	Modest
Efficiency	Substantial
Overall Outcome Rating	Moderately Unsatisfactory

E. OTHER OUTCOMES AND IMPACTS (IF ANY)

Gender

46. While the project did not include specific activities to address potential gender issues, positive unintended impacts can be underlined. During the MTR, communities indeed specifically reported that owing to the construction of all-weather rural roads in areas with poor connectivity, women and/or girls were able to travel more frequently to attend schools and engage more with other communities.

Poverty Reduction and Shared Prosperity

47. Improved rural roads led to major changes. Better connections to markets and urban centers resulted in (a) more favorable prices for agricultural products, (b) increased employment opportunities for the villagers, and (c) reduced travel time and cost. In Rajasthan, the project contributed to an increase in household income (and welfare), specifically in rural areas. Increase in per capita income (weighted average) through agricultural and nonagricultural activities indeed increased from an estimated INR 1,954 at 2013 price levels to INR 2,792 at 2018 price levels. Based on project survey findings, additional employment for villagers residing in the project catchment areas was generated by the project in different sectors including trade and agriculture. The education and health benefits from improved access are also substantial.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

48. Overall, the project design was unfortunately inadequate. In particular, regarding the institutional strengthening components, the possibilities of designing a different set of activities could have been explored (during preparation or restructuring) by the project team. For example, the road safety component and related development outcomes could have been focused on rural roads only instead of highway corridors. Project appraisal should have brought out the various capacity constraints of the implementation agency. This would have allowed to focus on activities where PWD had appropriate capacity to implement the defined activities and achieve the expected outcomes.

49. The guidance role of the World Bank team in relation to the client when it comes to the selection of priority actions to be implemented under the project is important but always delicate. Ownership, from the government side, of activities to be implemented under the project is essential. It appeared that a few project stakeholders were not fully convinced by the relevance of some activities under Components B and C, which resulted in a reduced involvement during the implementation of said activities.

50. The Capacity and Governance risk ratings were identified as Moderate during project preparation. Considering the initial ambitious project scope (covering both rural roads and highways), these ratings might have been identified as Substantial with additional mitigation measures to strengthen the Client's capacity.

51. The M&E framework was lacking some indicators, not allowing to quantitatively validate the achievement of important outcomes, such as the actual condition of project roads at project closure or the impact of implemented rural road safety measures on fatalities. This can be explained in part because of the lack of proper methodology or existing data system for the state to collect this level of information, which prevented the project team from integrating these indicators in the M&E framework.

B. KEY FACTORS DURING IMPLEMENTATION

Factors Subject to the Control of the Government and/or Implementing Entities

52. The implementation of some activities was subject to the creation of working groups or task forces responsible for said activities. Yet, a stronger leadership may have been required for some of these tasks to guarantee timely implementation. For example, the Road Sector Modernization Task Force leads might not have been fully inclined to pursue the recommendations provided under this activity.

53. As regards procurement, procurement officials for all districts received procurement trainings which helped to some extent in expediting execution and ensuring compliance. Yet, general capacity issues did slow down the implementation of key activities. There was a lack of expertise available in the PWD to procure specialized equipment for the Police, Transport, and Medical Departments. Moreover, the coordination and collaboration with relevant departments was missing which led to the non-execution of a critical contract related to the deployment and installation of road safety equipment.

54. Another lesson to be highlighted is that the works contract estimates should have been based on the market rate to avoid instances of rebidding: 108 of 328 cases had to go through rebidding.

55. To avoid cost and time overruns and contract administration issues, forest and other administrative clearances should have been in place prior to awarding contracts. Some of the road works were dropped due to land and/or forest clearance issues (cf. below).

56. The critical environmental safeguard issue, which was the need for forest clearance for 26 roads (around 3 percent of total project roads), affected project performance. In total, 26 roads under the project were passing through forest areas. Stage 1 forest clearances for 13 roads (category C3) had been received, and 2 roads had already moved to Stage 2 clearances by the closure of the project, the remaining are being processed as of now. Civil works for 8 roads (category C1) were completed without completing the forest clearance process, which remains a non-compliance under the Government of India and World Bank's safeguards requirements. As of October 2019, the Borrower has reported that Stage 1 clearance for one road has been received, the remaining roads are still under process. For the 7 roads (category C2) which had not started due to impending clearances, Stage 1 clearance for 4 roads has been processed, one road is under process, and the pending two roads have been de-sanctioned. PWD is in the process of getting all relevant clearances, depositing the compensatory afforestation funds and implementing compensatory tree planting works. The state of Rajasthan assured that all forest clearances would be completed in the coming months.

57. Lastly, PWD had little to no experience in conducting large-scale awareness campaigns in collaboration with NGOs. Awareness campaigns were completed just before project closure.

Factors Subject to the Control of the World Bank

58. The World Bank experience in implementing the PMGSY proved helpful in supporting the GOR, particularly when it comes to the preparation of rural roads works DPRs, civil works management, and implementation of new construction technologies.

59. Additional studies/briefs demonstrating the relevance of specific activities (such as the need to develop a proper Road Asset Management System) to achieve expected outcomes, or in-depth discussions/workshops with the client, in particular the Finance Department, would have been useful. It would have allowed the World Bank to secure endorsement from relevant stakeholders for successful project implementation.

60. Formal restructuring only happened a year after the conclusions of the MTR suggesting project restructuring were drawn. The time frame between the MTR and the actual restructuring should have been minimized to start implementing adequate countermeasures and potentially complete more activities and expected outputs by project closure.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

61. The design of the M&E framework was weak in some areas. As mentioned in the PAD, in projects with a strong focus on institutional development, there is a need to choose more granular targets/indicators to measure achievements and impacts. Yet, some indicators were either not precisely defined (such as the indicator ‘Computerization of key business processes in PWD’) or missing (such as a specific outcome indicator to measure the third dimension of the PDO related to road sector modernization).

62. The fact that a specific outcome-level indicator to properly measure the third dimension of the PDO was missing may explain why the focus was somewhat lost during project implementation when it comes to ensuring that activities related to the road sector modernization are discussed and carried out on time.

63. Regarding the improvement of rural road connectivity, the improved condition, that is, IRI, of selected roads could have been considered as an outcome-level indicator, as a way to further demonstrate that good-quality roads were indeed provided through the project.

M&E Implementation

64. Reporting from the implementation units on the M&E framework was regularly monitored. As indicated in previous Aide Memoires, data collection was difficult for some indicators due to problems of

data availability, methodology, or data reliability. For example, the indicator pertaining to the percentage of core road network in good/fair condition, which was crucial to confirm the project roads condition at project closing, was eventually dropped as there were no existing data on core roads condition level.

M&E Utilization

65. The project M&E findings were regularly shared with stakeholders through progress reports and the World Bank's Aide Memoires after each mission. Some of the indicators' values were useful in verifying that the project outputs were achieved or not achievable. It was instrumental when deciding to process the project restructuring.

66. Nevertheless, two observations can be made. First, the difficulty to measure the percentage of core roads in good condition could have been addressed by supporting the client in carrying out a full road network condition assessment earlier on during project implementation, considering that a network condition assessment was also required as part of the development and use of a RAMS. Moreover, the noted increase in road fatalities during project implementation should have alerted the project team and the client of the urgent need for stronger actions to be promptly taken building on the work that had been initiated under the Road Safety Management component.

Justification of Overall Rating of Quality of M&E

67. Based on the above, the quality of M&E is rated Modest.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

68. The vast experience of the PWD in implementing the PMGSY, with support from the World Bank, helped the PWD manage safeguards or fiduciary matters during project implementation. The Project Director was indeed in charge of both the PMGSY and MMGSY.

69. **Safeguards.** The project was expected to have site-specific adverse environmental and social impacts. The following safeguards policies were triggered: OP/BP 4.01 (Environmental Assessment), OP/BP 4.04 (Natural Habitats), OP/BP 4.36 (Forests), OP/BP 4.11 (Physical and Cultural Resources), OP/BP 4.10 (Indigenous Peoples), and OP/BP 4.12 (Involuntary Resettlement).

70. Most safeguards issues identified during the project were appropriately addressed. There were no major resettlement issues. Most roads were built or upgraded in the right-of-way. Land acquisition was mainly handled through voluntary donations (a system widely used under the PMGSY and MMGSY). While voluntary land donation seems to be common practice in Rajasthan, the mutation process—that is, actual transfer of the land title ownership and not just of the land use or destination—is difficult but was adequately managed under this project through proper consultations with landowners. The main safeguards issue pertained to the need for forest clearance for 26 roads under the project.

71. **Forest clearance issue.** For some of the roads where forest clearance was required, works were initiated and completed by the client before getting the appropriate clearance, considering that it would lead to penalties, which is not in compliance with World Bank guidelines. Details are provided in the 'key factors during implementation' section. The matter was escalated to the: Department of Economic Affairs,

Ministry of Finance; Principle Secretary, PWD, GOR; Chief Secretary, GOR; and World Bank's management. The GOR shall ensure that proper resolution is found, even if the project is closed.

72. **Procurement.** A procurement and contract management manual was prepared and adopted for the project. PIUs at the district level were responsible for the preparation of post-review/single-bid packages and for technical and financial evaluations. Final reviews were handled by the PWD. Other procurement related issues identified are detailed in the 'key factors during implementation' section.

73. **Financial management.** All audit reports were submitted. The main issue identified pertained to the lack of dedicated staff and financial management experts to handle financial management related issues and report accordingly. The next project financial report is expected to be submitted by December 2019, after finalization of this ICR.

C. BANK PERFORMANCE

Quality at Entry

74. The World Bank team prepared an important project with activities including civil works as well as institutional strengthening activities that were planned to support the Government of India's priorities and met all World Bank requirements. The project civil works, as designed, were essential to upgrade the existing road infrastructure to reinforce rural road connectivity in Rajasthan by connecting smaller villages in areas not targeted by the PMGSY program. The PAD was especially articulate regarding the background analysis and rationale behind the project. Preparation was carried out with adequate technical and financial resources, being fully consistent with the World Bank's fiduciary and safeguards requirements.

75. However, notable shortcomings include:

(a) An inadequate project design, considering the complexity of implementing the activities related to the Road Sector Modernization and Road Safety Management components, which required more implementation time and full commitment of all relevant stakeholders;

(b) The inconsistency between the project title/main intent and the importance given (in content and financial terms) to the different components composing the projects;

(c) Inadequate design of the original RF with the last dimension of the PDO not covered by relevant outcome indicators; and lack of precise methodology or tools to appropriately capture road condition data and to measure the outcome in terms of road safety on rural roads.

Quality of Supervision

76. The project was implemented over a period of more than five years with three different task team leaders. All World Bank team leaders and team members provided full support to the client. The project was closely supervised by the different World Bank teams, and sufficient budget and staff resources were allocated. Regular supervision missions and technical visits, including site visits, were conducted throughout the project implementation. The team composition reflected the project supervision needs, including transport experts; engineers; and financial, procurement, and safeguards specialists, both from Washington, D.C. and from the field. Mission Aide Memoires were well written, reflecting progress,

delays, and challenges and including honest ratings on the project implementation objectives and implementation progress. The last mission took place in August 2018, six months before project closure, and no subsequent mission (de facto no ICR mission) took place.

77. Rural roads upgrading, or construction works are generally difficult to supervise, considering the large number of contracts and worksites. The World Bank team decision to introduce the PAT in Rajasthan, with relevant training, to frequently monitor the implementation and quality of civil works completed proved to be highly beneficial to the client and well received by the different PIUs.

78. Nevertheless, one may question why it had been decided to pursue the implementation of Components 2 and 3 without modifying the scope of these components, changing the PDO, or extending the project implementation period, considering the assessment made during the MTR. Indeed, it was clearly identified at the MTR that the achievement of part of the PDO was compromised by the major delays in implementing activities under Components 2 and 3 and lack of endorsement from relevant stakeholders.

Justification of Overall Rating of Bank Performance

79. Based on the above, the World Bank performance is rated Moderately Unsatisfactory.

D. RISK TO DEVELOPMENT OUTCOME

80. The risk that the achieved development outcomes will not be sustained is Substantial.

81. The Rajasthan Road Sector Modernization Project has contributed to strengthening rural connectivity and providing all-weather roads in underserved rural areas. Nevertheless, considering that asset management practices still require major improvement to ensure sustainability of the investments, it is urgent that practices are put in place and efforts made to finalize the RAMS and implement strategic maintenance with appropriate maintenance budget allocated over years.

82. Outcomes achieved related to road safety enhancement with an expected reduction of road fatalities and related to the increase in the PWD's operational and business processes efficiency were minimum. Considering that some activities were initiated (for example, design of safe corridor safety measures, acquisition of road safety/enforcement equipment and gap analysis of the current PWD processes), efforts should be pursued by the GOR to actually implement some of the recommendations provided during project implementation.

83. These issues are worth flagging and discussing during the implementation of subsequent transport projects with support from donors as needed. As of now, the GOR indicated their plan to pursue the development and implementation of the RAMS. The RAMS maintenance is planned to be funded through state budget for 5 years. Lastly, according to the state latest arrangements, further improvement of business processes and the implementation of the SCDP (road safety drawings completed at the time of the ICR and yet to be implemented), are expected to be implemented through state funds.

V. LESSONS AND RECOMMENDATIONS

84. **Level of readiness.** Lack of full endorsement at preparation by the decision makers can critically affect project outcomes. It is important to get endorsement from relevant stakeholders early on during the preparation process to ensure ownership for all components/activities (need to identify a champion). Proper assessment of relevant stakeholders' level of readiness and of how to adequately break down activities in different phases to ensure smooth implementation in a given period is critical as well (for example, development, implementation, and full operationalization of a functional RAMS require a few years and could not have been successfully achieved during the initial project implementation period).

85. **Preparation.** This project may have benefitted from additional preliminary studies. Ground preparation before project approval with studies carried out to showcase the relevance of proposed activities to achieve specific outcomes (such as the need to develop a proper Road Asset Management System), or with in-depth upstream discussions/workshops with the client – in particular the finance and technical departments, is a best practice that must be considered for most projects.

86. **Sector modernization and implementation of efficient business processes.** Implementing new management standards and business procedures to generate increased efficiency must be adapted based on the network characteristics. The sector gap analysis reflected that a separate State Highway Agency (SHA) would be more relevant to manage the state highway network. It is recommended to assess what business process is transferrable from the PWD to the SHA and what can be improved when setting up the SHA, based on the recommendations.

87. **System to optimize resource allocation.** Developing and implementing a Road Asset Management System at the state level is important to assess and understand the road assets value and location to then optimize budget allocation for new construction investments or maintenance operations and avoid arbitrary decision or political bias. This assessment must be carried out at the central level by the Finance Department of Rajasthan, but in close collaboration with local entities that are currently responsible for the implementation of maintenance works. It is thus recommended that the RAMS, once finalized, be discussed not only at the central level but also at the local level with local entities.

88. **Mutation process for the donated land.** Voluntary donation of land under the PMGSY and MMGSY programs is a system that appears to be applied throughout Rajasthan, but the mutation process remains difficult. Commendable work done on the ground to make sure that the land ownership was legally transferred can be replicated in future projects in Rajasthan or even other states in India.

89. **Social enhancement works.** Enhancing social settings next to the road bed for communities in selected areas (for example, provision of local access) proved to be successful under this project. Similar consultation is needed for future projects to accommodate the social needs that will in turn bring the buy-in of the community.

90. Annex 8 provides a comparative assessment of states' initiatives (cases of Karnataka, Andhra Pradesh & Telangana and Rajasthan states) with further lessons to be learned from introducing or implementing organizational and sector modernization reforms in Indian states.

ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: To improve rural connectivity

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Share of rural population with access to an all-season road	Percentage	67.00 01-Sep-2013	81.00 31-Dec-2018		80.86 31-Dec-2018
Number of rural people with access to an all-season road	Number	33115250.00	33489250.00		33490396.00

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Size of total classified network	Kilometers	133435.00 31-Mar-2014	135935.00 31-Dec-2018		135788.00 31-Dec-2018

Comments (achievements against targets):

Objective/Outcome: To enhance road safety

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
A reduction in annual average fatality count of road users on model road safety corridors	Number	46.00 31-Mar-2014	30.00 31-Dec-2018		61.00 31-Dec-2018

Comments (achievements against targets):

Objective/Outcome: To strengthen road sector management capacity

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Road Asset Management System Operational	Text	Existing system not user-friendly and not in use 31-Mar-2014	RAMS Operational (developed and in use) 31-Dec-2018		The RAMS still under development by SPC and undergoing the User Acceptance Test 30-Jun-2019

Comments (achievements against targets):

System Defining Consultant (SDC) Contract Agreement was signed on 28 December 2015 and mobilized on 13 January 2016. Contract for SPC was signed on August 02, 2018. Procurement for services for data collection is still to be procured.

A.2 Intermediate Results Indicators

Component: Component A- Rural Connectivity Improvement

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Roads constructed, Rural	Kilometers	0.00 01-Sep-2013	2500.00 31-Dec-2018		2334.00 31-Dec-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Cost effective technologies piloted for road design and construction and upgradation/maintenance of existing gravel roads	Kilometers	0.00 31-Jan-2014	100.00 31-Dec-2018		67.00 30-Jun-2019

Comments (achievements against targets):

The intermediate indicator 'Cost effective technologies piloted for road design and construction and upgradation/maintenance of existing gravel roads' was partially achieved with a result of 61 km completed at project closure, and 67 km completed at the time of the ICR, instead of 100 km.

Component: Component B - Road Sector Modernization and Performance Enhancement

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Computerization of key business processes in PWD	Yes/No	N 06-Aug-2013	Y 31-Dec-2018		N 30-Jun-2019

Comments (achievements against targets):

Most processes in PWD were manual at the beginning of the project. Considering that the expectation was to improve and implement a series of new and/or more efficient business processes, based on the assessment and recommendations provided for the modernization of key business processes, this target can not be considered as achieved. By project closure, the Integrated Financial Management System (IFMS) [implemented at the state level to improve management of FM related issues] was indeed the only new system implemented under this project.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Sector Policy and Financing Framework developed	Yes/No	N 30-Dec-2016	Y 31-Dec-2018		Y 31-Dec-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised	Actual Achieved at

				Target	Completion
Training Plan and HR Policy & Procedures developed	Yes/No	N 30-Dec-2016	Y 31-Dec-2018		Y 31-Dec-2018
Comments (achievements against targets):					

Component: Component C - Road Safety Management

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Model road safety corridor(s) developed	Kilometers	0.00 31-Jan-2014	100.00 31-Dec-2018		0.00 31-Dec-2018
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Average star rating achieved on model road safety corridor(s)	Number	0.00 31-Mar-2014	3.00 31-Dec-2018		0.00 31-Dec-2018
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Road safety policy and action plan approved and implemented	Yes/No	N 31-Jan-2014	Y 31-Dec-2018		Y 31-Dec-2018
Comments (achievements against targets):					

I. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1 - To improve rural connectivity	
Outcome Indicators	1. Increased share of rural population with access to an all-season road 2. Increased size of total classified network
Intermediate Results Indicators	1. Rural roads connecting about 1,300 revenue villages with population between 250 and 499 constructed 2. Cost effective technologies piloted for road design and construction and upgradation/maintenance of existing gravel roads
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)	1. Rural roads constructed 2. Cost effective technologies piloted 3. Rural roads condition improved
Objective/Outcome 2 - To enhance road safety	
Outcome Indicators	1. A reduction in annual average fatality count of road users on model road safety corridors
Intermediate Results Indicators	1. Model road safety corridor(s) developed 2. Average star rating achieved on model road safety corridor(s) 3. Road safety policy and action plan approved and implemented
Key Outputs by Component (linked to the achievement of the Objective/Outcome 2)	1. Model road safety civil works implemented on selected corridors (state level major road) 2. Star rating of 3 achieved on selected corridors 3. Road Safety Policy and action plan approved and implemented 4. Road safety awareness campaigns completed 5. Road safety audits completed on rural road network
Objective/Outcome 3 - To strengthen road sector management capacity	
Outcome Indicators	1. Road Asset Management System Operational

Intermediate Results Indicators	1. Sector Policy and Financing Framework developed 2. Computerization of key business processes in PWD 3. RAMS in place and innovative forms of contracting used 4. Training Plan and HR Policy & Procedures developed
Key Outputs by Component (linked to the achievement of the Objective/Outcome 3)	1. Improved sector policy framework 2. Engineering practices and key business procedures modernized/computerized 3. RAMS developed and in use 4. Institutional and Human Resource Policy and Strategy developed 5. Preparatory studies (Feasibility Studies and DPRs) prepared for future projects

ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Ashok Kumar, Mesfin Wodajo Jijo	Task Team Leader(s)
Anand Kumar Srivastava	Procurement Specialist(s)
Savinay Grover	Financial Management Specialist
Radia Benamghar	Team Member
Venkata Rao Bayana	Social Specialist
Neha Vyas	Environmental Specialist
Farah Zahir	Economist
Elena Chesheva	Team Member
Dominic Pasquale Patella	Team Member
Carylann Lobo	Monitoring
Satyendra Prasad	Governance Specialist
Supervision/ICR	
Justin Runji, Reenu Aneja	Task Team Leader(s)
Priti Jain	Procurement Specialist(s)
Anantha Krishna Karur	Financial Management Specialist
Radia Benamghar	Team Member
I. U. B. Reddy	Social Specialist
Genevieve Maria Dutta	Team Member
Mesfin Wodajo Jijo	Team Member
Raman V. Krishnan	Team Member
Sharlene Jehanbux Chichgar	Environmental Specialist
Tema Alawari Kio-Michael	Team Member
Oceane Keou	ICR TTL

B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US$ (including travel and consultant costs)
Preparation		
FY12	6.000	20,959.56
FY13	61.459	258,993.89
FY14	29.063	109,948.54
FY15	.367	1,018.56
FY16	0	0.00
Total	**96.89**	**390,920.55**
Supervision/ICR		
FY14	23.259	277,763.89
FY15	41.560	245,127.90
FY16	37.710	213,678.69
FY17	36.523	228,787.35
FY18	35.430	274,979.16
FY19	31.259	174,373.15
FY20	7.789	30,110.04
Total	**213.53**	**1,444,820.18**

ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US$, millions)	*Amount after Restructuring (US$, millions)*	Amount at Approval with Devaluation (US$, millions)	Actual at Project Closing (US$, millions)	Percentage of Approval with Devaluation (%)
Component A - Rural Connectivity Improvement	138.00	*134.52*	125.75	111.66	89
Component B - Road Sector Modernization and Performance Enhancement	7.75	*9.43*	7.06	2.76	39
Component C - Road Safety Management	10.55	*13.90*	9.61	6.28	65
Incremental Operating Cost	0.70	*1.05*	0.64	1.00	156
Refinancing preparation advance	3.00	*0.00*	2.73	0.00	0
Total	**160.00**	***159.00***	**145.79**	**121.70**	**83**

ANNEX 4. EFFICIENCY ANALYSIS

1. In 2013, the project was originally approved with three key components in which the World Bank financing constituted 70 percent of the project cost:

(a) Rural Connectivity Improvement

- Civil Works (2,500 km)
- Project Management and Audit Services

(b) Road Sector Modernization and Performance Enhancement

(c) Road Safety Management

2. For all the road sections, the evaluation was carried out using general approach followed for the rural roads project, in which all the potential future benefits from beneficiaries like increase in agriculture production, increased employment, travel benefits, etc. were captured, and costs and provided economic decision criteria for low-traffic rural road construction and maintenance activities.

3. In 2017, the project was restructured. The restructuring covered the changes of:

(a) Increased World Bank share of financing in works components for expenditures related to civil works by retroactively increasing the World Bank's financing percentage from 70 percent to 80 percent;

(b) Revision of the results monitoring framework of M&E indicators; and

(c) Reallocation between categories.

4. The ex-post economic evaluation follows the methodologies conducted for the ex-ante evaluation in the PAD and the changed outcome indicator in the Restructuring Paper. Costs and benefits of the 'with project' scenario were compared with those of the 'without project' scenario. Economic viability was assessed using two indicators of Net Present Value (NPV) and Economic Internal Rate of Return (EIRR).

5. **Project costs.** The main costs are from:

(a) The initial investment costs;

(b) The subsequent maintenance costs to keep the road in good condition.

6. **Project benefits.** The benefits estimated in the Economic Analysis (EA) for the original project include the following:

(a) Increase in household income through agriculture and non-agriculture-based activities;

(b) Additional employment benefits;

(c) Traffic-related benefits:

(i) Vehicle Operating Cost (VOC) savings from having an improved road surface;

(ii) Travel time savings for road users due to the improved driving conditions.

7. Unit prices of the updated project costs and benefits are based on prices in India for the RRSMP in 2018. The evaluation was conducted using U.S. dollar with exchange rate of INR 65.17: USD 1[2], which was close to the market rate and so no shadow foreign exchange rate was considered necessary. The 12 percent discount rate is used according to the normal practices for World Bank-funded rural road projects at project appraisal.

A. Cost of Construction and Maintenance

8. **Project costs.** The analysis used the project life cycle costs which included not only capital costs required for the investment but also operation and maintenance costs throughout the evaluation period.

9. **Capital costs.** The capital cost for the RRSMP included costs for civil works, project management, and audit services.

Table 4.1. Total RRSMP Disbursement - Component Costs (World Bank Financing) (US$, millions)

	PAD (2013)	Restructuring (2017)	ICR	% Disbursed (with devaluation)
			(2019)	
Financial cost	160	158.9	121.7	83

Table 4.2. Annual Disbursement (World Bank Financing) (US$, millions)

	Total	2014	2015	2016	2017	2018	2019
Disbursement amount	85.34	15.12	37.33	11.50	9.58	5.29	6.52
U.S. dollar equivalent	121.63	23.33	52.22	16.03	13.54	7.47	9.04

10. **Maintenance costs.** The maintenance cost mechanism assumed in the PAD was valid and has been updated using current 2019 prices. As shown in table 4.3, maintenance cost per road increased 18.61 percent in 2019 than in 2013.

[2] The exchange rate conducted in evaluation is the five years' average market rate between 2014 to 2018.

Table 4.3. Updated Maintenance Cost per Road (INR)

	2019		2030		2033	
	Annual Maintenance 1% / 2		Periodical Maintenance at 10th Year - 35%		Annual Maintenance 1%	
	PAD	ICR	PAD	ICR	PAD	ICR
Maintenance cost (annual)	34,946	41,449	2,446,191	2,901,402	69,891	82,897
Maintenance cost (in total)	34,946	41,449	3,180,049	3,771,823	3,389,722	4,020,515

11. At the aggregate level, the project funded about 2,500 km (around 2,400 km has been completed) of rural roads to provide connectivity to about 1,300 revenue villages with population between 250 and 499. Table 4.4 shows the district-wise average construction costs and completed details of the 1,032 rural roads in 2019 compared to the sample of 513 Phase 1 rural roads in 2013 at a cost of INR 4,193 million in Rajasthan state.

Table 4.4. District-wise Cost Distribution of Rural Roads

S. No.	District	No. of Roads		Average Population Coverage/Road		Average Length of Road (km/Road)		Average Cost (INR, millions/Road)		Average Cost (INR, millions/km)	
		2013	2019	2013	2019	2013	2019	2013	2019	2013	2019
1	Ajmer	12	14	375	341	1.65	1.78	4.553	5.76	2.7628	3.23
2	Alwar	11	23	417	378	1.38	1.53	4.159	5.21	3.0194	3.39
3	Baran	19	72	366	385	2.54	2.57	9.007	14.32	3.5467	5.57
4	Bharatpur	25	38	372	417	1.74	1.77	6.574	7.17	3.7835	4.05
5	Bhilwara	93	147	363	364	2.28	2.26	7.672	8.66	3.3638	3.78
6	Bundi	14	24	413	368	2.72	2.46	9.679	13.28	3.5542	5.41
7	Chittorgarh	84	175	348	352	2.36	2.25	9.169	9.90	3.879	4.40
8	Dausa	4	47	351	467	1.68	2.21	4.698	8.55	2.792	3.87
9	Dholpur	13	26	386	387	1.96	2.38	5.155	8.38	2.6328	3.52
10	Hanumangarh	3	10	399	377	3.58	2.67	9.297	9.37	2.5944	3.50
11	Jaipur	34	34	336	342	2.02	2.00	7.468	8.04	3.7023	4.01
12	Jhalawar	28	106	385	398	2.54	2.25	8.840	11.24	3.4824	5.00
13	Karauli	4	4	374	374	2.19	2.20	6.855	10.20	3.1249	4.65
14	Kota	12	10	345	299	2.51	2.31	9.993	11.46	3.9826	4.97
15	Pratapgarh	n.a.	8	n.a.	365	n.a.	2.61	n.a.	10.02	n.a.	3.84
16	Rajsamand	21	65	364	408	2.01	2.20	6.304	8.96	3.1425	4.07
17	Sawai Madhopur	17	37	376	384	2.65	2.31	11.156	11.11	4.2122	4.80
18	Sirohi	1	1	318	318	3.40	3.40	16.155	16.89	4.7515	4.97
19	Sriganganagar	40	47	339	334	3.38	3.29	8.587	9.31	2.5443	2.83
20	Tonk	45	93	372	355	2.38	2.40	8.259	9.56	3.4719	3.98
21	Udaipur	33	51	351	361	3.17	2.83	9.779	9.41	3.0828	3.33

Source: 2013, PWD, Rajasthan.

Table 4.5. Summary of Cost and Beneficiaries

	No. of Roads		No. of Villages		Population		Length of Road (km)		Cost per Road (Lacs)		Cost per km (INR)	
	2013	2019	2013	2019	2013	2019	2013	2019	2013	2019	2013	2019
Total	513	1,032	510	1,300	178,477	386,147	1,227.04	2,403.18	41,935.65	49,589.20	3,417,545	4,185,671
Average					362.02	374.17	2.41	2.33	81.75	97.47		

Source: 2013, PWD, Rajasthan.

12. As shown in table 4.5, the construction cost per road increased by around 19 percent and the construction cost per km increased 22.48 percent in 2019 than in 2013.

B. Project Benefits

13. Improved rural roads lead to major changes: (a) better connections to markets result in more favorable prices for agriculture products; (b) better access to nearby market/urban centers provide employment opportunities and create additional employment to the villagers; and (c) increase in the vehicle ownership pattern and the resultant additional vehicle trips for various work and social trips result in reduced travel time and cost. The education and health benefits from improved roads access are substantial, especially as they have been already captured in the saving in travel time and cost. The total benefits from new road provision are closely correlated with the number of people served by those roads.

(i) Increase in Household Income (Per Capita Increase in Total Annual Income)

14. In Rajasthan, as new all-weather roads have been paved, household income (and welfare) has been raised. Per capita income, in terms of weighted average through agriculture and non-agriculture activities, has been raised from the estimated INR 1,954 at 2013 price levels to INR 2,792 at 2018 price levels, as shown in table 4.6.

Table 4.6. Details of Increase in Per Capita Annual Income Due to Rural Road Connectivity

Average increase in agricultural income per acre (INR)[a]	3,074
Average landholding per person (acres)[a]	0.56
Per capita increase in agricultural annual income (INR)[a]	1,735
Per capita increase in nonagricultural annual income (INR)[a]	807
Per capita increase in total annual income (weighted) INR -2010[a]	1,577
Per capita increase in total annual income (weighted) INR - 2013 @7.4%	1,954
Per capita increase in total annual income (weighted) INR -2018 @7.4%	**2,792**

Note: a. The estimation for 'Per capita increase in total annual income (weighted) INR' is based on 7.4 percent increase rate.

15. In Rajasthan, based on the survey data in 2010, the agricultural productivity had increased by 18.23 percent due to the road connectivity from INR 16,850 per acre to INR 19,923 per acre and 24.57 percent increase in income from non-farm activities from INR 19,050 to INR 23,730 per capita. The

occupation composition in Rajasthan is assumed fixed (no updated survey data), and the agriculture and non-agriculture-based occupation is 83 percent and 17 percent, respectively.

Table 4.7. Assessment Benefits to the Rural Roads in Rajasthan

Rural Road Scenario	Total No. of Sample Beneficiaries Assessed	Economic Well-being	No. of Vehicles			Employment Opportunities
			Bicycle	Rickshaw	Motorized Vehicle	
Before rural roads	**200**	91	40	15	48	61
		[45.50%]	[20.00%]	[07.50%]	[24.00%]	[30.50%]
After rural roads		195	144	100	136	200
		[97.50%]	[72.00%]	[50.00%]	[68.00%]	[100.00%]

Source: Evaluation Study on Rural Roads Component of Bharat Nirman, Programme Evaluation Organization Planning Commission Government of India, New Delhi, May 2010.

16. The overall increased income due to rural road connectivity in Rajasthan per road from 2019 to 2033 is INR 17,137,306, with 1.6 percent per capita production growth. The household income increased 47.69 percent per road construction in 2019 compared to the 2013 estimation.

(ii) Increase in Income through Additional Employment Generation

17. Based on the survey findings, the rural road connectivity could generate additional employment for the village population in trade and agriculture-related industrial establishments and in the nearby towns to the tune of 10–15 persons. With the assumption of 300 working days and INR 150 as daily wage and 10 additional employment per village, an additional income of INR 0.45 million is estimated as employment benefit. With average population size of 374 persons, the per capita income through additional employment is estimated as INR 1,202.66 per year.

Table 4.8. Additional Employment Benefits due to Rural Road Connectivity

Additional employment generated per village (number)	10
Total additional annual income (INR)	450,000
Average village population (number)	374.17
Per capita additional employment generation (INR)	1,202.66

18. The overall increased employment benefits due to rural road connectivity in Rajasthan per road from 2019 to 2033 is INR 7,224,038 with 1.6 percent per capita growth of employment rate. The additional employment benefits decreased 3.33 percent per road construction in 2019 compared to the 2013 estimation.

(iii) Traffic-related Benefits

19. The traffic forecast assumes that the vehicle generation pattern will change to approximately those found in the presently connected villages when villages are connected with an all-weather road. Vehicle generation pattern used in the present analysis for without and with all-weather road connectivity is summed up in Table 4.9. The traffic was assumed to grow at 5 percent for the normal traffic. No attempt

is made to differentiate between 'normal' and 'generated' traffic and to apply different values to the flows in general.

Table 4.9. Travel Pattern/Traffic Forecast

Vehicle Category	Vehicle km/1,000 Population	
	Before Connectivity	After Connectivity
Cycle	34	124
Rickshaw	13	86
Motorized vehicle	41	117
Motorcycle	15	46
Car	14	39
Tractor	12	13
Bus	0	16
Truck	0	3

Note: Estimated based on the data from 'Report No: 29742-IN, PAD, Rural Roads Project, August 2004.
*As estimated at the time of project appraisal as these data are not available.

20. The savings in the VOCs and passenger time value for each vehicle type were adapted from the Rural Roads Project 1 (RRP1) evaluation studies[3] with suitable update to the 2013 level in the PAD compared to the 2019 level in the ICR. The unit values adopted from the initial analysis are summed up in tables 4.10 and 4.11. Considerable benefits in health, education, and other social sector areas like accessibility to markets, railway stations, bus stands, post offices, banks, and so on in terms of reduced travel time and operating cost were reported from the evaluation study results. However, all these accessibility benefits to social services will be reflected in the additional vehicular trips generated after the road improvements. Thus, only traffic-related benefits in terms of VOC savings and savings in travel time were considered as the third benefit to avoid duplication of benefit calculations.

21. For benefit calculations, existing traffic and generated traffic are treated separately. Differences in unit rates of VOC and travel time were used to estimate the benefits for the existing traffic (before connectivity). For generated traffic, 50 percent of the VOC and time cost for the improved situation were treated as project benefit.

Table 4.10. Vehicle Travel Time Cost (INR/Vehicle km)

Vehicle Type	Value of Travel Time									
	INR/h		Average Speed (km/h)[a]		Average Occupancy (Nos.)		Average Load (ton)		INR/Vehicle km	
	2013	2019	2013	2019	2013	2019	2013	2019	2013	2019
Motorcycle	27.8	34.41	25	35	1.5	1.71	—	—	1.67	1.68
Car	66.3	82.13	20	40	4	3.23	—	—	13.26	6.63
Tractor	6.8	8.44	15	15	—	—	2	2	0.91	1.13
Bus	18.3	22.68	20	30	25	30.00	—	—	22.88	22.68

[3] (a) Report No: 29742-IN, PAD, Rural Roads Project, August 2004 and (b) ICR, Rural Roads Project, July 2012.

Vehicle Type	Value of Travel Time									
	INR/h		Average Speed (km/h)[a]		Average Occupancy (Nos.)		Average Load (ton)		INR/Vehicle km	
	2013	2019	2013	2019	2013	2019	2013	2019	2013	2019
Truck	8.5	10.48	15	25	—	—	9	9	5.09	3.77

Note: Estimation for 2013 was based on the data available from Indian Roads Congress, SP 30, 2009, and base figures have been taken from project appraisal report of the RRSMP.
a. Average speed after construction of road has been considered based on experience.

Table 4.11. Unit Rates for Calculating VOC and Travel Time for Rural Roads

Vehicle Type	Value of Time: INR/Vehicle km		VOC: INR/Vehicle km	
	2013	2019	2013	2019
Motorcycle	1.67	1.68	1.59	3.20
Car	13.26	6.63	6.39	10.15
Tractor	0.91	1.13	14.30	14.30[a]
Bus	22.88	22.68	14.02	25.50
Truck	14.30	5.09	14.30	27.04

Note: a. Data for tractor VOC is not available and is estimated based on the data available from Indian Roads Congress, SP 30, 2009. The data are based on roughness factor of 15 m/km and roughness of 3,000 mm/km including passenger cost.

22. **VOC savings.** The unit VOCs in with and without cases were calculated. The overall VOC saving due to rural road connectivity in Rajasthan per road from 2019 to 2033 is INR 634,143 with 5 percent growth rate in traffic. VOC saving increased 79.51 percent per road construction in 2019 compared to the 2013 estimation.

23. **Passenger travel time savings.** Travel time savings were assumed to be obtained when trips are shorter and faster as a result of the investment in the construction of the rural roads. Similar to VOCs, VOTs used in the analysis were also updated using the recent survey result. The overall VOT saving due to rural road connectivity in Rajasthan per road from 2019 to 2033 is INR 378,149 with 5 percent growth rate in traffic. VOT saving decreased 19.77 percent per road construction in 2019 compared to the 2013 estimation.

C. Economic Analysis Results

24. **Updated economic evaluation results.** Although both the construction costs and maintenance costs increased about 20 percent, the benefits of VOT saving decreased about 20 percent, and the benefits generated by additional employment decreased 3.33 percent; the drastically increased VOC saving of almost 80 percent and increased income per capita of almost 50 percent due to rural road connectivity resulted in better returns of the investment. Both IRR and NPV at the ICR phase are greater than those expected at the appraisal phase. The updated valuation shows that at the ICR phase, the investment in rural roads is efficient, with an IRR of 15.87 percent.

Table 4.12. Economic Evaluation Results (INR/Road)

	PAD (2013)	ICR (2019)
NPV (12%)	740,607	1,639,837
IRR (%)	14.11	15.87
MIRR (%)	12.82	13.49
NPV/cost	1.27	1.36

25. The base analysis and their sensitivity tests indicated a relatively wide spread in the economic results as shown in Table 4.13 below.

Table 4.13. Results of Sensitivity Analysis of Economic Evaluation Results (INR/Road)

Sensitivity Scenario	EIRR (%)	MIRR (%)
Base Case	15.87	13.49
20% increase in Construction Cost	14.42	13.04
20% increase in O&M Cost	15.35	13.26
20% decrease in project benefit	10.67	11.47
Combined effect (Worst Scenario)	**6.71**	**9.87**

26. The Results of the Sensitivity Analysis of Economic Evaluation Results show that the investment in rural road is efficient even with the combined effect in the worst scenario – 20 percent increase in construction cost, 20 percent increase in O&M cost, and 20 percent decrease in project benefit, with an EIRR of 6.71 percent and an MIRR of 9.87 percent.

ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

91. The Borrower's comments are attached below.

92. The World Bank thanks the state of Rajasthan for the comprehensive comments on this ICR. First, it is important to note that the World Bank policy requires that project rating be based on achievements at project closing (December 31, 2018). In the case of the present ICR, all progress made until December 31, 2018 and the progress made until June 30, 2019 was reflected in the ICR, based on the inputs provided in the Borrower's ICR and further communication with the project team and the Client. The final ICR thus emphasizes and recognizes post-closing date efforts and further progress made by the Borrower, as the World Bank had agreed that the progress made post-closing date to address remaining issues such as road safety works, forest clearance, etc., would be considered to some extent in the final evaluation.

93. The World Bank has discussed and taken note of the Borrower's opinion regarding the rating. Achievements made related to the civil works at project closure were rated positively. Considering the works completed within 6 months after project closure, the rating related to the first outcome remains positive. Yet, some of the remaining issues or activities under the two other components are either not implemented, not completed or are not fully resolved at the time of this ICR despite the noted progress. The proposed ratings will thus remain the same. The World Bank encourages the Borrower to pursue these efforts and is committed to provide the necessary support.

Comments on the ICR draft of the World Bank for RRSMP project.

The Bank has considered the progress of the project achieved up to August 2018 and which were included its Aid Memoire of the mission of 20-21 Aug 2019 e.g. Road constructed 2334km, CET roads completed 28.36 km. In the ICR report itself it is mentioned at page 23 that "The ICR thus mainly considered the results provided by the last mission".

The project was closed on 31 December 2018. It is not understood why the progress achieved up to 30 June 2019 was not considered. In fact, in the letter written by the Bank on Dec 28, 2018 to Additional Secretary DEA, GoI, it was mentioned "I would kindly request your continued support and commitment to the completion of these activity over six months. During further discussion with the Bank it was deliberated that progress achieved up to June 2019 will be considered during the preparation of ICR.

It is, hence, submitted that progress achieved up to June 2019 should be considered in the ICR for assessing the achievement of the project as substantial progress in the CET works, recourse in the cases where works were completed without receiving forest clearances have been achieved.

As already reported in the Borrower's ICR report, the progress made up to 30 June 2019 is as under:

Component 'A'

Table 1: Status of CET works

Up to	CET works sanctioned		CET works awarded		CET works completed		CET works in progress		CET works not started	
	No.	Length (km)	No.	Length (km)	No.	Length (km)	No.	Length (km)	No.	Length (km)
Dec, 31, 2018	34	100	34	100	28 (82%)	61.15	4	17.55	2	21.3
June, 2019	34	100	34	100	30 (88%)	67.15	2	11.6	2	21.3
							These are likely to complete soon as after 1st stage clearance, mutation done and CAMPA amt. deposited		Being de-sanctioned (Already de-sanctioned)	

As per the draft ICR of the Bank, the intermediate indicator *"kilometers of roads constructed"* was mostly achieved with 2,334 km of roads built compared to an initial target of 2,500. The intermediate indicator "cost effective technologies piloted" was not achieved, with a result of 28 km completed instead of 100 km. However, as clear from the Table above, up to 30 June 2019, 67.15 km of CET works completed and more importantly all the Cost Effective Technologies have been used in these completed roads. Hence, this intermediate indicator of cost effective technologies piloted has been achieved.

Forest Clearance

The status of works for which Forest Clearance could not be obtained is as under:

16.9.19
(Vikas Dixit) client Engineer
Additional PWD (World Bank)

Out of eight (8) works completed without forest clearance, for one work 1st Stage clearance has already been received and amount in CAMPA fund already deposited. Six works, are at advance stage of obtaining the 1st stage clearance process. As advised by the Bank, recourse action of plantation in equal non-forest area has already been started for all these 8 works and thus compliance has already been made.

Similarly, out of 4 works which were stopped due to non-availability of Forest clearance, 1st stage forest clearance for two works is obtained (as on today 1st stage clearance of 3 works has been obtained), mutation of compensatory land in the name of forest department has been done. Hence, these two works (as on today 3 works) now have deemed permission for commencement of work.

For other two works the 1st stage clearance is likely to be obtained very soon. The amount required for CAMPA will be deposited quickly and mutation of compensatory land in the name of forest department will be done expeditiously. The works will be completed from state funds (However, as on today these two works have been got de-sanctioned).

From the above, it is clear that most of the compliances have been made.

Component 'B'

1. **RAMS:** As mentioned earlier, the activity is split in two parts, (i) System development and testing with 2000 km pilot data and (ii) data collection of about 22000 km of SH/MDR data. The System is developed and under User Acceptance test. Simultaneously, bids for data collection are received. It may be appreciated that the Bank's Task team has already agreed in-principle to finance the balance sub activities of Development of RAMS including engagement of Data Collection agency under RSHDP-II. For follow up support and maintenance of the system, PWD has already got Administrative and Financial sanction available for supporting the same through state budget for 5 years once the system is developed. Hence, RAMS development and implementation will be completed under RSHDP-II.

2. **Strengthening of Road Sector Policy-** As per the objective of the project, a new Road Sector Policy along with strategy & financing plan is already prepared and deliberated with stakeholders. Hence, the activity as per the project objective is completed.

3. **Modernization of Engineering practices and Business Procedures:** Action on the major recommendations of the consultant has already been initiated. The Integrated Financial Management System (IFMS) is in place and piloting of software for Works Management including e-MB, e-bills etc is being done. Hence, it is clear that though implementation of the recommendations of the consultant were not envisaged as objective/indicator under the project, but the Borrower has taken pro-active step for implementing the same.

Sd/-
16.9.19
(Vikas Dixit)
Additional chief engineer
PWD
(World Bank)

Component 'C'

Implementation of Demonstration Safe Corridor- The multi-sector countermeasures are already designed, bid documents thereof are prepared. The arrangements of implementation are as under:

(a) **Civil Works-**

- This corridor (SH-14) is being operated and maintained by RSRDC on BOT basis. The RSRDC has agreed for the improvement of 15 Blackspots out of total 17 nos. amounting to INR 72.12 million. The drawings and BOQ are already shared with the RSRDDC and the process for procurement will start very soon.
- It was agreed that 2 junction improvement and improvement of one blackspot will be taken up under ongoing NCR development project. The drawings are already shared with the concerning Chief Engineer to start implementation of the same.
- The Chief Engineer (NH) has agreed to take up improvement of balance one Blackspot, which is a junction with National Highway. The drawings are already shared with the Chief Engineer (NH).
- The remaining all civil works will be taken up by PWD under the Road Maintenance head.

(b) **Emergency Care**

Public Health department has agreed to provide equipment for all the 5 (five)Trauma Stabilization Centres. The list of equipment will be shared with the department once the civil works are completed. The Civil works of trauma Care will be taken up through NRHM (National Rural Health Mission). Similarly, three (3) BLS Ambulances will also be provided by NRHM.

(c) **Enforcement and ITS**

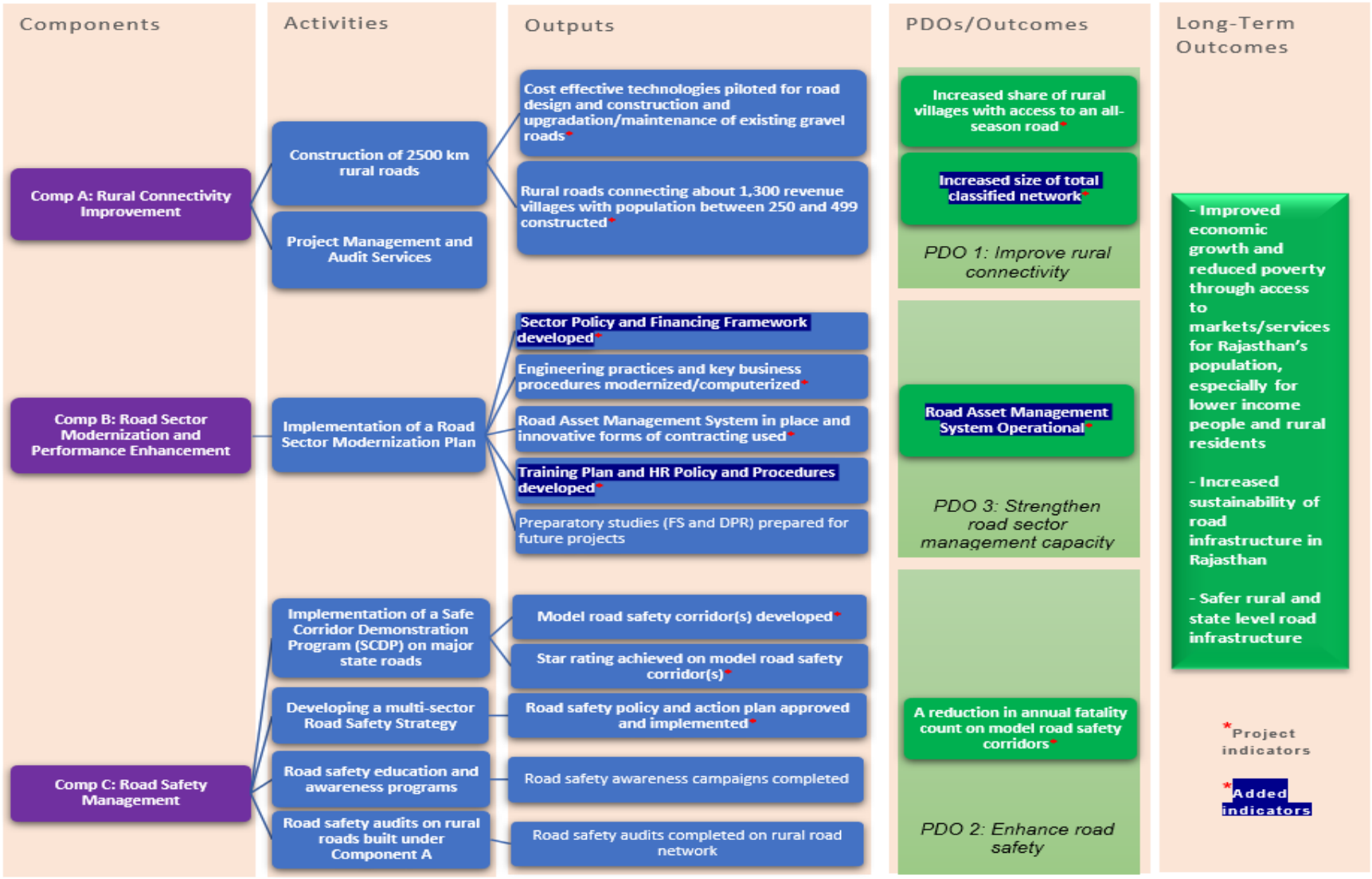
The Transport Department has informed that the police department has been provided a sum of INR 3.89 Cr for enforcement equipment including interceptors.
For ITS, in a high-level meeting under the chairmanship of ACS PWD, it was agreed by the Transport Commissioner that transport department will get ITS implemented and the work has now been entrusted to Rajasthan Electronics & Instruments Limited (REIL).

Hence, PWD has acted fast and made funding & implementation arrangements available so that all the balance sub-activities of this component are completed at the earliest.

Looking to the above status of the project as on 30 June 2019 and disbursement obtained more than 80% of the total credit amount, it can be concluded that Borrower has made substantial progress within 6 months from the date of closure of the project. Therefore, Borrower does not agree with the "Moderately Unsatisfactory" rating assessed by the Bank and instead is of the opinion that the rating of the project should at least be "Moderately Satisfactory", if not Satisfactory.

16.9.19
(Vikas Dixit)
Addl. Chief Engineer (WB)
PWD, Rajasthan

ANNEX 6. REVISED THEORY OF CHANGE



ANNEX 7. BORROWER ICR REPORT

94. The Borrower's ICR can be found at the link below:

https://worldbankgroup-my.sharepoint.com/:f:/g/personal/okeou_worldbank_org/EqcTLoy24B5GuYFM05OOPEIB8H6Fss19UzPQENqKo3qayA?e=wRhkPH

ANNEX 8. COMPARATIVE ASSESSMENT OF STATES' INITIATIVES

Comparative Assessment of State's Initiatives: Case of Karnataka, Andhra Pradesh & Telangana and Rajasthan

Background and Objective:

1. The World Bank ("the Bank") has been extensively involved in the Indian transport sector over the past 70 years. By the end of 2018, it had closed 62 projects (loans and credits) totalling $11.1 billion to the sector, or about 15 percent of the Bank portfolios of loans and credits closed this far in the country. Roads and highways accounted for 63% (active and closed projects combined) of the total investments in the transport sector. The Bank has successfully implemented and closed 29 road projects including National Highways, State Highways and rural roads in India worth US$ 8.77 billion and has an active portfolio of 11 projects (one NH, 7 SHs and 3 rural roads) worth US$3.2 billion across nine states of India including two centrally funded projects of national highways and rural roads where civil works are also being implemented in additional nine states. In addition, four projects worth US$989 million in the state of Meghalaya, Himachal Pradesh, Tamil Nadu and including one National Highways project are under preparation and scheduled to be delivered in the current fiscal year i.e. FY20.

2. In view of the above, it is worthwhile to take stock of the performance of the portfolio and assess the impact of Bank support in the sector. As part of that effort this note presents a comparative review of three state roads projects that have closed at about the same time: Second Karnataka State Highway Improvement Project (KSHIP II), Andhra Pradesh & Telangana Road Sector Project (APTRSP) and Rajasthan Road Sector Modernization (RRSMP). This note focuses particularly on elements of project design and impact related to institutional development in the three projects.

Strategic Framework:

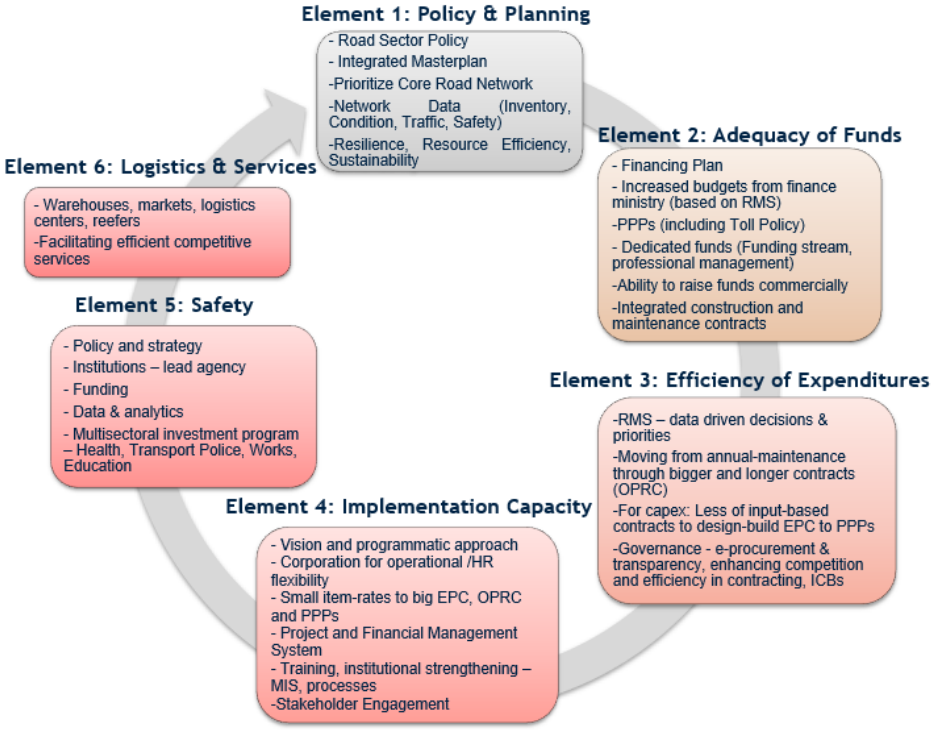
3. ***Project Designs consistent with the Strategic Framework***. Three key reports frame the Bank's intervention in the state roads sector in India. The 1995 India*: Transport Sector- Long Term Issues*[4] report examined the ways to respond to the national economic reforms initiatives and proposed policy and institutional reforms to improve regulation of private transport operations, as well as the provision and maintenance of physical infrastructure. This was updated in year 2001-02[5] with the objective to provide policy dialogue between the Bank and the Government of India and laid the Bank's sector assistance strategy for Transport. This was followed by a review[6] of highway agencies in the South Asia Region to help governments and policy makers identify reforms required to modernize and strengthen the capacity and performance of their road agencies to deliver large investment programs through performance monitoring as a tool. These studies have laid the foundation for the sector assistance strategy for road sector modernisation and highlighted the essential elements of the strategic framework which are shown in the figure 1 below with the objective to transform road agencies from the role of "provider" to

[4] India: Transport Sector – Long Term Issues, The World Bank Group
[5] India: Transport Sector – The Challenges Ahead, 2002, Report No. 24457, The World Bank Group
[6] A Review of the Highway Agencies in South Asia Region, 2002, Transport Research Support, DFID and the World Bank

"manager" of road infrastructure. The project designs of the three projects was consistent with this approach and strategic framework.

4. This framework is broadly consistent with the engagement framework recommended by the IEG Report on "*A Decade of Action in Transport*"[7] of supporting private sector development and improving governance and institutional capacity. Though the approach of improving institutional capacity in procurement, financial management and asset management etc. are all in line with that strategy, there is one key difference – in terms of the focus on corporatisation and creating bankable institutions. Although Bank support has seen some success in encouraging the establishment of commercially run road agencies and the creation of road funds to bring greater stability into financing recurrent road expenditures, especially in Africa. The judgment was that in Indian states, an initial focus on strengthening existing institutions was more politically feasible with only incremental steps towards corporatisation and bankable institutions till date. The private sector development in the South Asia region has been encouraged mainly through road construction and maintenance management.

Figure 1: Strategic Framework



Project Design:

5. ***All three projects were designed as investment project finance (IPF) operations with institutional strengthening components complementing primarily infrastructure projects.*** The civil works focused on the investment and maintenance requirements of the state's core road network. The investment support

[7] Independent Evaluation Group: A Decade of Action in Transport - An Evaluation of World Bank Assistance to the Transport Sector: 1995-2005, IEG (2007), The World Bank.

was combined with strengthening institutional capacity of the road departments at the state level through introduction of sound strategic and regulatory framework, organisational reforms, modernisation of business and engineering practices and human resource development through training of staff, contractors and consultants. The engagement also provided support to reduce maintenance backlog by funding periodic maintenance in the state of Andhra Pradesh and Karnataka with introduction of modern maintenance equipment replacing manual operations and piloting alternative contracting methods based on performance. Further, the investment components were also designed to aid institutional strengthening: the Karnataka and Andhra Pradesh projects included important pilots/demonstrations for private sector participation for infrastructure development and innovations in contractual arrangements to increase operational efficiency and the implementation capacity of state institutions.

6. ***Focusing on Institutional Strengthening through Road Sector Modernisation***. In case of Rajasthan, though the civil works were mainly on rural roads, however, the road sector modernisation agenda including road safety was designed to focus on transformation of the entire Public Works Department into a modern road agency by adopting best practices and strengthen institutional effectiveness. The key elements of this road sector modernization approach were like the Institutional Development Action Plan prepared in KSHIP II and APTRSP.

Project Interventions:

7. The civil works in all three projects focused on improving the quality of core road network through upgradation, widening and maintenance of priority roads in Andhra Pradesh, Telangana as well as in Karnataka whereas in Rajasthan, the works were focusing on providing all-weather road connectivity to the rural population of the state. In Andhra Pradesh & Telangana, the focus was to improve riding quality and capacity of the network by reducing the maintenance backlog through adoption of long-term output and performance-based maintenance contracts on a significant part of the core road network and pilot transactions to increase states capacity to engage private sector to finance, develop and manage two road concessions on public-private partnership (PPP) basis. In Karnataka, project activities mainly focused towards highway financing modernization and strengthen the capacity of the government to attract private sector financing through adoption of PPP– Design, Build, Finance, Operate, Maintain and Transfer (DBFOMT) contracts and commercial financing through domestic financial institutions. In addition, the project interventions were focusing on enhancing the institutional effectiveness in all states through structured institutional strengthening and development action plans in Andhra Pradesh, Telangana and Karnataka and road sector modernisation plan in Rajasthan. The road safety demonstration corridor approach was adopted in all four states. A snapshot of project interventions in provided in the table one below and a detailed comparison of the design and interventions is at Appendix-1.

Table 1: Summary of Project Interventions

	AP	Telangana	Karnataka	Rajasthan
Civil Works – Upgradation/ Widening/ Maintenance/ connectivity	●	●	●	●
Highway Financing Modernisation	●	●	●	○
Institutional Strengthening & Road Sector Modernization	●	●	●	●
Road Safety Management – Demo Corridor	●	●	●	●
Road Safety Management – Policy & Institutional Actions	●	●	●	◖

Note: ● - *substantially done;* ◖ - *partly done;* ○ - *yet to be done*

Results Achieved:

8. ***Element 1. Policy & Planning. Defined policy & planning framework for effective road sector management***: The first key element of the sector modernization agenda is for the road agencies to clearly define a road sector policy with the comprehensive vision/mission statement, backed by a legal and regulatory framework, covering development, asset management and safety. The international experience suggests that creating a policy framework ensures adequate flow of resources to the sector. Additionally, in order to effectively prioritize expenditures (both capital and maintenance) and channel them for most impact – it is important for road agencies to put in place a masterplan/core road network. A systematic effort was made in Karnataka, Andhra Pradesh and Telangana with reasonable success to adopt a road sector policy framework; develop network level master plans and finalize a core road network to replace the ad hoc systems of planning, budgeting and investment. However, in Rajasthan, the experience was less successful. While a comprehensive road sector policy was developed it has not been formally adopted by state government. Though the state government has identified the core road network and finalise the strategic road network which led to development of State Highway Development Program, currently being supported by the Bank through ongoing engagement.

Table 2: Policy & Planning Framework

	AP	Telangana	Karnataka	Rajasthan
Road Sector Policy	●	●	●	◖
Network Level Master Plans & Finalised Core Road Network	●	●	●	○

Note: ● - *substantially done;* ◖ - *partly done;* ○ - *yet to be done*

9. ***Element 2. Adequacy of Funds. Framework to ensure adequacy of funds and stabilise road financing***: The second key element of sector modernization is to ensure an adequate and stable financing base for managing the asset base and finance new expansion. Adoption of a comprehensive and structured framework would ensure adequacy of funds for cost-effective, efficient and sustainable asset management including capital works as well as maintenance. The fundamental need here is to identify an adequate funding base via a combination of road user charges and stable transfers from the general revenue base. A sound funding base facilitates the development of a range of financing options including: private financing for projects, domestic borrowing and multilateral financing, ring-fencing and securitization of revenue proceeds. The state of Karnataka has shown high level of ownership in successfully implementing reforms to improve highway financing by endorsing a new road sector policy with appropriate financing strategy[8]. The state of Andhra Pradesh and Karnataka have strengthened the budgetary discipline through multi-year planning based on asset management data, however, the current financial system and governing mechanism does not allow for multi-year budgeting. The draft road fund bills in Andhra Pradesh and Telangana and road sector policy including the financing plan in Rajasthan are still under the consideration of the Government. However, the fundamental issues such as prioritizing maintenance over capital works, appropriate balance between capital and recurrent expenditure;

[8] Financing Strategy included adoption of user-pay principle approach, amending Highway Act to allow tolling on state highway, increasing PPP transactions in the road sector, ring-fencing and securitization of toll proceeds for annuity payments and framework for domestic borrowings.

adequate and appropriate cost sharing between central and state governments; and multi-year budgeting remain unaddressed due to political economy and constraints of existing systems.

Table 3: Financing Framework

	AP	Telangana	Karnataka	Rajasthan
Financing Strategy	◖	◖	●	◖
Road Fund	◖	◖	●	◖
Multi-Year Budget Planning	●	◖	●	◖

Note: ● - *substantially done;* ◖ - *partly done;* ○ - *yet to be done*

10. ***Element 3. Efficiency of expenditures. Strengthening network management approaches.*** A comprehensive and integrated road asset management system (RAMS)[9] ensures systematic management of the network in a sustainable and cost-effective way using scientific life-cycle based approach. This approach affects the full range of activities including planning, engineering, finance, programming, and actual works. It supports preparation of both annual and multi-year investment plans for maintaining the road network considering the condition, function, available funding, resources and prioritization. The state of Andhra Pradesh and Karnataka have achieved considerable success in institutionalising this system and are currently using Multi-year rolling plans including annual investment and maintenance plans prepared through the RAMS. The use of RAMS has increased credibility of budget requests from the PWD and resulted in significantly higher outlays for maintenance. The budget planning & allocation decisions are based on the outputs of the RAMS replacing the old ad hoc systems. Many other states have also attempted for similar network level system for asset management such as Tamil Nadu, Assam, Orissa, however, the key achievement in Andhra Pradesh and Karnataka that they have adopted a strategic and holistic approach through the backward and forward integration of the system for planning, investment, maintenance, financial allocation and monitoring and supervision. These states have established Asset Management cell with dedicated staff for operations and close monitoring of these systems. The state of Andhra Pradesh has also pioneered in developing an IT-Command and Control Centre which is a comprehensive console (web and GIS map platform) utilising RAMS and MIS for decision support. On the other hand, Rajasthan has not been able to complete the development of the system and it is still at the nascent stage due to lack of support and ownership of the relevant stakeholder department including the finance department. Though after bifurcation, it has been non-starter in case of state of Telangana also.

Table 4: Asset Management System

	AP	Telangana	Karnataka	Rajasthan
Road Asset Management System	●	○	●	○

Note: ● - *substantially done;* ◖ - *partly done;* ○ - *yet to be done*

11. ***Element 4. Implementation Capacity. Enhancing the implementation Capacity through innovative contracting approaches, use of digital tools for program management and institutional strengthening:***

[9] A comprehensive and integrated road assets management system includes – Pavement Management, Bridge Management, Traffic Data Management, Transport Modelling Tool, Traffic Incident Management, Monitoring & Evaluation, Environment and Social Information System, Road Safety Management, Cross Asset Prioritization System.

a. *Adoption of innovative contracting approaches*: The implementation of innovative contracting models to boost private sector investment in construction and maintenance of road assets resulted in improving efficiency, economies of scale and implementation capacity by shifting focus from traditional input and process-based to output and performance-based approach. It involved adoption of toll based Public private partnership contracts, long-term performance-based maintenance (LTPBM) contracts in Andhra Pradesh and Telangana; and annuity-based Design, built, finance, operate and Transfer (DBFOMT) model and co-financing framework from domestic financial institutions in Karnataka. This approach of long-term concessions resulted in substantial reduction and/or elimination of time and cost over runs due to inbuilt incentive mechanism of concession stake in capital expenditure.[10] This output and performance-based approach resulted in securing good operation and maintenance of assets financially and legally and payment is linked to service standards. The framework is now being replicated by the government for infrastructure development including expressways, corridor development, highways, water supply and renewable energy at national as well as sub-national level.

Table 5: Implementation Capacity

	AP	Telangana	Karnataka	Rajasthan
PPP-Toll Based BOT/ DBFOMT	●	●	●	○
Long Term Output & Performance Based Maintenance Contracts	●	●	●	○

Note: ● - *substantially done;* ◖ - *partly done;* ○ - *yet to be done*

b. *Enhanced implementation Capacity through use of digital tools for program management:* These projects have been successful in adopting digital project management systems which are currently being mainstreamed for monitoring and supervision of all construction and maintenance works based on work life cycle approach (irrespective of funding sources) at the Department level. These systems have been further integrated with the GIS based IT command and control centre in the state of Andhra Pradesh. One of the notable initiatives undertaken in Rajasthan was the adoption of innovative Performance Assessment Tool (PAT) with relevant training for staff was beneficial in getting management's attention towards better quality of works and creating performance competition among divisions and PIUs. The PAT also helped in ensuring better management of environmental and social safeguards, and health and safety of workers on site.

c. *Improved sector governance through institutional strengthening:* A strategic and holistic approach of institutional strengthening was adopted under these projects based on five broad common themes: Strategic & Regulatory Framework; Organisational Reforms, Business & Management Processes; Asset Sustainability; Performance & Accountability; and Human Resource Development. Structured and streamlined institutional development and strengthening Action Plans (IDSAP) based on institutional development assessments and strategies were drawn in the state of Karnataka and Andhra Pradesh. These actions plans for institutional strengthening focused

[10] See *https://blogs.worldbank.org/transport/our-infrastructure-projects-can-help-build-many-things-including-stronger-institutions*

on organisational functional realignments from a provider to manager role; restructuring of field offices; support for operationalisation of Road Development Corporations, core business process including planning, programming works, effective procurement and contract management, strengthening program monitoring through online project management systems, revision of department codes and systemize quality control; financial mechanism by modernising planning and budgeting function through use of financial management systems; establishing road information systems and strengthening of state's environment and social management capabilities. The state of Andhra Pradesh and Karnataka have shown a high level of ownership in implementation of these actions plans and the dedicated staff have champions to lead the initiatives towards successful implementation and mainstreaming such as ISO certifications for quality management and environmental management, E-learning management system and project management system are being scaled up at the departmental level. However, the institutional mechanism of the road sector modernisation working group has been unsuccessful in delivering the reform agenda in case of Rajasthan. A comparison of the detailed outputs achieved under these action plans in the three projects is at Appendix-2.

Table 6: Institutional Strengthening

	AP	Telangana	Karnataka	Rajasthan
Strategic & Regulatory Framework	●	●	●	◖
Business Process Reengineering	●	◖	●	◖
Asset Sustainability	●	○	●	○
Performance & Accountability	●	◖	●	◖
Human Resource Development	●	●	●	●

Note: ● - *substantially done;* ◖ - *partly done;* ○ - *yet to be done*

12. ***Element 5. Safety. Result focused approach to road safety management***. An incremental approach to road safety management was adopted in all the three projects to reduce the road accidents and fatalities in a sustainable manner through policy and institutional reforms and multi-sectoral demonstration corridor pilots. The interventions were centred around developing the policy framework, road safety strategy and actions plans, incorporation of road safety engineering measures in design, construction and maintenance of investment programs, and pilot safety demonstration corridors with multi-stakeholder interventions based on globally accepted safe system approach. This comprehensive and holistic approach of road safety demonstration corridors was highly successful in the state of Karnataka which validates that physical/ engineering improvements are not enough to bring reduction in road fatalities in the face of rising traffic volume, however, engineering measures necessarily be accompanied by robust programs for enforcement, education and awareness and post-crash management. It requires coordinated effort from different stakeholder departments with proper institutional structure and synergies can be achieved if designed and integrated well with other programs being implemented by the respective departments.[11] This approach resulted in reasonable success in in

[11] See *https://blogs.worldbank.org/transport/human-lives-need-not-be-lost-road-crashes-much-less-current-levels-0*

Andhra Pradesh[12] and Telangana where creation of the road safety cell within the Transport Department in Andhra Pradesh has proven effective for planning and tracking impacts of road safety initiatives and managing data for road safety indicators. On the other hand, it was unsuccessful in the state of Rajasthan where the road safety interventions on the selected corridor could not be undertaken during the project period due to lack of ownership and proper institutional arrangement for implementation. Table 7 summarises the project interventions in the Bank funded road projects.

Table 7: Road Safety Interventions

Themes	Andhra Pradesh	Telangana	Karnataka	Rajasthan
Safe Corridor Demonstration Program - Multi-sectoral interventions based on iRAP surveys	●	●	●	○
Institutional Structure	●	●	●	○
Policy & Strategy	●	●	●	●
Capacity Building	●	●	●	●
Black Spot improvement program	●	●	●	◖

Note: ● - *substantially done;* ◖ - *partly done;* ○ - *yet to be done*

13. ***Success Factors:*** The analysis of the three ICRs suggest the four key factors contributed to the achievement/ success in these states including: Ownership, Strategic & Holistic Approach and Constant learning and Innovation approach. The state government of Karnataka and Andhra Pradesh have shown greater level of ownership leading to successful implementation of the reform agenda in both states. The projects have used a strategic and comprehensive approach to road sector management which is also consistent with the strategic framework in these states including planning, financing, efficiency, implementation capacity and safety. The assessment also showed that the support to system planning, institutional strengthening, private sector participation and road safety was highly successful in Karnataka and achieved reasonable success in case of Andhra Pradesh with constant learning and innovative approach adopted in these states. The performance was average in case of Telangana and Rajasthan where road sector modernisation could not be achieved as planned and designed reflecting lower level of ownership.

Table 8: Analysis of Key Success Factors

	Andhra Pradesh			Telangana			Karnataka			Rajasthan		
	Ownership	Strategic & Holistic Approach	Constant Learning & Innovation	Ownership	Strategic & Holistic Approach	Constant Learning & Innovation	Ownership	Strategic & Holistic Approach	Constant Learning & Innovation	Ownership	Strategic & Holistic Approach	Constant Learning & Innovation
Policy & Planning Framework	●	●	●	◖	●	◖	●	●	●	◖	◖	○
Financing Framework	●	●	●	◖	●	◖	●	●	●	◖	◖	○
Asset Management	●	●	●	○	●	◖	●	●	●	○	◖	◖
Institutional Capacity	●	●	●	◖	●	◖	●	●	●	○	○	○
Road Safety Management	●	●	●	◖	●	◖	●	●	●	◖	◖	◖

Note: ● - *substantially done;* ◖ - *partly done;* ○ - *yet to be done*

[12] See *https://blogs.worldbank.org/transport/road-safety-action-pays-and-demonstration-corridors-are-here-prove-it*

Key Takeaways and Recommendations:

14. ***State Highway engagement remain relevant today***: The state highways and major district roads (MDRs) constitute the secondary system of road transportation in the country carrying about 40 percent of the total road traffic. Neglect of this strategic secondary network, serving as the bridge between the National Highways and rural roads, could result in the 'missing middle' in the increasingly integrated overall road network and could seriously impact the overall road transport cost and logistic efficiency of the country. Traditionally, the development of national highways and rural road network has been boosted by centrally sponsored schemes like National Highway Development Program (now rebranded as Bharatmala) and Pradhan Mantri Gram Sadak Yojana. The vital feeder/ collector network of state highways and MDRs, however, have been neglected due to chronic underfunding, in absence of any comprehensive National program and/or individual state-run programs. The inadequate and unstable funding has also made systematic planning and improvement of the state highways difficult in most of the states, resulting in deteriorating condition and lower level of services, even compared to rural roads at times. Except financing from MDBs such as World Bank and ADBs, the states have not been able to attract or mobilize enough private/ commercial financing for state highways and MDRs in comparison to national highways or even rural roads. Therefore, as recommended by the Working Group of Twelfth Five Year Plan of the Planning Commission, resource mobilization for the sector needs to be enhanced, adequately supplemented with adequate external financing sources from MDBs and suitably leveraged with private sector financing.

15. ***State Highway Sector Agenda is evolving.*** Keeping in line with the evolving agenda in highway sector in India encompassing improved transport and logistic efficiency, safety and services, as enshrined in the flagship Bharatmala program, the state highway agenda need to also evolve towards improved logistic efficiency, safety and services, resource efficiency and climate resilience. The state highway institutions also need to consolidate the gains from reform initiatives undertaken during the last decade to emerge as independent, bankable institutions running on commercial principles to attract private sector financing and manage assets and services more efficiently.

16. ***The Bank's contribution to this institutional and sector evolution has been significant and effective – though not universally successful.*** IEG's seminal report for the transport sector, 'A Decade of Action in Transport' 2007, highlights the importance of creating public sector capacity for attracting private sector financing. The report has also highlighted in several emerging middle-income countries how the Bank has played a significant role in strengthening the institutional capacity of the public sector in procurement, financial management, asset management and project management as well as improving the investment climate which has played a critical role in attracting private investments and bringing private sector efficiency in asset management and services. India has not been an exception. The aforementioned analysis clearly indicates that Bank engagement has resulted in significant success in Karnataka and Andhra Pradesh and has contributed to encouraging private sector development in financing, construction and maintenance, sustainable management of the sector through adoption of network level master plans, core road network and asset management system, scientific planning, financing framework, innovative contracting approaches, improving institutional strengthening and

providing safer network. Relatively modest success was seen in Rajasthan and Telangana though, reflecting low level of ownership and willingness to change. The Bank experience in the sector suggest that pace of institutional reform has been incremental and slow with significant variance across states based on their capacity, public sector governance structure and reform commitment. Notwithstanding significant sector reform in quite a few states, major institutional reform and transition of the public sector road agencies towards commercial autonomous roads authorities remains a work in progress and yet to commence in some states.

17. ***The Bank's engagement strategy in the state road sector is evolving:*** To support the much-needed transformation in the state highway agenda, Bank's approach towards engaging with the state road sector is also rapidly evolving with the ongoing new generation of state road projects such as Rajasthan State Highway projects targeting towards operationalising a corporatized autonomous highway authority with a mandate to mobilize commercial financing by leveraging public resources at its disposal. In the current pipeline projects, the direction now is moving towards stronger focus, though in an incremental manner, on corporatized institutions, logistics and transport services, and developing an integrated multimodal transport framework. A more cohesive and results-focused road safety management approach has been adopted in Uttar Pradesh State Road Project.

18. ***Delivery instruments are also evolving:*** From conventional investment project financing (IPF), most projects are increasingly adopting result-based financing approach through Disbursement linked Indicators with IPF such as Rajasthan State Highways Project. Some pipeline projects are also exploring the possibility of Development Policy loan combined with IPF to support reform on logistics, transports services and corporatized institutions.

19. ***Time to redefine engagement strategy through national platforms***: Moving forward, to respond to the menacing impacts of transport expansion, the strategic approach towards engaging in the state highway sector needs to be redefined by considering this evaluation and the ongoing assessment of the Bank's contribution to this sector in India. The focus of the Bank's transport operations needs to move beyond intercity highways and give more attention to issues of growing urgency including congestion, logistics efficiency, bankable institutions, transport services, safety, affordability and sustainability. The future strategy also needs to explore possibilities of developing National Platform for creating benchmarking among states for strategic investment and distinguished support for advanced states versus lagging states. A Road Transport Community of Practise need to be developed under the lighthouse India approach for enhancing knowledge and experience sharing among states with stronger role of institutions such as NITI Aayog, Indian Roads Congress and Central Road Research Institute.

Appendix-1
Key Interventions under the Projects

Core Areas	APTRSP	KSHIP II	RRSMP
Civil Works	upgrade and maintain the Core Road Network (CRN): • 429 km upgraded efficiently in an environmental and socially sustainable way. • 6,241 km of roads under Long-term performance-based maintenance contract	Improvement & maintenance works of selected priority core road network • 269 km upgraded through traditional item-rate contracts • 562 km to be upgraded & O&M through PPP- DBFOMT concession	Increasing share of rural population with access to an all-season road • Construction of 2500 km of rural roads
Highway Financing Modernisation/ PPP facilitation	Technical assistance to strengthen the capacity of the GOAP to attract private sector participation: • RDC manages concession of three roads of those selected for PPP transactions	• KRDCL to generate additional road user revenue and commit them for mobilising debt financing and/or making payments for PPP transactions • Upgrading and O&M of 400 km through co-financing arrangements	---
Road Safety	• Multi-sectoral Demonstration projects carried out in at least two road corridors • Comprehensive GOAP road safety functions, capacity and action plan(s) put in place • Black-spot improvements initiated	• Multi-sectoral Demonstration projects on two road corridors • Lead Agency established • Policy and Institutional Actions	• Multi-sectoral Demonstration projects on two road corridors • Star rating for Model Corridor • Road Safety Policy and Action Plan • Road Safety Awareness Campaign
Institutional Development and Road Sector Modernisation	Institutional Strengthening Action Plan • Strategic & Regulatory Framework • Organisation, Management & Systems • Human Resources Development	Institutional Development and Strengthening Action Plan • Business Process Effectiveness • Performance and Accountability • Asset Sustainability • Human Resources	Implementation of a Road Sector Modernisation Plan: • Sector Policy & financing framework • Engineering practices and key procedures modernized • Road Asset Management System & innovative forms of contracting • Training Plan and HR policy & Procedures developed

Appendix-2

Comparison of Institutional Development/Strengthening/ Road Sector Modernization Plan

Themes	APTRSP	KSHIP II	RRSMP
Strategic & Regulatory Framework (Policy & financing)	• AP Road Act • State Level Road Network Master Plan • Core Road Network • Road Fund • Encouraging PPP & performance-based CRN maintenance contracts • Road Safety Action Program • Black spot rectification program	• Road Sector Policy • Karnataka State Highway Act -tolling powers for both public and PPP roads • New Road Asset Maintenance Policy • Establishing Core Road Network • Financing Strategy & Institutional Measures for CRN • Road Fund • Increase private sector participation • Finalise and roll out of State Level Road Master Plan	• Road Sector Policy • Financing Framework for the Network – construction and maintenance • Encouraging private participation
Modernisation of Key Organisation, Business Process Effectiveness (Business and Engineering Practices, Processes)	• Revised Departmental Code • IT-ICT-MIS Strategy • Financial Powers & FM tools • MIS • Staffing powers defined • Dedicated HRM & HRD functions & capacity • PPP roles & capacity	• Revised Departmental Code & its cyclical review and updating including E&SM, Safety • IT-ICT-MIS Strategy • Financial Management & Information System • ISO Certification for Environmental Management • IT Based Project Management System	• Modern Project Preparation and management practices • Design & construction standards • Cost-effective new technologies for road construction • PWD-wide procurement and contract management manual • Computerisation of PWD offices
Performance and Accountability (including Governance)	• GAAP • Road User Satisfaction Surveys • ISO Certification Quality Management	• GAAP • Road User Satisfaction Surveys • Quality Management System -ISO Certification • Quality control-Laboratory/Equipment • E-procurement • E-billing &E-contract management	• E-procurement • Improved public disclosure & information sharing

Themes	APTRSP	KSHIP II	RRSMP
Asset Sustainability (Road Asset Management)	• Planning & Budgeting based on Road Asset Management System	• Road Asset Maintenance and Management System integrated with RIS & GIS • Planning & Road Asset Management Centre • Asset Maintenance Plan	• Asset Management System • Prioritised Annual Plans for construction & maintenance based on RAMS • Area-wide maintenance contract system
Human Resources Development (Training & Capacity Building)	• Training Needs Assessment • Multi-Year Staff Training Program • New Staff Appraisal Policy & Process Implementation • Specific PPP Training Program	• Training Needs Assessment • Multi-Year Staff Training Program • New Staff Appraisal Policy & Process Implementation • Separate Budget Head for Staff Training • High Impact Training Plan	• Training & Capacity Building