

Ex-Post Project Evaluation 2016: Package III-4 (India, Sri Lanka)

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JAPAN INTERNATIONAL COOPERATION AGENCY

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India

FY2016 Ex-Post Evaluation of Japanese ODA Loan Project
“Ajanta Ellora Conservation and Tourism Development Project II”

External Evaluator: Junko Fujiwara, OPMAC Corporation

0. Summary

The project was intended to promote the tourist industry by monument conservation, holistic tourist development and infrastructure development, thereby contributing to the enhancement of regional development.

The relevance of the project is high as project implementation was consistent with the development policy and development needs of India both at the time of appraisal and ex-post evaluation, as well as with the ODA policy of Japan at the time of appraisal. There were major modifications to the outputs of the project, including the abandonment of some components and a reduction of the target area. The actual cost of the project was within the planned cost. The project period, however, went well beyond the plan as consensus building among stakeholders and various approval processes became complicated, requiring more time for progress management and coordination. The efficiency, therefore, is fair.

The preservation and conservation works at the target archaeological monuments were carried out with the advice of the Panel of Experts both within and outside the country. Skills in preservation and conservation were thus improved. The value of the archaeological monuments centered around the Ajanta and Ellora Caves as tourist destinations was confirmed and improved, and the number of tourist visitors at major caves in the project area exceeded the target. The average duration of stay did not reach the target, but this was mainly due to the infrastructure development under the project, which led to an improvement in tourist accessibility and efficiency in travel time. In other words, this does not represent a reduction of tourists or a decline in the tourism industry. Data on tourism revenue was not obtainable. The number of visitors at the Visitor Centers built near the Ajanta Caves and Ellora Caves was rather less than the target. The actual visitors to the centers, on the other hand, rated them highly, and it can be concluded that the value of their existence is high. The area, however, does not function well enough as a comprehensive tourism development facility as was originally expected, and there is room for improvement in terms of the quality of service for visitors and the use of tourism resources. It was confirmed that the combination of archaeological monument protection, comprehensive tourism development and infrastructure development under the project contributed to vitalization of the local economy including enhancement of business opportunities, an increase in employment opportunities, an improvement in convenience for tourists, expansion of tourism related industries, an increase in business travelers, promotion of industrial parks, etc. There was no negative impact on the natural environment by the project, nor were there land acquisition and resettlement. In sum, the

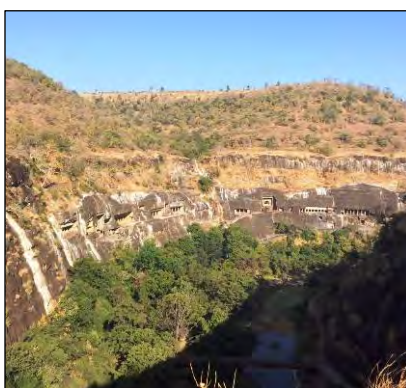
implementation of the project generated positive effects to some extent. The effectiveness and impact of the project are fair.

As to sustainability, there are no issues concerning the operation and maintenance management of the project in terms of the institutional, technical, financial aspects and current status, and the sustainability of the effects of the project is high. In light of the above, the project is evaluated to be satisfactory.

1. Project Description



Project Location



Ajanta Caves



Ellora Caves

1.1 Background

The Ajanta Caves and Ellora Caves, the center of the project target area, are archaeological monuments located in the northern part of Maharashtra State in Western India. The Ajanta Caves have Buddhist murals, sculptures and architecture that date from the 1st century B.C. to the 6th century A.D., while the Ellora Caves have Buddhist, Hindu, Jain sculptures and architecture built between the 5th and 10th centuries A.D. Both caves were inscribed on the UNESCO World Heritage List - a first for India in 1983 - together with the Taj Mahal and Agra Fort¹, and since then, the balanced development between their conservation and promotion as a tourist attraction has been an important issue going beyond state and national boundaries. Japan approved a loan assistance to the “Ajanta Ellora Conservation and Tourism Development Project” (“the first phase of the project” hereafter) in the fiscal year (FY) 1991, and assisted in the conservation of both heritage sites and the surrounding area, in the development of indoor and outdoor facilities for visitor management, in improvement of the adjacent natural environment, in the development of infrastructure, and in comprehensive tourism promotion activities. In Maharashtra State, however, there were many sites besides the Ajanta and Ellora Caves that were left unrepaired as a result of financial constraints. The access roads to these sites were underdeveloped. The capacity of the existing airport and water treatment facility was

¹ There were 35 world heritage sites in India as of May 2017 consisting of 27 cultural, 7 natural, and 1 mixed heritage sites.

limited. There was also a shortage in the workforce that would carry out tourism marketing and promotion activities. To address these issues, the project was approved as the 2nd phase of the above mentioned project.

1.2 Project Outline

The project was intended to promote the tourist industry by the protection and conservation of the Ajanta Caves, Ellora Caves and other archaeological caves and temples in the surrounding area, the improvement of the adjoining natural environment, the development of infrastructure, the management of visitors and comprehensive tourism development such as the construction and operation of the Visitor Centers with accompanying human resource development, thereby contributing to enhancement of regional development.

Loan Approved Amount / Disbursed Amount	7,331 million yen / 6,490 million yen	
Exchange of Notes Date / Loan Agreement Signing Date	March 2003 / March 2003	
Terms and Conditions	Interest Rate:	1.8% (except afforestation and micro credit) 0.75% (afforestation and microcredit)
	Repayment Period:	30 years (within which 10 years for grace period) (except afforestation and microcredit) 40 years (within which 10 years for grace period) (afforestation and microcredit)
	Conditions for Procurement:	General untied
Borrower / Executing Agency	The President of India / Ministry of Tourism	
Project Completion	April 2014	
Main Contractor (Over 1 billion yen)	Larsen & Toubro Ltd. (India), M/S. B. G. Shirke Construction Technology Pvt. Ltd., Pune (India)	
Main Consultant (Over 100 million yen)	Tata Consultancy Services (India) / Oriental Consultants Company Limited (Japan) ²	
Related Studies	“Assistance to the Formulation of the Management Plan for Visitor Centres under the Ajanta Ellora Conservation and Tourism Development Project (II) in India” (2010)	
Related Projects	[ODA loan project] Ajanta–Ellora Conservation and Tourism Development Project (January 1992) [JICA Partnership Program] Project for Supporting OMOTENASHI for Tourism Development in the State of Maharashtra (March 2015 - March 2017)	

² Their official names as of 2017 are Tata Consultancy Services Limited and Oriental Consultants Global Company Limited.

2. Outline of the Evaluation Study

2.1 External Evaluator

Junko Fujiwara, OPMAC Corporation

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: September 2016 – October 2017

Duration of the Field Study: November 27, 2016– December 23, 2016, and April 17, 2017 – April 25, 2017

2.3 Constraints during the Evaluation Study

2.3.1 Limitation on the Implementation of the Evaluation

The executing agency of the project was the Ministry of Tourism (MOT), but the project components were implemented by seven different central and state government agencies including the Archaeological Survey of India (ASI) and the Maharashtra Tourism Development Cooperation (MTDC)³. For the ex-post evaluation, due to constraints on the survey implementation period and on budget and human resources, the three above mentioned agencies were mainly contacted for interviews with individuals concerned. The information collected from the remaining five agencies was through a questionnaire survey only. The information collected and the subsequent results of analysis of each implementing agency, therefore, vary in quantity and quality.

2.3.2 Limitation on the Measures of Operation and the Effect Indicators of the Infrastructure Components

The improvement of the airport, forestation, roads and water supply were marked as the development of related infrastructure to achieve the project objectives. In the project appraisal, however, no base figures, and operation and effect indicators, including target figures, were set for each part of the infrastructure. Collection of information on the operation and effect of the above-mentioned infrastructure was carried out through questionnaires. The analysis of the effectiveness of the infrastructure component, as a result, was limited to the confirmation of efficiency and sustainability, except for the airport where such information as the number of passengers and cargo volume was available, and for afforestation where survival rates of planted trees were available.

³ The remaining five implementing agencies were as follows: Airports Authority of India (AAI), Department of Archaeology and Museums of Maharashtra State (DAM), Forest Department of Maharashtra State (FDM), Public Works Department of Maharashtra State (PWD), and Maharashtra Jeevan Pradhikaran (“Water Supply and Sanitation Department of Maharashtra State” in English), Maharashtra State (MJP)

3. Results of the Evaluation (Overall Rating: B⁴)

3.1 Relevance (Rating: ③⁵)

3.1.1 Consistency with the Development Plan of India

(1) National Development Plans

“The 10th five-year plan” (2002-2007) that was under implementation at the time of the project appraisal (2003) placed tourism as a focus of national activity, and stipulated objectives to improve the competitiveness of India as a tourist destination, to improve and develop tourist attractions that meet the needs of the tourist market, to develop world-class tourist infrastructure, and to make a sustainable and effective marketing plan. “National Tourism Policy” (1982 First edition, 2002 Revised), listed the following as the base policies: 1) Development of laws pertaining to the security of tourists and the development of tourist infrastructure. 2) Building of deeper linkage between cultural heritage and tourism, and 3) Environmental development of adjacent areas of protected cultural heritage. It also laid out the following points in a specific action plan: a) Protection and conservation of the world heritage sites and holistic development of adjacent areas; b) Implementation of strategic promotion of tourism in India; c) Urgent development of highways to the world heritage sites; d) Attraction of commercial facilities to meet the needs of foreign tourists, and; e) Improvement of airport facilities and services.

In the “12th 5-year plan” (April 2012 -March 2017) that was in place at the time of the ex-post evaluation (2016), the tourism sector was expected to advance the plan’s aim to “achieve rapid, comprehensive, and sustainable growth,” and to promote multifaceted growth accompanied by various activities and services, industries, and infrastructure development, which, in turn, would lead to the inclusive growth. The “National Tourism Policy” remains relevant as there has been no revision in its policies or change in its direction.

(2) State Development Plans for Maharashtra

At the time of the project appraisal, Maharashtra State was already actively engaged in tourism development to advance the project activities designated for the “special tourist area” by the central government. As of 1996, the Ajanta and Ellora area was already designated as a special tourist area and was considered to be an important tourism development area publicly endorsed by both the central and state government. The development of related infrastructure was also a priority.

⁴ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁵ ③: High, ②: Fair, ①: Low

At the time of the ex-post evaluation, tourism was identified as a priority sector in the “Maharashtra State Tourism Policy” (2006 First Edition, 2016 Revised) and seven strategies⁶ had been set out therein.

In the strategies, Aurangabad District, where the Ajanta Caves and Ellora Caves are located, is one of the target districts in the State for the “development and improvement of special tourism districts/zones” and as a “Public Private Partnership Model for growth in the tourism sector.”

In conclusion, implementation of the project is consistent with the national development plan and the Maharashtra State’s tourism sector development plan both at the time of the project appraisal and the ex-post evaluation.

3.1.2 Consistency with the Development Needs of India

(1) Preservation and Conservation of Archaeological Monuments

Some activities were not started during the first phase of the project. These included structural restoration of cave walls, the development of a visitor management facility, repair and restoration of breakages or defects in the body of the cave wall, architectural materials and sculptural decorations, and guarding against pests, etc. At the time of the appraisal therefore, it was considered urgent that repair and protection should take place, and also that the caves should be preserved and the murals protected. It was also necessary to protect and preserve other sites (Pitalkhora Caves, Aurangabad Caves, Daulatabad Fort, Bibi-Ka-Maqbara, Patnadevi Temple, Daityasudana Temple, etc.) that were left unpreserved due to a lack of financial resources. These sites boast the highest values among all the sites in existence in India today, and their protection and conservation needs were verified at the time of the ex-post evaluation.

(2) Comprehensive Tourism Development

In addition to environmental conservation of the area adjacent to the Ajanta Caves and Ellora Caves, and the visitor management that was implemented in the first phase of the project, there was an urgent need at the time of the project appraisal to improve the visitor facilities. Necessary improvements included measures against the intense heat, the development of human resources relevant to tourism, and the enhancement of IT skills to strengthen promotional and marketing activities. It was also recognized that cultural heritage

⁶ The seven strategies were as follows: a) To achieve 10% annual sector growth and make the share of tourism and related activities 15% of the State GDP. b) To create 1 million new employment opportunities by 2025. c) To strengthen organizational efforts and governance. d) To promote the development of special tourism districts. e) To develop a corridor for tourism development. f) To build a public-private partnership for tourism sector growth. g) To advance marketing and tourism promotion.

sites around Mumbai including the Elephanta Island Caves merited protection measures under the project to prevent deterioration of these precious tourism attractions⁷.

As at the time of the ex-post evaluation, MTDC remained actively engaged in various promotional activities including TV promotion, newspaper advertisement, brochure development, and the organization of festivals. The need for the comprehensive tourism development in Maharashtra State remains high, nonetheless, as improvements in quality are constantly expected for effective and efficient use of existing tourist attractions, and for the development of strategic and flexible marketing activities based on the analysis of tourist trends.

(3) Infrastructure Development

The main road which connects the city of Aurangabad, the airport, the Ajanta Caves, the Ellora Caves, and Daulatabad Fort was improved through the first phase of the project. There were, however, still many roads in need of development for better access to tourist sites and the improvement of convenient mobility at the time of appraisal. These included the access road connecting the Ajanta Caves with an important railroad and the access road to the Pitalkhora Caves. On the other hand, the terminal building and the apron of Aurangabad Airport were too small to serve frequent flights. International flights were not available due to the lack of customs, immigration and quarantine facilities.

At the time of ex-post evaluation, there was still room for improvement in terms of transportation access to some heritage tourist sites. It was also expected that Aurangabad Airport would further increase the number of flights and to improve connections⁸. Thus, the need to develop infrastructure in this district remains high.

Based on the above, consistency between the project and the development needs was verified at the time of project appraisal as well as at the ex-post evaluation.

3.1.3 Consistency with Japan's ODA Policy

The focal sectors in the ODA policy toward India, at the time of appraisal, were: poverty alleviation, afforestation, water quality improvement, etc. The Medium-Term Strategy for

⁷ While heritage sites, including caves, are considered as "tourist attractions" and infrastructure, including airports, roads and water sewage systems as "foundation for tourism," the project used the expression, "comprehensive tourism development" to include the efforts to develop facilities to develop publicity for the effective use of tourist attractions, and to support local employment enhancement and local development. In addition to the repair and protection of heritage sites that are managed by the central government such as the Ajanta and Ellora Caves, other monuments in Maharashtra State were also considered as the project target as part of the comprehensive tourism development to use tourist attractions effectively.

⁸ Based on interviews conducted with the stakeholders in the beneficiary survey (described later).

Overseas Economic Cooperation Operation⁹ listed “support for rural development,” “assistance to environmental improvement and pollution prevention,” and “infrastructure development for economic growth” as key areas. The Country Assistance Strategy for India in FY2002 stipulated “environmental conservation” as a key area, and further specified “assisting the preservation of the social environment by protecting archaeological monuments such as caves which are registered as World Heritage Sites and by developing tourism infrastructure,” as well as “assisting indirectly the enhancement of employment opportunities among the local poor by developing environmental infrastructure.”

In summary, the project has been highly relevant to India’s development plan and development needs, as well as to Japan’s ODA policy. Therefore its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The project consisted of three main components: protection of archaeological monuments, comprehensive tourism development and infrastructure development. In comparison with the original plan, however, there were major changes in terms of the project outputs. The differences between the original plan and the actual outputs are shown in Table 1 (Details are in “Comparison of the Original and Actual Scope of the Project” at the end of this report). The major outputs of the project components are shown in the map (Figure 1).

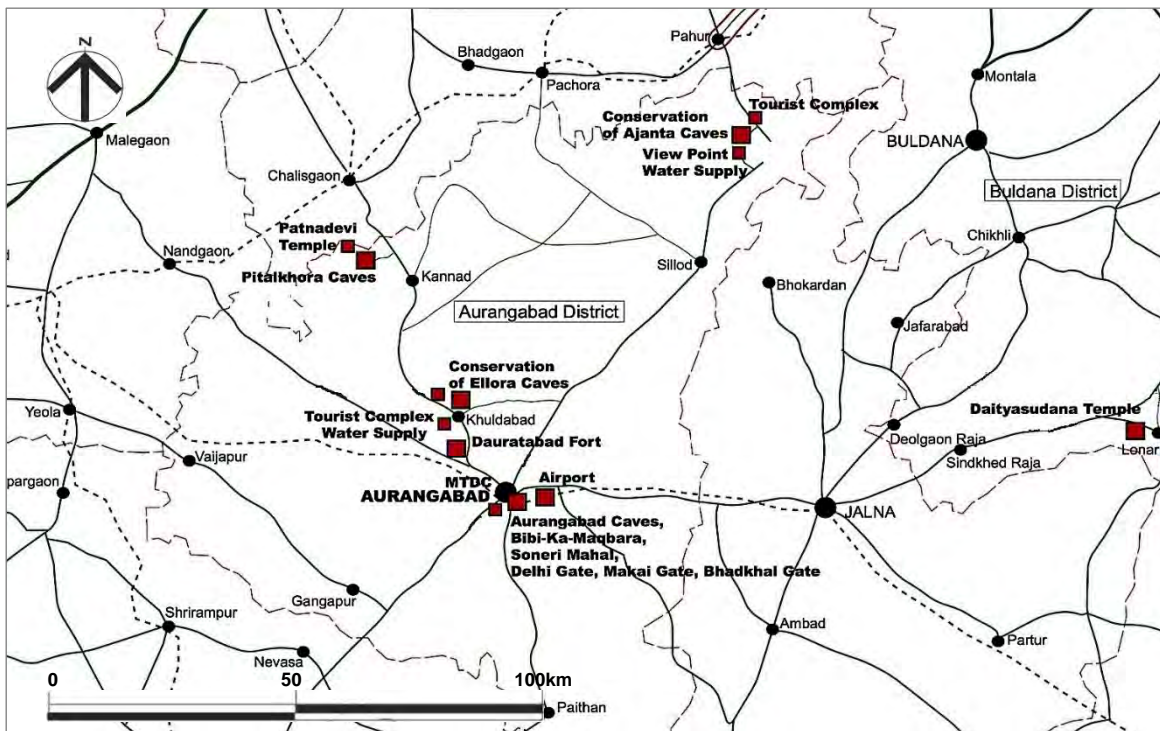
Table 1: The major differences between the original plan and the actual outputs

Components	Original Plan	Actual
1. Monument Conservation	Preservation of caves and temples (Ajanta Caves, Ellora Caves, Pitalkhora Caves, Aurangabad Caves, Bibi-Ka-Maqbara, Daulatabad Fort, and Patnadevi Temple), formulation of a Site Management Plan for each site, elaboration of an annual implementation plan, organization of the Panel of Experts’ meetings, development of the site record archive and documentation system, development of a monitoring system, and development of human resources.	Implemented mostly as planned.
2. Comprehensive Tourism Development	Construction of tourism infrastructure and facilities, enhancement of promotion activities, human resource development, IT utilization, poverty alleviation and regional development through microcredit, Lonar environmental conservation and tourism development, protection and preservation of Daityasudana Temple, preservation of state archaeological monuments, and additional subprojects in the vicinity of caves.	A part of human resource development (construction of a training center and development of training software), the microcredit scheme and a part of Lonar environmental conservation and tourism development, some of the state archaeological monuments, as well as additional subprojects in the vicinity of caves were abandoned. As a result, the project target area was limited to Aurangabad City

⁹ First established and publicized in December 1999. This policy is the second phase that covered the years between FY2002 and FY2005.

Components	Original Plan	Actual
		and its adjacent areas. Construction of tourism infrastructure and facilities, promotion activities, IT utilization and the protection and preservation of Daityasudana Temple were implemented mostly as planned.
3. Infrastructure Development	1) Improvement of Aurangabad Airport (Construction of the terminal building, expansion of the apron, extension of runway)	Components were implemented mostly as planned. As for the construction of the terminal building, there was a major change in the design.
	2) Afforestation (Planting trees in 1,878ha of land in ten sites), installation of fire towers, fire prevention equipment, and tourist facilities (such as nature trails, etc.)	Forestation sites were reduced to seven sites (about 2,000ha). Development of tourist facilities was not implemented. Information gathering, operation and management facilities and others were implemented mostly as planned.
	3) Improvement of roads (twelve sections, total length of 259.72km)	Implementation took place at two sections with a total length of 38.55km. Ten sites with a length of about 200km were excluded.
	4) Water supply at tourist attractions (six sites)	Implementation took place at two sites, which was less than half of the original plan.
4. Consulting Services	Detailed design, preparation of pre-qualification screening documents and evaluation reports, preparation of bidding documents, support of the bidding process, detail design review and evaluation, assistance to the implementation and other related agencies, and construction supervision.	As far as it could be confirmed, there was a major increase of 184 man / month.

Source: Summarized by the Evaluator based on the related materials.



Source: Provided by JICA

Figure 1: Distribution of Actual Major Outputs of the Project

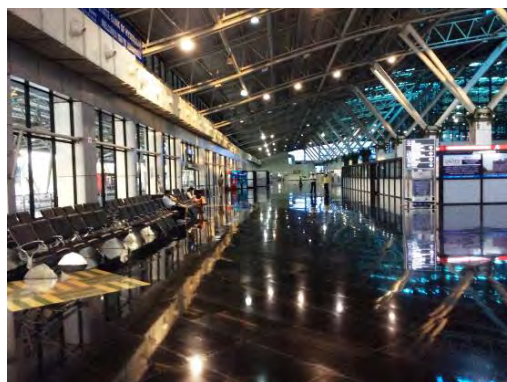
Major changes took place in the comprehensive tourism development component. A part of human resource development (construction of a training center and development of training software), microcredit and a part of Lonar environmental conservation and tourism development, some of the State's cultural sites, as well as additional subprojects around the caves were abandoned. The project target area, as a result, was limited to Aurangabad City and its adjacent areas. In addition, in the infrastructure development component, there were a major change in the design of the terminal building of Aurangabad Airport, a reduction in afforestation sites, a scaling down of road development, and a reduction in the water supply improvement sites.

One of the main factors that caused the reduction in the project outputs was the exclusion of some activities of the component from the project targets due to budget constraints. These were the outputs planned in the project appraisal to be implemented with a local budget. The project allocated a planned budget in advance to each implementing agency responsible for each project component. The central government's implementing agencies (two agencies) received the budget from the Ministry of Finance, while Maharashtra State's implementing agencies (five agencies) received it via the state government. This made it difficult in practice to divert the project budget between components. Each implementing agency carried out the procurement and civil work as well as expenditure progress management to the limit of their allocated budget. Even if an agency expected a budget shortfall for some project components, surplus budget from other components was not reallocated. When the implementing agency could not provide supplementary funds from its own budget, some projects component were abandoned. Due to the major extension of the project period, on the other hand, consulting services increased in quantity. As far as it could be confirmed, there was a major increase of 184 man / month.



Source: Taken by Evaluator (December 2016)

Photo 1: Entrance of Ajanta Visitor Center



Source: Taken by Evaluator (December 2016)

Photo 2: Inside of Aurangabad Airport

The main purpose of the first phase of the project was the restoration and conservation of the Ajanta Caves and Ellora Caves. Tourism development, therefore, was limited to the introduction of an electric bus, development around the heritage sights, and public relations. In contrast, the number of target archaeological monuments for preservation and conservation by the project increased to seven sites in and around Aurangabad City including the Ajanta Caves and Ellora Caves. The contents of the comprehensive tourism development also expanded not only in number, but also geographically to cover the entire Maharashtra State. This included the construction of two visitor centers (hereinafter “VC”), promotion activities, microcredit, human resource development, IT utilization, Lonar environmental conservation and tourism development, Daityasudana Temple, six state cultural sites, protection and repair of nine sites of various scales in Mumbai, Pune District, Nasik District, Buldana District and Jalgaon District. Organization of the project implementation and consulting services, however, was estimated at the same level as during the first phase. This was not a reasonable plan for effective function given the contents of the project plan. Inevitably, the project faced various difficulties in terms of project supervision. These included budget modification, coordination among concerned agencies, and implementation of progress management. The target areas and contents were consequently decreased, which was a reasonable and realistic measure in light of the given implementation structure. The increase of consulting services due to the extension of the project period is also considered to have been necessary.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The actual project cost, 8,172 million yen, was largely below the planned project cost of 15,461 million yen (53%) (Table 2).

Table 2: Planned Budget and Actual Expenditure

Item	Plan						Actual					
	Foreign Currency (Mil JPY)		Local Currency (Mil INR)		Total (Mil JPY)		Foreign Currency (Mil JPY)		Local Currency (Mil INR)		Total (Mil JPY)	
	Total	ODA loan	Total	ODA loan	Total	ODA loan	Total	ODA loan	Total	ODA loan	Total	ODA loan
1. Monument conservation	82	82	335	335	903	901	0	0	342	342	731	731
2. Tourism development	1,250	678	1,015	859	3,738	2,785	126	126	1,355	1,199	3,273	2,859
3. Infrastructure development	231	212	2,102	769	5,380	2,096	0	0	1,361	776	3,224	1,836
4. Consulting services	278	278	55	55	413	413	216	216	121	117	463	456
5. Price escalation	92	46	235	133	667	372	0	0	0	0	0	0
6. Contingency	78	48	173	98	501	289	0	0	0	0	0	0
7. Administration cost	362	-	705	-	2,088	-	N.A.	-	N.A.	-	N.A.	-
8. Land acquisition	-	-	150	-	368	-	-	-	0	-	0	-
9. VAT	161	-	313	-	928	-	0	-	0	-	0	-
10. IDC	475	475	-	-	475	475	475	475	-	-	475	475
11. Service charge	-	-	-	-	-	-	6.5	6.5	-	-	6.5	6.5
Total	3,009	1,819	5,083	2,249	15,461	7,331	824	824	3,179	2,434	8,172	6,490

Source: provided by JICA

Note 1: VAT is the abbreviation of “value added tax.” IDC refers “interest during construction.”

Note 2: the base for cost calculation at the appraisal was made as of September 2002, and the exchange rate for 1 Rupee was 2.45 JPY. The average rate between 2003 and 2014 was 2.14 JPY for 1 Rupee (calculated from the annual average exchange rates in the International Financial Statistics, IMF).

Note 3: Out of the actual expenditure, price escalation, contingency and VAT are included in each project component. No land acquisition occurred. There was no information provided for the administration cost.

In this ex-post evaluation, taking the major reduction of the actual outputs into consideration, the original budget plan was recalculated and revised in order to make the cost comparison¹⁰. The revised planned project cost, as a result of recalculation, is estimated as 8,260 million yen. The actual project cost of 8,172 million yen is well within the revised planned cost (100% against the revised planned cost.) (Table 3).

Looking at the actual cost of individual budget items, the major excesses were seen in the cost of the VC construction (from a planned 1,303 million yen to an actual 2,614 million yen), and the cost of the airport development (from a planned 1,682 million yen to an actual 2,864 million yen). The main causes of the cost overrun for the VC construction were the increased construction cost needed to drill and cut the hard base rock, which had not been foreseen at the time of the feasibility study, as well as the increased cost for the production of replicas of Buddha statues, murals, sculptures, etc. The cost overrun for the airport development, on the other hand, was a result of the review and updating of the planned content and the construction cost taking into consideration price escalation and exchange loss during the implementation period. Both situations are considered to have been inevitable.

¹⁰ The revised planned budget is estimated by deducting the budget amount for the components that were not implemented, administration cost and land acquisition cost from the original budget plan.

Table 3: Revised Plan of the Project Cost

Budget Item	Revised Budget Plan		
	Foreign Currency (Mil JPY)	Local Currency (Mil INR)	Total (Mil JPY)
1. Monument conservation	69	238	653
2. Comprehensive tourism development	1,250	736	3,055
3. Infrastructure development	212	883	2,375
4. Consulting services	278	55	413
5. Price escalation	91	130	408
6. Contingency	77	93	304
7. Administration cost	-	-	-
8. Land acquisition cost	-	-	-
9. Value added tax	158	171	577
10. Interest during construction	475	-	475
Total	2,610	2,306	8,260

Source: provided by JICA, and answers to the questionnaire survey from the executing agencies

Note: the base exchange rate at the time of appraisal (2.45 yen for 1 Rupee) has been applied.

3.2.2.2 Project Period

The planned project period was 64 months¹¹ (5 years and 4 months) from March 2003 to June 2008. The actual period was 134 months (11 years and 2 months) from March 2003 to April 2014, which largely exceeded the plan (209% against the plan).

The reasons that the project period was extended, despite the reduction of the actual outputs, were a) complications among the implementing agencies in the consensus building and approval process, which made coordination difficult; b) more time was needed for progress management and coordination between each construction work due to the large number of construction contracts; c) the necessity to change the design and to revise the cost due to the time lag between the plan and implementation; d) delay in budget allocation by the Maharashtra State Government; e) lengthening of the monument conservation activities, and; f) more time was needed to construct VCs and to create replicas. The lengthening of the site protection activities was due to the fact that the preservation and restoration of the target caves and temples was done to an international standard. This, and the lengthening of the VC development, are considered to have been inevitable.

3.2.3 Results of Calculations for Internal Rates of Return

The internal rate of return was calculated at the time of the appraisal. The Financial Internal Rate of Return (FIRR) of the improvement of the Aurangabad Airport facility, the Economic Internal Rate of Return (EIRR) of the two VCs in Ajanta and Ellora, and the EIRR of the road improvement were calculated as 12.6%, 22.7%, and 17.7% respectively (Table 4).

¹¹ The onset of the project is the month-year of the signing of the loan agreement. On the other hand, project completion was defined as "completion of project components."

Table 4: Internal Rate of Return at the Time of Appraisal

	Improvement of Aurangabad Airport facilities	Construction of Visitor Centres	Road repair and widening works
Cost	Construction cost, O&M cost, and interest payment	Construction cost and O&M cost	Construction cost, O&M cost and periodic overlay
Benefit	Route & navigation facilitation charge, landing charge, passenger service charge and other charges	Multiplied revenue generated from tourist expenditure on food & beverages, shopping and other expenditures such as guiding fees	Savings in vehicle operating costs, time saving costs and labor charge savings
Project Life	31 years	31 years	31 years
IRR	FIRR: 12.6%	EIRR: 22.7%	EIRR: 17.7%

Source: provided by JICA

In this ex-post evaluation, an attempt was made to collect data to recalculate the actual internal rate of return. Airports Authority of India (AAI), however, did not provide data related to the historical revenue of the airport since the opening. As for the road, only two out of twelve planned road construction sections were implemented, and there was no data provided by Public Works Department of Maharashtra State Government (PWD). Finally, for the VCs, no assumed revenue from the entrance fees and tenant fees had been collected from the opening. Recalculation was therefore impossible.

To summarize, the project cost was within the planned, but the project period was significantly longer than planned. Therefore, the efficiency of the project is fair.

3.3 Effectiveness¹² (Rating: ②)

The purpose of the project, “promotion of the tourism industry” was analyzed by reviewing the achievement rate of each indicator. The result of the beneficiary survey¹³ was also taken into consideration. The results of the analyses are discussed below.

¹² Sub-rating for Effectiveness is to be put with consideration of Impact.

¹³ Detailed interviews and questionnaire surveys were conducted as part of beneficiary survey. The survey period was between November 30 and December 19, 2016. An outline of each survey is as follows:

- i. Detailed interview survey: Conducted with tourism service providers (19 individuals locally employed, five tourist guides, four individuals from the hotel industry, three travel agencies, two taxi operators, and two individuals from local business circles.
- ii. Questionnaire Survey: Conducted with visitors to the Ajanta Caves and Ellora Caves (200 travelers) who included 101 Indians and 99 foreigners; 161 men and 39 women. In terms of age group, individuals in their 30s were the biggest group (72), followed by 40s (63), and 50s (41). A little less than 40% of Indians (38) were the residents of Maharashtra State. Europeans (English, Spanish, Austrian, and French) were the biggest group with 50 visitors among all the foreigners (including 6 non-resident Indians), followed by 34 Asians (Thai, Japanese, and Singaporean). The rest were from the Middle East (UAE and Oman), Africa (Kenya, etc.) North America (Canada and USA), and Oceania (New Zealand). In addition, the visitors to both caves had following characteristics: a) more Indians than foreigners. b) more visitors to Ellora Cave than the Ajanta Caves. c) more men than women. To obtain a certain number of samples for analysis, samples were extracted evenly between different sampling locations, Indian and foreigners, and men and women. The results of the beneficiary survey, therefore, do not give an approximate representation of the population characteristics. Furthermore, the difference in the sample numbers between men and women derived from the fact that the visitors were dominantly men, and that the attempt to interview women resulted in response from the men accompanying them. This made interviewing women difficult.

3.3.1 Quantitative Effects (Operation and Effect Indicators)

(1) Number of visitors to the caves and temples

The number of visitors to the major monuments restored under the project is shown in Table 5. At the time of the ex-post evaluation (2016), the number of visitors to the Ajanta Caves, Ellora Caves, Aurangabad Caves and Bibi-Ka-Maqbara had exceeded the target set for two years after project completion, although numbers for Daulatabad Fort did not reach the target.

Table 5: Numbers of visitors to the Caves and Temples

Unit: 1,000 people / year

Name	Baseline	Target	Actual					
	2001	2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016
	Planned Year	2 Years After Completion	-	Preservation work completion	-	Completion Year	1 Year After Completion	2 Years After Completion
Ajanta Caves	330	506	607	664	572	532	577	577
Ellora Caves	486	745	1,882	2,155	1,890	1,861	1,977	1,770
Daulatabad Fort	492	642	889	931	587	584	585	524
Pitalkhora Caves	10	13	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Aurangabad Caves	13	17	69	78	72	79	90	107
Bibi-Ka-Maqbara	393	513	1,726	1,936	1,303	1,365	1,339	1,305
Daityasudana Temple	1	2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Patnadevi Temple	1	2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Source: provided by Archaeological Survey of India

Note 1: Number of visitors is counted at each site, based on the number of entrance tickets sold at the entrance of each site.

Note 2: Data on the number of visitors at the Pitalkhora Caves, Lonar and Patnadevi Temple was not collected as there was no information on the number of tickets available. It was free of charge to enter these monuments.

Note 3: Number of visitors in the table has been adjusted taking the following conditions into consideration: 1) children under fifteen years old are not counted, and; 2) there is an open day monthly for all visitors free of charge.

Note 4: The whole project was completed in April 2014. Monuments conservation works, however, ended in March 2012.

Looking at trends since 2011, on the other hand, the number of visitors fluctuates almost every year. To understand this, “external factors” to the project must be taken into consideration such as the heat wave and the state election in 2014 and the demonetization of high denomination bank notes in 2016, all of which affected tourist movements. The number of visitors at Daulatabad Fort has not reached the target since FY2013, but it largely exceeded it during the project implementation years of FY2011 and FY2012, just as at the other sites, and then leveled off. It is not therefore considered problematic.

Under these circumstances, the significant achievement of the Ellora Caves and Bibi-Ka-Maqbara¹⁴ was very noticeable. The Ellora Caves, as a World Heritage Site, host the cave temples and monasteries of three religions (Buddhism, Hindu and Jainism) and are valuable religious tourist attractions. It is also true that access to the Ellora Caves was

¹⁴ The tomb of the first wife of the 6th Mughal Emperor built after the Taj Mahal by their son, the 7th Emperor.

significantly improved by the road development project in the first phase. In addition, many people visit the Ellora Caves on the way to the Grishneshwar Temple nearby. Grishneshwar Temple has high religious significance¹⁵. The highest number of visitors at the Ellora Caves is thought to have been influenced by this. The high number of visitors to Bibi-Ka-Maqbara is due to its reputation as a “Mini Taj Mahal” or the “Taj Mahal of the Deccan.” In many cases, people visit Daulatabad Fort and the Aurangabad Caves in conjunction with the Ellora Caves and Biki-Ka-Maqbara nearby, then also Aurangabad City in a one-day tour¹⁶.

At the Ajanta Caves, another World Heritage Site, rare murals were repaired and conserved under the project. As it is a Buddhist site, it has become a major religious tour destination for Buddhists from inside and outside of India. Many residents of Maharashtra State also visit. The reason for the smaller number of visitors in comparison with those at the Ellora Caves was reported to be its distance from Aurangabad City, the tourist hub. It takes only 30 minutes by car to the Ellora Caves, while it takes a few hours to the Ajanta Caves. The additional problem of having to change to a special bus in the parking lot at the foot of the hill is also said to deter individual tourists and tour guides.

(2) Number of visitors at Ajanta Visitor Center and Ellora Visitor Center

For the two VCs constructed in the project, the target number of visitors were set in accordance with the number of visitors to the Ajanta Caves and Ellora Caves themselves. The actual turnout in 2016 remained very low. In Ajanta, only one seventh of those who visited the Caves used the VC, while in Ellora, the figure was only one twentieth.

Table 6: Number of visitors at Ajanta Visitor Center and Ellora Visitor Center

Unit: 1,000 people / year

Name	Baseline	Target	Actual			
	2001	2010	FY2013	FY2014	FY2015	FY2016
	Planned Year	2 Years After Completion	Soft Opening	Project Completion	1 Year After Completion	2 Years After Completion
Ajanta Visitor Center	330	506	108	54	92	68
Ellora Visitor Center	486	745	32	22	21	37

Source: provided by MTDC

Note 1: The figure for FY2013 shows visitors from December 2013 (when the soft opening started) to March 2014 (seven months).

Note 2: The grand opening was April 2014 when all exhibits were complete.

Note 3: The figure for FY2016 shows visitors for ten months from April 2016 to January 2017.

¹⁵ One of the 12 Jyotirlinga manifestations of Lord Siva described in “The Siva Purana” (Sivaist Hindu literature).

¹⁶ According to the interviews with MTDC, tour guides and travel agents, many tourists visit the cave temples around Aurangabad City (Ellora Caves, Bibi-Ka-Maqbara, Daulatabad Fort, Aurangabad Caves) on a day trip. When asked about “other monuments visited during this trip aside from Ajanta and the Ellora Caves” in the ex-post evaluation, Bibi-Ka-Maqbara was mentioned most (74 out of 101 Indians and 80 out of 99 foreigners), followed by Daulatabad Fort (70 Indians and 68 foreigners), and the Aurangabad Caves (40 Indians and 32 foreigners). This result endorsed the interview testimonies above.

The following factors contributed to the low visitor turnout: a) at the time of appraisal, as major restrictions on the entrance to the caves was planned for their protection and preservation, the VCs were conceived as alternative visit sites with replicas of the murals and sculptures. The caves, however, continued to be open to public, and at the timing of ex-post evaluation as well, visitors could observe the real monuments even with some restrictions¹⁷. The need to see the replicas at the VCs, therefore, was relatively low. b) The VCs were placed and constructed not far from the visitors' travel routes, but they were constructed in a unobtrusive location. Recognition among tourists, as a result, was low. c) There was no effective guidance to attract cave visitors to the centers. d) Due to the limited time available in itineraries, there are cases in which the guides do not take the tourists to the centers. e) The educational value of the centers is not shared with the tourists. f) There is no explanations or guidance given by the curators. In the original plan, the main purpose of VC construction was, as mentioned above, to have alternative visit sites in times of major entrance restrictions which hosted replicas of the murals and sculptures not open to the public. Lack of coordination and agreement with ASI in terms of the planning and the design of the VCs, however, seems to be the root cause of the low visitor usage.

The educational value of the exhibitions at the centers is nonetheless high, and MTDC is sending out invitations to educational institutions such as primary schools in and out of Aurangabad District to attract group visits by pupils. Publicity activities also take place as required targeting state government officials to promote visits to the centers. JICA implemented the "Project for Supporting OMOTENASHI for Tourism Development in the State of Maharashtra" in the framework of the JICA Partnership Program between FY2014 and FY2016 to support comprehensive tourism development centered around the VC, and this contributed to improvement of the situation. Parallel to these efforts, MTDC is aiming at selling combination ticket for Ajanta and the Ellora Caves and the centers. At the time of the ex-post evaluation, there has not been much progress, however, due to the necessity for law amendments as well as arguments about whether or not to apply this idea to other sites.

In conclusion, the comprehensive tourism development facilities around Ajanta and the Ellora Caves have not reached the operation level that was originally expected, and therefore the objective has not been achieved.

¹⁷ ASI set the Cave opening hours as 9:00 am - 5:30 pm to protect murals and sculptures in the caves. Use of tripods and flash and other sources of light, video shooting, touching the murals and sculptures, eating, and speaking in the Cave were all prohibited. The number of visitors in one 15-minute visit was limited to 40 people (they also set an interval of 5 minutes before the next group could enter the caves.)

(3) Income from tourism

In this ex-post evaluation, collecting actual data on the expenditure from tourists was difficult, and therefore it was also difficult to analyze this indicator. Regarding the number of hotel guests in Aurangabad District, the source of various data used in the project planning period was not clear, and it was therefore difficult to collect data under the same conditions. The average number of nights, however, in one year starting July 2014 was 1.20 days for Indians and 1.16 days for foreigners, which was below the baseline and target (2016).

Table 7: Expenditure from tourists, number of hotel guest, and average duration of stay

Indicator	Unit	Baseline	Target	Actual		
		2001	2010	FY2014	FY2015	FY2016
		Planned Year	2 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion
1. Expenditure from tourists						
Indians	Rs. million / year	1,494	2,127	N.A.	N.A.	N.A.
Foreigners		121	171	N.A.	N.A.	N.A.
2. Number of hotel guests	1,000 person / day	57	89	N.A.	N.A.	N.A.
3. Average duration of stay	No of days	3.32	4	N.A.	Indians: 1.20 Foreigners 1.16	N.A.

Source: provided by JICA for baseline and target (original source unknown), and by MTDC for actual number of days tourists stayed (source: "Tourism Survey for the State of Maharashtra")

Note: Among the indicators in the table, the expenditure from tourists was defined as the amount of money spent by Indians and foreigners for their hotel accommodation, food and drinks within their hotels, and entrance fees at the tourist spots. The number of hotel guests described the number of guests at the hotels in Aurangabad District that were registered with the government. The average duration of stay showed the data collected at hotels in Aurangabad District.

The background to the non-achievement of the baseline and target of the average number of overnight stays is the improved efficiency of itinerary achieved by infrastructure development under the project and in the first phase of the project. According to the detailed interviews, reduction in travel time thanks to road improvement made it possible to visit the caves and temples in the suburb of Aurangabad City, including the Ellora Caves, in a day. It also made it possible to visit the Ajanta Caves on a day trip from Aurangabad City¹⁸. Furthermore, the improvement of Aurangabad Airport in addition to roads, made the day trip from Delhi and Mumbai possible.

The trends of tourists to Aurangabad District in recent years is shown in Table 8 as the supplementary data that endorses the contents of the aforementioned detailed interviews.

¹⁸ The results of the questionnaire survey with visitors to the monuments shows that 20 out of 101 Indian tourists were on a day trip, 48 had an itinerary of 2-3 days, and 25 an itinerary of about a week. Among the 81 people who stayed at a hotel, 50 did so in Aurangabad City. Only 11 Indian tourists stayed at hotels near Ajanta and the Ellora Caves. All 99 foreign tourists had accommodation, 86 stayed in Aurangabad City, 8 in Mumbai and 3 near the Caves. This clearly shows the trend that the accommodation facilities in Aurangabad City function as the hub of the Ajanta and Ellora Caves tourism.

Looking at the average duration of stays and day-trips among all tourists in FY2013 and FY2014, Indian visitors on a day trip were six times (2014) and 14 times (2013) more than those who stayed overnight¹⁹. It is therefore not considered to be a problem that the average number of overnight stays fell below the baseline and the target.

Table 8: Trends of tourists to Aurangabad District

Unit: 1,000 people / year

Tourist	FY2013			FY2014 (Completion Year)					
	Overnight stay	Day trip	Total	Overnight stay				Day trip	Total
				Hotel	Stay at friends & relatives place	Stay elsewhere	Total		
Indian	1,512	21,632	23,145	1,914	584	599	3,097	19,563	22,660
Foreigner	170	0	170	137	0	0	137	0	137
Total	1,682	21,632	23,315	2,051	584	599	3,234	19,563	22,797

Source: provided by MTDC ("Tourism Survey for the State of Maharashtra")

Note 1: The state parliament election took place in early 2014, which affected the implementation of the tourism survey. Due to such reasons, the FY2014 data were collected from July 2014 to June 2015.

Note 2: The method of data collection at the time of appraisal is unknown. The survey method which MOT introduced recently to the tourism statistical survey is different from those used in the past. It is therefore considered not appropriate to make a comparison with the target figure in Table 7 in terms of number of hotel guests.

Reference: In addition to tourists, the number of visitors for business purposes and others in Aurangabad District was 14,499 in FY2013 and 24,329 in FY2014. There are five industrial estates operated in the surrounding areas of Aurangabad City, which is one of the reasons that regional industry has been promoted.

On the other hand, in 2015, the number of hotels increased 18 times, the number of rooms seven times, and the occupancy rate 1.6 times against the reference at the project appraisal in 2000 (Table 9). According to MTDC, the hotel occupancy rate of Aurangabad District in recent years (around 80%) has been the highest in Maharashtra State.

According to the detailed interviews with MTDC as well as with tourism service providers (local souvenir shops, tourist guides, travel agents, taxi operators, and local business circles), the number of hotel guests is increasing every year. The increase in numbers of both Indian and foreign tourists to Aurangabad District was noted and it was pointed out that a major increase has been observed in the number of foreigners especially thanks to the infrastructure development including the airport.

¹⁹ This is thought to be the effect of local industry development in the suburb of Aurangabad such as the operation of 5 industrial parks.

Table 9: Number of hotels and guest rooms

Indicator	Unit	Baseline	Actual					
		2000	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016
		Planned Year	-	-	-	Completion Year	1 Year After Completion	2 Years After Completion
No of hotels	No.	10	161	N.A.	228	172	182	N.A.
No of guest rooms	No.	466	3,200	N.A.	4,560	3,396	3,596	N.A.
Hotel occupancy rate	%	50.4	N.A.	N.A.	N.A.	78	79	N.A.

Source: provided by MOT and MTDC ("Tourism Survey for the State of Maharashtra")

Note 1: In addition to the ten hotels registered with the GOI, there were a reported 50 unregistered hotels as of 2000.

Note 2: The hotel occupancy rate shows to what extent the guest rooms are used. It is calculated by dividing the number of guest rooms actually occupied by the number of guest rooms that are available for sale.

Note 3: The state parliament election took place in early 2014, and this affected the implementation of the tourism survey. Due to such reasons, the FY2014 data were collected from July 2014 to June 2015.

As stated above, the data for expenditure by tourists was not obtainable. Though the average duration of stay did not reached the target set at appraisal, given the fact that there are 4-5 times more one-day visitors than lodgers, the non-achievement of the target does not mean a reduction in tourists or a decline in tourism. The absolute number of hotel guests is also confirmed to be on the increase. Based on this, the tourist industry of Aurangabad centered around the Ajanta and Ellora Caves is considered to be booming.

(4) Operational Status of Infrastructure (reference)

The data for the operational status of Aurangabad Airport and the survival rates of planted trees were confirmed as follows. The data for the operational status of the roads and water supply facilities were not available.

i. Airport Improvement

Aurangabad Airport was fully opened in March 2009. The data shown in Table 10 were collected from AAI. Though there are still not regular international flights, there is a steady number of domestic flights. The number of annual domestic departure and arrival passengers has constantly reached the 100,000 mark since the opening. Between FY2011 and FY2014 the number exceeded 200,000 for both departure and arrival. According to the tourism service providers (tourist guides, hotel industry, travel agents, taxi operators, tourism industry papers, etc.) the impact of infrastructure development, including the airport and roads, is considerable, and the number of both business travelers and tourists is increasing by the year. There are about 2,000 scheduled flights annually. Cargo volume is larger in departing flights than arriving ones, which suggests stable local demand.

Table 10: Operational Status of Aurangabad Airport

Indicator	Unit	Baseline	Actual							
		FY2000	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016
		Planned Year	Full open	-	-	-	-	Completion Year	1 Year After Completion	2 Years After Completion
1. No of passengers on domestic flights										
Total	1,000 person	105	218	267	402	436	444	426	299	261
Arrival		N.A.	108	132	200	218	216	206	142	123
Departure		N.A.	110	132	202	218	228	220	157	138
2. No of passengers on international flights										
Total	1,000 person	N.A.	-	5	3	3	6	2	2	2
Arrival		N.A.	-	3	-	-	-	-	-	-
Departure		N.A.	-	38	3	3	6	2	2	2
3. Number of regular flights										
Total	No of flights	1,460	3,622	3,824	4,792	4,173	3,827	3,851	3,444	2,884
Arrival		N.A.	1,811	1,912	2,396	2,087	1,912	1,925	1,723	1,440
Departure		N.A.	1,811	1,912	2,396	2,086	1,915	1,926	1,721	1,444
4. Number of irregular flights										
Total	No of flights	2	1,244	861	820	740	876	1,064	855	718
Arrival		N.A.	654	455	423	383	452	537	435	357
Departure		N.A.	590	406	397	357	424	527	420	361
5. Cargo load										
Total	metric tons	530	1,328	1,840	1,227	724	889	1,250	1,401	1,157
Arrival		N.A.	499	657	526	310	352	474	392	397
Departure		N.A.	828	1,184	701	414	537	776	1,009	759

Source: AAI

Note 1: The airport was fully opened in March 2009.

Note 2: Data for FY2016 is up to December 2016.

ii. Afforestation

Afforestation activities ended between FY2003 and FY2007. Forest Department of Maharashtra (FDM) provided the survival rates shown in the table below. The survival rates were generally satisfactory with 90-95% in FY2006 and 65-83% in FY2010.

Table 11: Survival Rates of Planted Trees

Unit: %

Indicators	Plantation area (ha)	Actual										
		FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
		-	Completion of plantation work	-	-	-	-	-	-	Completion Year	1 Year After Completion	2 Years After Completion
1. Along viewpoint road and behind caves												
Balapur, Wasi, and Pipaldari	35	90	88	85	82	80	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Lenapur	30	90	88	85	82	79	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
2. Near Visitor Centers												
Ajanta	208	95	90	88	85	83	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Thana	286	94	91	88	84	80	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Anad	17	91	83	79	72	68	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
3. Hills visible from Aurangabad – Phulbari												
Chowka & Phulbari	25	90	85	80	79	75	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
4. Areas visible from roads / tourism spots												
Daulatabad and surroundings	1,436	90	82	78	70	65	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Source: FDM

Note: Data after 2011 were not provided by FDM.

3.3.2 Qualitative Effects (Other Effects)

(1) Improvement of monument conservation skills

Through the implementation of the project, many experts from abroad came to provide on-site technical advice and training on conservation, preservation and restoration activities. The site management plan of the Ajanta Caves and Ellora Caves was formulated based on the outputs of the project, and is well reflected and integrated into daily work. The ASI staff publish papers in international academic journals on the conservation of monuments, and these have become internationally well known. ASI representatives say that the knowledge and awareness among ASI staff of international standards of conservation has improved compared to before the project.

It can be concluded, from the above, that the conservation skills which the project has helped develop are improving.

(2) Improvement of the quality of visitor services at the VCs and the utilization of tourism resources

Under the project, VCs were planned and constructed for the benefit of visitors at both caves in the fierce heat of 45 degrees Celsius in summer, as well as to deal with the need for a major restriction of admission to protect the monuments. The canteens and restaurants in the facilities, however, were not operational until the time of the ex-post evaluation due to the delay in the selection of outsourcing contractors. It was expected that the shop spaces of the facilities would be used by local residents who run businesses connected with

heritage, but there has been no date set for occupancy. The audio guide installed to enhance the understanding of visitors has never been used because of the need to avoid losses.

According to the interview conducted with MTDC, there had been no cooperation from ASI in the operation of the VCs at the time of ex-post evaluation, and MTDC was therefore making its own efforts. Curators are being recruited to approach visitors directly to enhance their knowledge about the monuments (as opposed to visitors merely observing the exhibition). However, it has proved difficult to find appropriate staff. The organization of events, etc., is being discussed, but this also has not yet been realized.

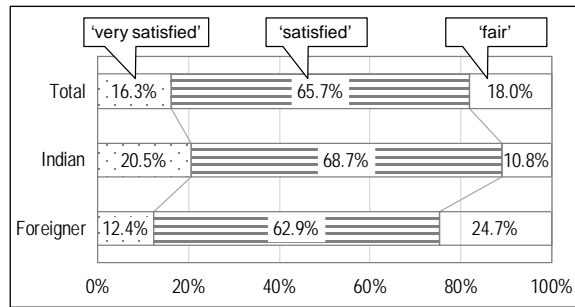


Source: Taken by Evaluator (December 2016)

Photo 3: School pupils visiting Ellora Visitor Center

From the above it can be seen that the VCs are not necessarily used effectively to fulfill the original aim to its maximum degree. There are rooms for improvement in many aspects.

The result of the beneficiary survey, on the other hand, shows a high evaluation of VCs by the visitors (Figure 2). Among the 172 tourists who actually visited the VCs, 28 (16.3%) responded “very satisfied,” and 113 (65.7%) “satisfied,” meaning about 80% found the center satisfactory.



Source: Beneficiary Survey
 Note: Effective numbers of Indians and Foreigners are 83 and 89. 172 in total

Figure 2: Evaluation of Visitor Centers

For Indian tourists in particular, about 20% of the valid respondents (17) reported “very satisfied” and about 70% (57) “satisfied.” It is assumed that the VCs have a high significance for Indians as it gives them an opportunity to learn the history of the monuments.

There is a possibility that the satisfaction rate would improve further if the plans and ideas of MTDC, including oral guiding by curators, the updating and exchange of exhibitions, or organization of events, were actualized in the future.

(3) Enhancement of the value of archaeological monuments centering around the Ajanta and Ellora Caves as tourist destinations

The result of the beneficiary survey demonstrates a relatively high evaluation in comparison with representative archaeological sites in India as well as a high overall evaluation as a tourist destination. The intention of visitors to revisit or to recommend to others is also high. It is considered that the tourism value of monuments centering around the Ajanta and Ellora Caves is high, and that this is an effect of the outputs of the project. The concrete meaning of this is explained below.

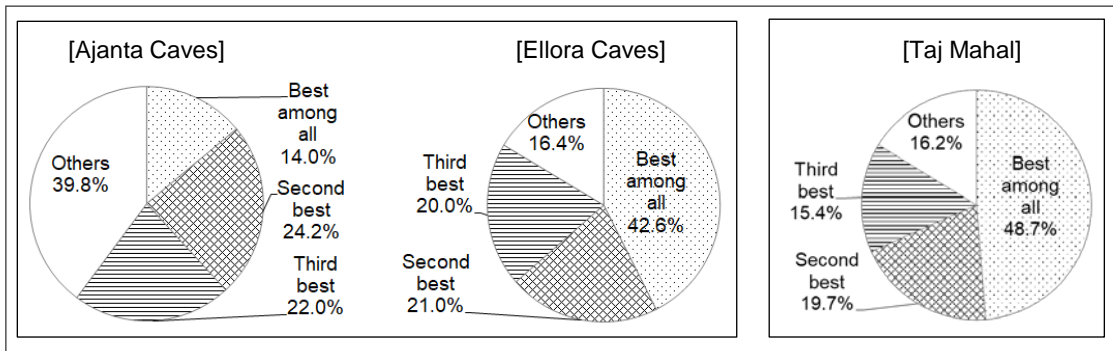
- Relative evaluation in comparison with representative cultural sites in India

Asked about “the best archaeological site,” “the second best site,” and “the third best site” among the 24 World Heritage Sites²⁰ actually visited, the highest percentage of people

²⁰ 24 World Heritage Sites listed as choices were as follows: Ellora Caves (Maharashtra State) , Ajanta Caves (ditto), Chhatrapati Shivaji Terminus (Former Victoria Terminus Station) (ditto), Elephanta Caves (ditto), Taj Mahal (Uttar Pradesh), Agra Fort (ditto), Fatehpur Sikri (ditto), Qutub Minar and its monuments (Delhi), Red Fort Complex (ditto) , Humayun’s Tomb (ditto), Churches and Convents of Goa (Goa), Archaeological sites of Nalanda Mahavihara (Nalanda university) (Bihar), Mahabodhi Temple of Bodh Gaya (ditto), Group of Monuments at Hampi (Karnataka), Group of Monuments at Pattadakal (ditto), six hill forts (Rajasthan), Group of Monuments at Mahabalipuram (Tamil Nadu), Great Living Chola Temples (ditto), Khajuraho Group of Monuments (Madhya Pradesh), Buddhist Monuments of Sanchi (ditto), Rock Shelters of Bhimbetka (ditto), Champaner-Pavagadh Archaeological Park (Gujarat), Rani-ki-Vav (The Queen’s Stepwell) at Patan (ditto), Sun Temple, Konarak (Orissa).

chose the Ajanta Caves, Ellora Caves and the Taj Mahal. The number of people who had visited the Ajanta Caves, Ellora Caves and the Taj Mahal were 186, 195 and 117 respectively (multiple responses) .

Among the 186 visitors to the Ajanta Caves, the percentage of respondents who responded that the “Ajanta Caves were the best site” (14.0%: 26 respondents) was small in comparison of those of the Ellora Caves (42.6%: 83 respondents out of 195 and the Taj Mahal (48.7%: 57 respondents out of 117). However, the Ajanta Caves appeared often in “the second best” and “third best” category (24.2% (45 respondents out of 186) and 22.0% (41 respondents)), meaning that about 60% of visitors evaluated them highly. Of the 195 visitors to the Ellora Caves, on the other hand, the total percentage of people responding “the best,” “the second best,” “the third best” (83.6%: 163 respondents) compares favorably with India’s representative monument, the Taj Mahal (83.8%: 98 respondents out of 117), which demonstrate people’s appreciation of the Ellora Caves (Figure 3).



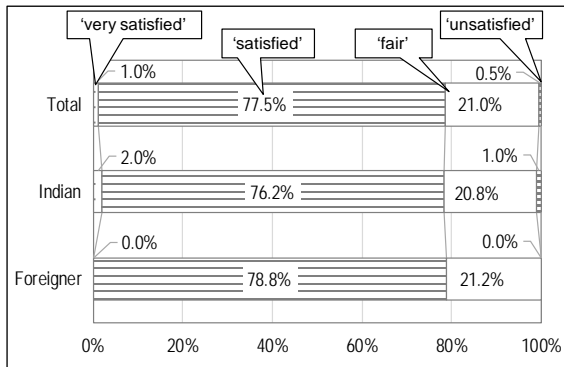
Source: Beneficiary survey

Figure 3: Relative evaluation in comparison with other cultural sites visited in the past

- Overall evaluation as tourist destinations

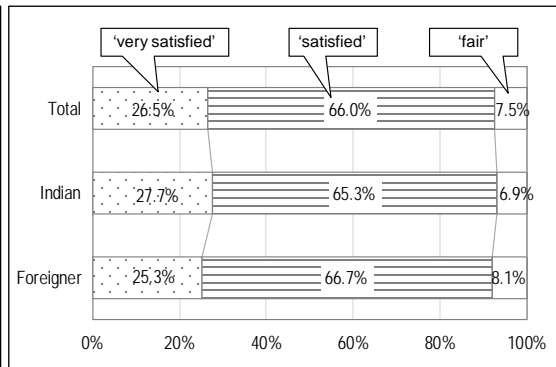
A little less than 80% of the respondents (157 respondents out of 200: 78.5%) said they were “very satisfied” or “satisfied” as their overall evaluation of the Ajanta Caves and Ellora Caves as tourist destinations (Figure 4).

When asked to specify the high points, the highest assessment was given to the monuments themselves, including cave murals, constructions, sculptures, etc. (Figure 5). More than 90% (185 respondents) responded “very satisfied” (53 respondents: 26.5%) or “satisfied” (132 respondents: 66.0%). The Ellora Caves in particular tended to have an even higher satisfaction rate both among Indians (“very satisfied” (20 respondents: 39.2%), “satisfied” (30 respondents: 58.8%) and foreigners (“very satisfied” (17 respondents: 34.0%), “satisfied” (32 respondents: 64.0%).



Source: Beneficiary Survey

Figure 4: Overall evaluation of the Ajanta and Ellora Caves



Source: Beneficiary Survey

Figure 5: Evaluation of murals, architecture and sculptures of the Ajanta and Ellora Caves

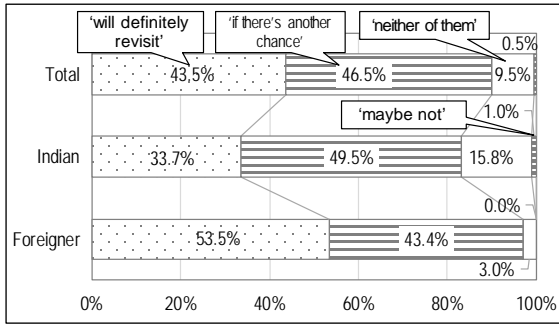
As to the infrastructure, 82 out of 108 valid respondents (79.5%) said they were either “very satisfied” or “satisfied.” A total of 168 respondents (84.0%) said they were “very satisfied” or “satisfied” about the scenery around the Caves.

Among the components of the project, the protection and preservation of the Ajanta and Ellora Caves, the airport facility development and improvement of the surrounding natural environment were also implemented under the first phase. From the results of the questionnaire survey it is impossible to differentiate clearly between the contribution of the first phase and the project. The high evaluation given to both Caves as a tourist attraction shows the contribution of both projects in protecting and repairing the murals and sculptures. The high evaluation of the airport and the surrounding scenery, by 80% of respondents, seems to have contributed to the high overall evaluation of the tourist destinations.

- Desire to revisit or to recommend

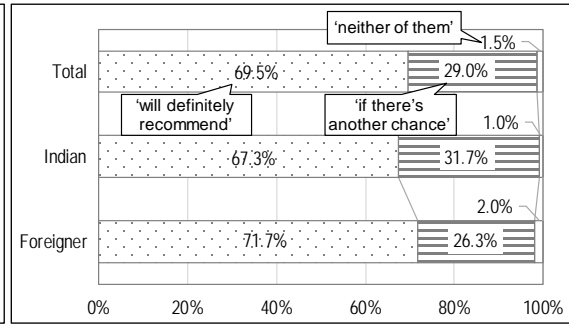
A strong desire to revisit the Ajanta Caves and Ellora Caves was observed with 180 respondents out of 200 (90.0%) responding that they either “will definitely come back” or “will come back if there is an opportunity” (Figure 6). The trend was more evident among foreigners with 53 people (53.5%) responding “will definitely come back.”

A very strong desire to recommend the Caves was also observed with 197 respondents out of 200 (98.5%) saying that they would “definitely recommend the visit to others ” or “will recommend if there is an opportunity” (Figure 7).



Source: Beneficiary Survey

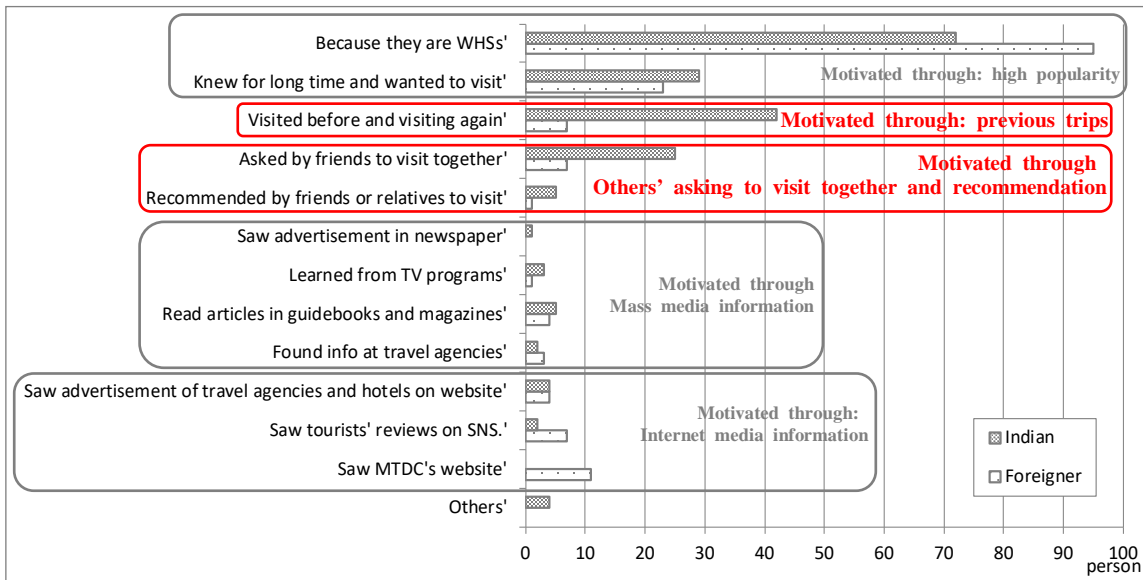
Figure 6: Desire to revisit the Ajanta and Ellora Caves



Source: Beneficiary Survey

Figure 7: Desire to recommend visiting the Ajanta & Ellora Caves

The beneficiary survey identified tourists who were indeed revisiting or those invited by friends and acquaintances, especially among Indians (Figure 8).



Source: Beneficiary Survey

Note: multiple answers from beneficiary survey targets (200 respondents).

Figure 8: Reasons for the visit to the Ajanta Caves and Ellora Caves

As to the reason for the visit of the Ajanta Caves and Ellora Caves, 167 responded “because it is World Heritage” and 52 responded that they “knew about them and wanted to come”. These answers demonstrate that the high reputation of the destination is a motive for visitors. Meanwhile, 49 people (42 Indians and 7 foreigners) said they “have been here before and am visiting again”, 32 people (25 Indians and 7 foreigners) said that they had been “invited by friends or acquaintance”, and 6 people (5 Indians and 1 foreigner) said that they had come when “recommended by someone close”²¹. Past experience is a factor in the

²¹ Many of the Indian repeat customers are from Maharashtra State, with a total of 23 (16 out of 26 residents from

motivation for some, while recommendation and invitation seem to motivate others.

3.4 Impacts

3.4.1 Intended Impacts

Qualitative analysis was conducted to review the contribution of the project to the promotion of regional development, mainly based on the results of the interviews with tourism service providers (local souvenir shops, tourist guides, the hotel industry, local business circles). It was difficult to obtain statistical data of the socioeconomic situation in the Aurangabad district.

It was confirmed that the combination of monument protection, comprehensive tourism development, and infrastructure development under the project had contributed to vitalization of the local economy including the enhancement of business opportunities, an increase of employment opportunities, improvement of convenience for tourists, an expansion of tourism related industry, an increase in business travelers, the promotion of industrial parks, etc.

Particularly notable results were the securing of job opportunities in the hotel industry, an increase in demand and opportunity for tourist guides, an increase in business opportunities for local souvenir shops, an increase in the volume of land and air traffic, an increase in the demand for carriers such as taxis, etc. It is said that the project is contributing to the promotion of industrial parks, the garment industry, the car industry, and the construction industry (Table 12).

Table 12: Results of Beneficiary Survey (Detailed Interviews)

Interviewee	Responses
Local souvenir shops	<ul style="list-style-type: none"> ✓ Demand for local souvenir shops and tourist guides increased, which in turn increased both competition and business opportunities in general. ✓ The increase in demand for local souvenir shops and tourist guides also contributed to the vitalization of the hotel industry and increased local business opportunities.
Hotel Industry	<ul style="list-style-type: none"> ✓ Employment opportunities were secured for both locals and outsiders. ✓ Thanks to the vitalization of the tourism industry, the number of visitors increased. Tourists now have a greater choice. Hotel services and facilities are gradually being improved as the competition becomes intense. ✓ As the airport facilities were improved, the number of tourists and business visitors increased, especially foreigners. If flight connections were improved, the number would increase even more. ✓ Road development expanded to the road between the Ajanta Caves, Ellora Caves and other tourist destinations. This made the smooth driving possible, made the traffic easier and faster, and as a result increased the number of vehicles and the volume of land transport. These are leading to better effectiveness in tourism and business. ✓ Infrastructure development improved business significantly. Local businesses are increasing investment and promoting local employment.

Maharashtra interviewed at the Ajanta Caves and 7 out of 12 residents from Maharashtra interviewed at the Ellora Caves are repeat customers). This suggests that repeat visits by the local residents are contributing to the increase in visitors. Among 7 foreigners, on the other hand, 3 were from Thailand and they form the biggest group.

Interviewee	Responses
Tourist guides	<ul style="list-style-type: none"> ✓ As the number of tourists has increased, there are more job opportunities than before. ✓ One comment was that “I am gaining professional knowledge and language skills through the training on the archeological sites in and around Aurangabad. I want to further improve the quality as a tourist guide and expand the opportunity (hope to learn multiple languages)”.
Local business circle	<ul style="list-style-type: none"> ✓ Because of improvement of airport facilities, both tourists and business customers increased. If flight connections were improved, the number would increase even more. ✓ As the roads were developed, the traffic volume increased. There is more mobility and better time efficiency. This is contributing to the vitalization of five industrial parks, the garment industry and the car industry in the suburbs of Aurangabad. ✓ The construction industry has also benefited from the infrastructure development.
Travel Industry	<ul style="list-style-type: none"> ✓ Road access improved and the number of both business travelers and tourists increased. Road access must be further improved. ✓ Improvement of the airport facilities is boosting the local business development. ✓ Travel by air makes travel time shorter. The use of taxis from the airport is also on increase. ✓ Infrastructure development is slowly encouraging investment by business travelers. Economic development is observed.

Source: Responses from beneficiaries

3.4.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

The project mainly aimed at protecting cultural heritage. It included expansion of the airport and roads, but not on a large scale. As an impact on the natural environment was not foreseen at the time of planning, the project was rated “category B” according to the “JBIC Environmental Guidelines for ODA Loans” (October 1999 version) that was applicable at the time of appraisal²². Indian laws and regulations did not mandate environmental clearance for road and airport development where the total project cost did not exceed one billion rupees. There was no obligation for an environmental impact assessment or forest clearance.

In the detailed design process of project implementation, environmental impacts were predicted, however, and environmental protection measures were put in place to avoid, minimize and mitigate them. These practical measures are shown in the following table.

²² According to the guideline, “Category B” projects are defined as those who do not belong to “Category A” (large, new and rehabilitation projects, projects implemented in, or which may affect a specific area, and projects with certain characteristics (projects expected to have a wide, diverse and irreversible environmental impact, projects affecting a large number of inhabitants, projects consuming a large amount of non-renewable natural resources, projects resulting in the occurrence of a significant change in land use or the environment, projects causing the generation or involving the disposal of a large amount of hazardous and/or toxic wastes)) or those with a less remarkable environmental impact than a Category A project.

Table 13: Anticipated Impacts on the Natural Environment and Environmental Mitigation Measures

No.	Project component		Adverse impact anticipated on the Natural Environment	Environmental Mitigation Measures
1	Afforestation	Tourists facility (Nature Trail)	It was planned that these would be installed in the Gautala Wildlife Sanctuary, and therefore an impact on the environment was anticipated.	From the point of view of environmental protection, the plan was abandoned.
2	Water Supply	Water Supply to Ajanta View Point Facilities	It turned out that developmental activities were prohibited in the forests around the Ajanta Caves, and it was necessary to obtain forest clearance.	Forest clearance was obtained through official procedures, and the facility was put in place as planned.
3	Roads	Development of an approach road to the Satkund-Pitalkhora Caves	As a part of the road passed the wildlife reserves, FDM raised an objection.	The road was constructed avoiding the said area. (the total length became 300m shorter.)

Source: provided by JICA

Environmental monitoring since implementation has not been conducted by the implementing agencies, and there are no environment related reports. No negative impact on the natural environment after the implementation of the project was seen, either in the consultation with each implementing agency or in the results of the beneficiary survey carried out in this ex-post evaluation.

(2) Land Acquisition and Resettlement

There was no resettlement or land acquisition for the implementation of the project.

In summary, the number of tourist visitors to the main caves and temples exceeded the target, and there was an improvement in preservation skills for the target monuments of the project. The value as the tourist destinations of the monuments centered around the Ajanta and Ellora Caves was confirmed and enhanced. The duration of tourist overnight stays did not reach the target, but this was because a shorter period of stay became possible as a result of more efficient itineraries, shorter travel time, improved access to other tourist destination, etc. achieved through infrastructure development under the project. It does not, therefore, mean a reduction in tourists or a decline in the tourism industry. It was not possible to obtain data on the expenditure of tourists. On the other hand, although the VCs constructed near the Ajanta Caves and Ellora Caves were conceived as comprehensive tourism development facilities centered around heritage tourism, the number of visitors remains far below the target. The reviews of visitors to the centers however are nonetheless very good, so it is considered that they have a high significance. It is hoped that their value be reevaluated and measures for improvement be considered and put in place.

As to impact, a contribution to the vitalization of the local economy including tourism related industries was identified. The combination of monument protection, comprehensive tourism development and infrastructure development conducted under the project led to an increase in business opportunities and employment opportunities in the project target area. The convenience of tourists was also improved. Other tourism related industry boomed and the number of business customers increased. Vitalization of industrial parks is also noticeable. No negative impact of the project on the natural environment was identified. There was no land acquisition and resettlement under the project.

The project has achieved its objectives to some extent. Therefore the effectiveness and impact of the project are fair.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

The institutions that are in charge of the O&M of each project component are listed in the table below (Table 14).

Table 14: Project Components and their O&M Institutions

No.	Project Components	O&M Institutions	Remarks
1	Ajanta Caves, Ellora Caves, Pitalkhora Caves, Aurangabad Caves, Bibi-Ka-Maqbara, Daulatabad Fort, Daityasudana Temple and Patnadevi Temple (archaeological monuments managed at national level)	ASI	Central government organization (head office: Delhi)
2	Ajanta Visitor Center and Ellora Visitor Center	MTDC	Maharashtra State Organization (head office in Mumbai)
3	Soneri Mahal, Delhi Gate, Makai Gate, and Bhadkhal Gate (state archaeological monuments managed at state level)	DAM	Maharashtra State Organization (head office: Mumbai)
4	Aurangabad Airport	AAI	Central government organization (head office: Delhi)
5	Afforestation (seven sites: about 2,000ha)	FDM	Maharashtra State Organization (head office: Mumbai)
6	Road improvement (two sections: 38.55km in total)	PWD	Maharashtra State Organization (head office: Mumbai)
7	Water supply facilities improvement (two sites)	MJP	Maharashtra State Organization (head office: Mumbai)

Source: Developed by the Evaluator based on the relevant documents and answers to questionnaires by the executing agencies

Note: MOT, which was the representing executing agency of the project has not played any role in O&M after project completion.

The structure and staffing for the O&M for each project component are shown in Table 15. The local office of each executing agency has the role and responsibilities for the O&M function. There is no institutional problem for O&M with the staff currently available.

Table 15: Organization and Staffing of Operation and Maintenance Institutions

	O&M Institution	Institutional arrangements and staff allocation
1	ASI	Director (Conservation), who works under the Director General at Delhi Head Office, manages monument conservation throughout the nation. The Aurangabad Circle is located in the city, where superintending archaeological engineers are deployed and taking care of archaeological sites managed under national level. Site offices are created for large-scale monuments such as the Ajanta and Ellora Caves, where 50 engineers and technical staff reside for O&M works. The Aurangabad Circle directly manages smaller-scale sites, to which they send their staff on demand.
2	MTDC	VCs are supervised by the Regional Manager of Aurangabad, and there is no permanently assigned staff at the VCs. Staff from MTDC facilities near both VCs go every day to check on O&M issues. There are about 70 staff of the outsourced contractor who do daily O&M activities such as apparatus operation and uncomplicated repair, cleaning, etc.
3	DAM	Deputy Director in based in Aurangabad Office. An assistant director in charge of archaeology and an assistant curator lead the assigned staff members to manage the project target facilities.
4	AAI	An office is placed at Aurangabad Airport. Under the Director are the sections in charge of air traffic control, communication, fire prevention, engineers (civil work and electricity), human resources, finance and commerce. Each section has experts.
5	FDM	Aurangabad District Forest Office is in charge of the O&M of the project component. Under the District Conservator of Forests based in the district office, field level staff are hired, including Range Forest Officers, Foresters, and Forest Polices, to conduct regular patrols of the forest and carry out other operational and maintenance activities.
6	PWD	Aurangabad District Office is in charge of the O&M of the road developed under the project. The O&M is conducted by a chief technician for Aurangabad District, who, in return, manages superintendent engineers and operation engineers.
7	MJP	Aurangabad District Office is in charge of the O&M of the supply facility developed under the project. For the O&M, specialists are assigned at the Aurangabad District Office, who manage site engineers.

Source: Produced by the Evaluator based on the results of questionnaires filled out by each institution and consultations.

3.5.2 Technical Aspects of Operation and Maintenance

The technical strength of the O&M institutions is verified as follows. In all institutions, the quality of O&M skills is secured by staff members with relevant qualifications, expertise and experience. There is, therefore, no problem in this aspect.

Table 16: Skills of each operation and maintenance institution

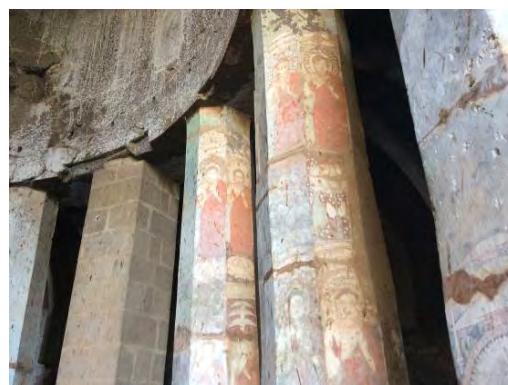
	O&M Institution	Skills
1	ASI	At the Ajanta Caves and Ellora Caves, protection and conservation activities are carried out according to an annual implementation plan which is based on the site management plan. At other monuments, they are carried out in line with the National Policy of Conservation. As a function of the Aurangabad Circle, there is a lab for protection and conservation, which hosts training as required with national-level experts of National Environmental Engineering Research Institute, Indian Institute of Technology, and other institutes as instructors. It has a high reputation abroad, and trainees are sent from Sri Lanka and Middle Eastern countries to learn monument protection and conservation skills. Staff members attend symposiums, international conferences and training in and out of the country. Their academic papers often appear in international journals and enjoy an international reputation. All technical experts and staff go through a performance evaluation annually to review their skills on a regular basis.
2	MTDC	O&M is carried out by signing an annual O&M contract with a provider that satisfies the eligibility requirements and requirements for technical skills.
3	DAM	Technical training, including monument conservation training, is conducted once a year in Delhi or within the State. The training systems and O&M manual are in place, to be implemented or used as needed.
4	AAI	In line with the international standards of the aviation bureau, the technical level is maintained by the staff members with relevant expertise and experience.
5	FDM	Forest management is carried out by technical officers. As the training system and O&M manual are in place to be implemented or used as needed, there are no issues in this aspect.
6	PWD	Quality management of technical skills is carried out by qualified technical offices with expertise and experience.
7	MJP	Based on the manuals and guidelines, quality control is carried out by technical officers who have qualifications in electricity and water supply system O&M. Annual technical skills training is carried out.

Source: Produced by the Evaluator based on the results of questionnaires filled out by each institution and consultations.



Source: Taken by Evaluator (December 2016)

Photo 4: Conservation Work at the Ajanta Caves



Source: Taken by Evaluator (December 2016)

Photo 5: Pitalkhora Caves

3.5.3 Financial Aspects of Operation and Maintenance

(1) Archaeological monuments managed at national level (ASI)

The three-year trend of the O&M budget versus the actual of the target monuments of the project is seen in the table below. ASI reports that there are no financial constraints in the carrying out of the current activities.

Table 17: O&M budget versus actual of the target monuments of the project

Unit: million rupees

	FY2014	FY2015	FY2016
Budget	50.45	38.54	42.55
Actual Expenses	48.92	36.42	5.34

Source: Information provided by ASI

Note: Actual Expenses of FY2016 is up to December 2016.

(2) Two visitor centers (MTDC)

No admission fees have been collected since their opening in September 2013, and no income that was expected originally. The O&M cost amounts to 7.7 million rupees annually for both centers, but budget allocation by Maharashtra State Government is carried out without delay. MTDC manages this fund.

(3) Archaeological monuments managed at Maharashtra State level (DAM)

Even though the practical figure was not obtained, Maharashtra State Archaeological Museum Bureau reported that budget allocation by the state government is carried out without delay. It is verified that there are no financial difficulties.

(4) Aurangabad Airport (AAI)

The actual cost of the O&M for Aurangabad Airport between FY2013 and FY2015 is shown in the table below. AAI reports that the current budget is sufficient.

Table 18: Actual cost of the O&M for Aurangabad Airport

Unit: million rupees

	FY2013	FY2014	FY2015	FY2016
O&M Cost	26	44	46	N/A

Source: Information provided by AAI

Note: The actual cost of FY2016 was not obtained.

(5) Afforestation (FDM)

The actual expenses of the O&M between FY2008 and FY2012 are shown in the table below. In FY2013, there was no separate budget allocation for this component of the project. Instead, the cost was included in the general O&M budget together with that for other forests. No budget shortage is reported.

Table 19: Actual cost of the O&M for planted trees

unit: million rupees

	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016
O&M cost	26	44	46	1.9	1.2	N/A	N/A	N/A	N/A

Source: Information provided by FDM

Note: There was no actual data for years between FY2013 and FY2016

(6) Roads (PWD)

The actual figure was not obtained, but PWD reported that budget allocation by the state government is carried out without delay. No financial issue, therefore, was identified.

(7) Water Supply (MJP)

As to the Ajanta Water Supply Scheme, the information below is verified. The annual cost of the Ellora Water Scheme is 1.8 million rupees. No budget shortage is reported.

Table 20: Actual cost of the O&M for Ajanta Water Supply Scheme

Unit: million rupees

	FY2013	FY2014	FY2015	FY2016
Budget	1.8	1.8	1.8	2.4
Actual expense	1.2	1.44	1.68	2.16

Source: Information provided by MJP

In conclusion, a specific budget for O&M is allocated annually without delay by the central government as well as the Maharashtra State Government. As at ex-post evaluation, there were no financial constraints for O&M.

3.5.4 Current Status of Operation and Maintenance

The current status of the O&M for each project component is verified as below. All components are operated and maintained by staff members who have qualifications, expertise and experience. It can be concluded that there is no specific problem in the status of O&M.

Table 21: Status of Operation and Maintenance

	Project component	Status as of the ex-post evaluation
1	Ajanta Caves, Ellora Caves, Pitalkhora Caves, Aurangabad Caves, Bibi-Ka-Maqbara, Daulatabad Fort, Patnadevi Temple, Daityasudana Temple (Archaeological sites managed at national level)	Works are carried out in line with the annual action plan based on the site management plan at the Ajanta and Ellora Caves. As to other cave temples, monument protection and repair work based on UNESCO guidelines are carried out. At the Ajanta Caves, Ellora Caves, Pitalkhora Caves and Aurangabad Caves, falls of upper conglomerate sometimes happen due to extreme weather, but the measures are put in place as this happens. The equipment and the spare parts for monument conservation can be procured domestically as an annual maintenance contract is in place.
2	Two visitor centers	O&M of the facilities is properly carried out by the outsourced contractor and the facilities are in good condition. There is no change or update on the exhibitions and the contents of the audio sets.
3	Soneri Mahal, Delhi Gate, Makai Gate, Bhadkhal Gate (Archaeological sites managed at Maharashtra State level)	All state monuments are properly operated and maintained by staff who have expertise and experience.
4	Aurangabad Airport	It is properly operated and managed by staff with relevant expertise and experience. The operational status has been generally satisfactory since the full opening in March 2009.

	Project component	Status as of the ex-post evaluation
5	Afforestation (About 2,000 ha in seven locations)	Survival rates of planted trees as at FY2010 was between 65% and 83% and was generally satisfactory. Data was not obtained for the status after FY2011. No withering or dead trees were visually found at the time of site observation in December 2016.
6	Road development (38.55km over 2 sections)	Information was not provided by PWD.
7	Water Supply Facilities (two locations)	The facilities are operated and maintained without any problem of supply by qualified technical officers with expertise and experience. It was difficult to collect data on the current operational state (population served, etc.) as the water supply was at each tourist spot.

Source: Consultation in the field survey, and the responses to the questionnaire by each institution

To summarize, no major problems were observed in the institutional, technical, financial aspects and the current status of the O&M system. Therefore the sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The project was intended to promote the tourist industry by monument conservation, holistic tourist development and infrastructure development, thereby contributing to the enhancement of regional development.

The relevance of the project is high as project implementation was consistent with the development policy and development needs of India both at the time of appraisal and ex-post evaluation, as well as with the ODA policy of Japan at the time of appraisal. There were major modifications to the outputs of the project, including the abandonment of some components and a reduction of the target area. The actual cost of the project was within the planned cost. The project period, however, went well beyond the plan as consensus building among stakeholders and various approval processes became complicated, requiring more time for progress management and coordination. The efficiency, therefore, is fair.

The preservation and conservation works at the target archaeological monuments were carried out with the advice of the Panel of Experts both within and outside the country. Skills in preservation and conservation were thus improved. The value of the archaeological monuments centered around the Ajanta and Ellora Caves as tourist destinations was confirmed and improved, and the number of tourist visitors at major caves in the project area exceeded the target. The average duration of stay did not reach the target, but this was mainly due to the infrastructure development under the project, which led to an improvement in tourist accessibility and efficiency in travel time. In other words, this does not represent a reduction of tourists or a decline in the tourism industry. Data on tourism revenue was not obtainable. The number of visitors at the Visitor Centers built near the Ajanta Caves and Ellora Caves was rather less than the target. The actual visitors to the centers, on the other hand, rated them highly, and it can be concluded that the value of their existence is high. The area, however, does not

function well enough as a comprehensive tourism development facility as was originally expected, and there is room for improvement in terms of the quality of service for visitors and the use of tourism resources. It was confirmed that the combination of archaeological monument protection, comprehensive tourism development and infrastructure development under the project contributed to vitalization of the local economy including enhancement of business opportunities, an increase in employment opportunities, an improvement in convenience for tourists, expansion of tourism related industries, an increase in business travelers, promotion of industrial parks, etc. There was no negative impact on the natural environment by the project, nor were there land acquisition and resettlement. In sum, the implementation of the project generated positive effects to some extent. The effectiveness and impact of the project are fair.

As to sustainability, there are no issues concerning the operation and maintenance management of the project in terms of the institutional, technical, financial aspects and current status of the operation and management, and the sustainability of the effects of the project is high. In light of the above, the project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Actions for strengthening operation of the Visitor Centers

The Visitor Centers are operating under different conditions from those that were originally presupposed in the original design. For example, they were conceived as alternative destinations for visitors to the caves when there was restricted admission. However, in fact, such restricted admission has not taken place. The centers are not located on a point to the caves. Taking these changes into consideration, it is desirable that drastic revisions be taken urgently in terms of operation policy and future direction by revising the significance of the centers, and considering changes in their roles and functions, etc.

The results of the beneficiary survey revealed that visitors to the VCs highly appreciated them. Their most important role seems to be in providing visitors with an opportunity to learn about the history of the monuments. In future, practical use of the VC facilities should be promoted with clear direction to expand the educational effect. This should include group visits of school pupils as MTDC is already making efforts to focus on educational values instead of assuming that all the Caves visitors would visit the VCs. It is strongly desired that the ideas currently being discussed be turned into actual plans and that they should be realized without fail. Ideas include the hiring of curators, the updating and changing of exhibitions, the organizing of events, etc.

As at the time of the ex-post evaluation, MTDC remained actively engaged in various promotional activities including TV promotion, newspaper advertisement, brochure

development, and organization of festivals. The need for the comprehensive tourism development in Maharashtra State remains high as improvements in quality are constantly expected in terms of effective and efficient use of existing tourist attractions, and the development of strategic and flexible marketing activities based on the analysis of tourist trends. In the efforts of strengthening operation of the VCs, it is recommended that the marketing strategy be strengthened and publicity enhanced based on the trend analysis of current visitors to the Ajanta Caves and Ellora Caves.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

(1) Project implementation arrangements among several relevant agencies

The project was a comprehensive tourism development project and it was implemented by seven agencies (both from central government and Maharashtra State). They were under the management of MOT as the executing agency taking full responsibility for the entire implementation. A project steering committee was established to make decisions regarding important points of discussion, annual implementation plans, etc., and to monitor work progress. It was to take measures as necessary to promote the smooth implementation of the project.

However, the above mentioned implementation system did not function effectively, and information sharing and coordination between organizations including MOT and the executing agencies were insufficient. A budget for each project component was allocated to the relevant implementing agency, but the allocation mechanism was complicated as two national-level agencies received budgets from the Ministry of Finance while five agencies from the Maharashtra State Government received budgets via the state government. As each agency was highly independent, it was difficult in practice to divert project budgets between project components. Despite the fact that certain components had a surplus in budget, the funds could not be diverted to other components. In consequence, there were instances where some activities of priority project components had to be abandoned.

As seen in this project, in a country where the state government and central government ministries have equal status, and the independence of each agency is highly protected, a project that involves agencies at different levels such as central government agencies and state government agencies needs an executing agency with a strong authority to manage and coordinate the project as a whole. For example, the Ministry of Finance, with budget management authority, could be assigned as an executing agency. A project management unit (PMU) composed of representatives of each implementing agency could be established

to manage the overall project while a Project Implementation Unit (PIU) created in each implementing agency would have monitoring meetings among PIUs or between PMU and PIUs. In other words, it is recommended that such measures be taken to build a stronger system of project management as well as budget management. To support the functions of PMU and PIU in this regard, sufficient consulting services should be put in place as required.

<End>

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	(1) Monument conservation	
	1) Conservation of caves and temples (Ajanta Caves, Ellora Caves, Pitalkhora Caves, Aurangabad Caves, Bibi-Ka-Maqbara, Daulatabad Fort, and Patnadevi Temple)	Almost as planned
	2) Development of the Site Management Plan for each archaeological monument	Developed for the Ajanta Caves and Ellora Caves only
	3) Development of the Annual Implementation Plan for each archaeological monument	As planned
	4) Organization of the Panel of the Experts meetings (six times in total)	As planned
	5) Site record and archive management system, improvement of monitoring system and human resource development	As planned
	(2) Comprehensive tourism development	
	1) Tourist complexes (Ajanta Visitor Center and Ellora Visitor Center)	As planned
	2) Public awareness activities (TV and press, public relations, interpretation films, leaflets, posters and brochures)	As planned
	3) Human resource development (training of tourism staff, training for middle cadre staff of MTDC, training for supervisors and frontline staff, development of training centers and software)	Training centers and software were not development. Others were implemented as planned.
	4) Computerization of tourist information (computerization in MTDC headquarters at Mumbai, regional offices, and tourist centers, hardware at tourist destinations and software development)	As planned.
	5) Poverty reduction and regional development through microcredit	Not implemented.
	6) Loner conservation and development (pathways for circulation, fencing work, establishment of site museums and information centers, ticketing booths, and parking facilities, restoration and conservation of Daityasudana Temple, buffer plantations)	Restoration and conservation of Daityasudana Temple and buffer plantations were implemented.
	7) State archaeological monuments around Aurangabad City (Soneri Mahal, Delhi Gate, Makai Gate, Bhadkhal Gate, Bani Begun Garden and Anwa Temples)	Conservation works for Bani Begun Garden and Anwa Temples was not implemented. Others were implemented as planned.
	8) Additional subprojects in vicinity of caves (Elephanta Caves, river front development of Nasik Ghat, development of Malshej Ghat, Tikona Fort, Tunga Fort, Visapur Fort, Lohgahd Fort, Shivneri Fort and Rustic Valley)	Not implemented.
	(3) Infrastructure development	
	1) Improvement of Aurangabad Airport New construction of passenger terminal building (domestic: 11,000m ² , and international: 7,300m ²), new apron facilities (new apron 500 feet X 400 feet and new taxiway), extension of runway by 1,500 feet	Almost as planned
	2) Afforestation i. Plantation works at ten sites for 1,878ha in total (Along the Ajanta viewpoint road and behind the caves (99ha in total), near the Ajanta Visitor Center (339ha in total), hills visible from Aurangabad (859ha in total), areas visible from	i. Plantation works at seven sites for 2,000ha in total

Item	Plan	Actual
	<p>roads / tourism spots and along roads (Daulatabad and surrounding areas, approach to the Pitalkhora Caves: 581ha in total))</p> <p>ii. Information and maintenance (erection of fire towers, fire line cutting, firefighting equipment, promenade walks, and display cards on trees)</p> <p>iii. Tourist facility at Gavatala (drinking water, camping & accommodation facilities, establishment of protection & signage structures, establishment of nature trails and watch towers, and establishment of nature interpretation centers)</p> <p>iv. Others (AV equipment, etc.)</p>	<p>ii. Information and maintenance: as planned</p> <p>iii. Tourist facility at Gavatala: not implemented.</p> <p>iv. Others: AV equipment, computer and purchase</p>
	<p>3) Improvement of roads</p> <p>i. Roads to the Pitalkhora Caves (two sections for 13km in total)</p> <p>ii. Roads (Ajanta – Pitalkhora Corridor: southern route) (five sections for 91.5km in total)</p> <p>iii. Approach roads from other entry points (two sections for 81.8km in total)</p> <p>iv. Approach road to tourism resources (1.82km)</p> <p>v. Approach road to Lonar Crater (43.2km)</p> <p>vi. Construction of new Aurangabad city ring road (27.8km)</p>	<p>i. Road to the Pitalkhora Caves (one section for 9.7km)</p> <p>ii. Not implemented.</p> <p>iii. Approach road from other entry point (one section for 28.85km)</p> <p>iv. Not implemented.</p> <p>v. Not implemented.</p> <p>vi. Not implemented.</p>
	<p>4) Water supply at tourist attractions Construction of water supply facilities at Ellora Caves, Ajanta viewpoints, Mahadeva Temple at Anwa, Shiva Temple at Ambhai, Antur Fort and Parion Ka Talao</p>	<p>Water supply facilities at Ellora Caves (store volume: 20,000 liters) and Ajanta viewpoints (store volume: 30,000 liters and water treatment) were constructed as planned. Those at Mahadeva Temple, Shiva Temple, Antur Fort and Parion Ka Talao were not implemented.</p>
	(4) Consulting Services	
	<p>i. Detail design</p> <p>ii. Preparation of pre-qualification documents</p> <p>iii. Preparation of tender documents and assistance in bidding.</p> <p>iv. Review and evaluation of detailed design</p> <p>v. Assistance to the executing agencies</p> <p>vi. Construction supervision</p> <p>Foreign consultants: six personnel (57M/M), Local consultants: 17 personnel (355M/M), 23 personnel in total (412M/M)</p>	<p>Services were extended as planned. Work volume, as much as which could be confirmed, was increased as below: Foreign consultants: 57M/M, and Local consultants: 542M/M</p>
2. Project Period	March 2003 to June 2008 (64 months)	March 2003 to April 2014 (134 months)
3. Project Cost		
Amount paid in Foreign Currency	3,009 million yen	824 million yen
Amount paid in Local Currency	12,452 million yen (5,083 million rupees)	7,398 million yen (3,180 million rupees)
Total	15,461 million yen	8,222 million yen
ODA Loan Portion	7,331 million yen	6,490 million yen
Exchange Rate	1 Rupee = 2.45 yen	1 Rupee = 2.14 yen (average during the project period)
4. Final Disbursement	April 2014	

India

FY2016 Ex-Post Evaluation of Japanese ODA Loan Project

“Integrated Natural Resource Management and Poverty Reduction Project in Haryana”

External Evaluator: Junko FUJIWARA, OPMAC Corporation

0. Summary

The objectives of the project were to restore forests and improve the living standards of residents in Haryana State, northern India, by afforestation, soil and water conservation, poverty reduction, technical assistance and supporting activities, thereby contributing to forest conservation and the promotion of sustainable forest management in the state. Implementation of the project was highly relevant to India’s development plan and development needs, as well as to Japan’s ODA policy at the time of appraisal. Through implementation of the project, afforestation area, the survival rates of planted trees and the number of Village Forest Committee (VFC) that were formed have all accomplished their targets. The annual household income of the beneficiaries generally improved, and in particular an improvement in living standards was qualitatively confirmed among the residents targeted by the project (although the quantitative confirmation of the extent of that improvement was not possible as the executing agency did not collect data during the project period). Quantitative data endorsing project effectiveness regarding the groundwater table in the targeted districts for the construction of water harvesting structures was not available to a sufficient extent so as to confirm the effectiveness in an objective manner. Meanwhile, the project had a certain effect on the improvement of forest and tree cover and the prevention of forest destruction in Haryana State and a contribution to forest conservation and the promotion of sustainable management in Haryana State was confirmed. It was too early to evaluate the benefit from forest products at the time of the ex-post evaluation. Therefore, the effectiveness and impact of the project are fair. On the other hand, both project cost and project period were within the plan, so the efficiency is high. No major concerns were found in the institutional, technical, financial aspects of operation and maintenance (O & M) or current status, and therefore the sustainability of the project effects is high.

Considering the above, this project is evaluated to be highly satisfactory.

1. Project Description



Project Location



Afforestation area (Left: Strip forest, Right: Community forest; Both in Yamunanagar District)

1.1 Background

Haryana State, the target area of the project, is in northern India and is the 9th smallest state among all 29 states of the country¹, and approximately 80% of the total state area consists of the most prominent granaries in India. A population increase in the Delhi metropolitan area, the industrial area in the southern part of the state, represented by Gurgaon and other districts, has seen a rapid urbanization, which has seriously affected its preservation and expansion of the forests in the state. Further, the demands of lumber for housing land development, daily fuelwood and non-timber forest products had been continuous and increasing.

At the time of project planning (2002), the forest and tree cover in Haryana State² was 6.63% out of the total state area, which was lower than other part of the country³. There was also conspicuous deterioration in the quality of the forest. Meanwhile, although the poverty rate in the state was lower than the national average (8.7%⁴), there were a great number of socially vulnerable people, such as the illiterate (who comprised of 32.1%), and the population with stably employment remained at just 29.5% out of the total⁵. Under these circumstances, it was confirmed

¹ 7 Union Territories are excluded. The total area of Haryana State is 44,212km².

² Official definitions of “forest”, “forest cover” and “tree cover” in India are as follows: “Forest”: official forest defined in the Indian Forest Act 1927 such as “protected forest” and “reserved forest.” “Forest cover”: all types of lands which have a tree canopy density of 10% and above, and minimum mapping unit of one ha. All areas bearing tree species including orchards, bamboo, palms, etc. irrespective of their ownership, land use and legal status. “Tree cover”: defined as small tree patches and isolated trees outside the recorded forest area between 0.1 ha to one ha in extent (in the case of Haryana State, these trees are mainly found on private land, on community land and trees planted in agricultural areas (including fruit trees). “Forest and tree cover”, a combination of “forest cover” and “tree cover”, is used as an index to measure the forest conservation status of each state of India.

³ The assessment of forest cover through the interpretation of satellite data started in the 1990s. As remote sensing data had higher resolution, the contribution of tree cover started to be estimated in 2002 the results of which were reported in the “India State of Forest Report” (Forest Survey of India) issued in FY2003.

⁴ As of 1999 to 2000. This poverty rate is the standard applied by the Government of India. It is calculated with the cost to maintain the minimum level of life, mainly consisting of food consumption for a necessary amount of energy (2,400 kcal in agricultural areas, 2,100 kcal in urban areas).

⁵ The Population Census in 2001 (http://www.censusindia.gov.in/2011-common/census_data_2001.html) (accessed in June 2017))

that it was necessary to provide job opportunities for the prevention of forest destruction due to destitution, to assist local livelihoods through forest conservation activities, and to promote the understandings of locals on forest conservation. It was expected, through project implementation, to increase forest and tree cover, improve the forest quality, and improve the quality of life at village level.

1.2 Project Outline

The objectives of this project were to restore forests and improve the standards of living of residents in Haryana State, by afforestation, soil and water conservation, poverty reduction activities, technical assistance and supporting activities, thereby contributing to forest conservation and the promotion of sustainable forest management in Haryana⁶.

Loan Approved Amount / Disbursed Amount	6,280 million yen / 5,961 million yen	
Exchange of Notes Date / Loan Agreement Signing Date	March 2004 / March 2004	
Terms and Conditions	Interest Rate	0.75%
	Repayment Period (Grace Period)	40 years (10 years)
	Conditions for Procurement	General untied
Borrower / Executing Agency	The President of India / Forest Department, the State Government of Haryana	
Project Completion	March 2011	
Main Contractor (Over 1 billion yen)	None	
Main Consultant (Over 100 million yen)	None	
Feasibility Studies, etc.	None	
Related Projects	[The European Union] <ul style="list-style-type: none"> • “Aravalli Project” (1990 to 1999) • “Haryana Community Forest Project (HCFP)” (1998 to 2008) 	

⁶ The project objective at the time of appraisal was “to rehabilitate forest in an ecologically sustainable manner and improve the quality of life of the villagers adjoining forests, thereby contributing to long-term natural and social development in the region”. However the project objective and contribution were revised in consideration of the planned project activities, for the following reasons, 1) what is indicated by “ecologically sustainable manner” was ambiguous, 2) what was enhanced and promoted in the project for both forest restoration and the living improvement of residents was the participatory afforestation mechanism: “Joint Forest Management” (hereinafter referred to as JFM), 3) the forests targeted by the project were not always in the vicinity of residential areas and “villages adjoining the forest” was too vague to specify the range of ‘adjoining’ areas, 4) the extent of the project’s contribution to “long-term natural and social development in the region” was not measurable.

2. Outline of the Evaluation Study

2.1 External Evaluator

Junko FUJIWARA, OPMAC Corporation

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: September 2016 - October 2017

Duration of the Field Study: November 27 - December 23, 2016, and April 17 - April 25, 2017.

2.3 Constraints during the Evaluation Study

2.3.1 Constraints during the Evaluation Study

To work out the extent to which the project effects were accomplished, a set of beneficiary surveys (residents questionnaire survey and focus group discussion)⁷ was conducted in ten villages in the Yamunanagar and Karnal Districts.

Although intervention through afforestation was planned in 800 villages in 17 districts under the project, the beneficiary survey target area was narrowed down due to the limited resources for the ex-post evaluation study (human resources, budget and time). To secure a certain number of samples under specific conditions, non-random sampling was selected. Thus, the beneficiary survey results do not show the approximate resident characteristics of the population of the 17 districts affected by afforestation works.

3. Results of the Evaluation (Overall Rating: A⁸)

3.1 Relevance (Rating: ③⁹)

3.1.1 Consistency with the Development Plan of India

The objectives of the national development plan of India, *the 10th Five Year Plan 2002 - 2007* at the time of the project appraisal (2002) were to increase forest and tree cover from 23.68% (77.83 million ha) as of 2002, to 25% by 2007, and to 33% by 2012. Nation-wide

⁷ Duration of the beneficiary survey was December 14 to December 30, 2016. After discussion with HFD, the executing agency of the project, the Yamunanagar and Karnal Districts were selected from the northern area and the central area respectively as the survey target areas, considering differences in topographic conditions, climate, project components and plantation areas among each region. Pre-conditions in village selection were: a) that VFC were formed, b) that self-help groups (hereinafter referred to as SHG) were organized, c) that poverty reduction activities were implemented. In addition, the Evaluator asked HFD to select villages with an assumption of d) five villages per district (with the breakdown by afforestation type of 1 strip plantation, 1 block plantation, 2 community plantation and 1 farm forestry), and e) in-between distance among villages by car to be within a few hours (due to the time constraints in the survey schedule). However, securing sample villages for farm forestry was not possible because fast-growing trees were planted and most of them had already been felled, and the number of available villages where strip plantation was implemented was relatively less than that of block forest villages. 10 villages were ultimately selected in total by choosing 1 village with strip forest, 2 villages with block forest and another 2 villages with community forest in both districts.

⁸ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁹ ③: High, ②: Fair, ①: Low

plantation was to increase to as much as 7.5 million ha and open forest was to be restored¹⁰. In addition, it was confirmed as important in this plan that Joint Forest Management (hereinafter referred to as JFM)¹¹ should be further promoted and enhanced, and that local participation be increased.

In *the National Forest Policy* revised in 1988, “to turn one third of national land into forest”, which had been the basic goal of its first edition (1952), was kept as the target, while maintenance of the natural environment through ecosystem conservation, the sufficiency of residents’ basic needs and maintenance of the traditional relation between forest and residents were also added as goals. In addition, the restriction of diverting forests to other purposes such as dams, reservoirs, mines, industrial or agricultural areas became more strictly regulated.

In *the 12th Five Year Plan 2012 - 2017* at the time of the ex-post evaluation (2016), the main policies for the forest sector were to continue efforts to increase forest and tree cover, to improve the quality of existing forest, to conduct comprehensive measures against climate change and so on. The targets in the period of the 12th Plan included the further promotion of JFM, productivity improvement of forest resources, forest resource restoration in areas devastated by grazing, the development of nurseries to grow a variety of forest resources and so on. The draft of re-revised version of *the National Forest Policy* was under preparation and discussion at the time of ex-post evaluation, but it was assumed that there would be no major modifications. Based on the above *National Forest Policy*, *the Haryana State Forest Policy* was established in Haryana State in 2006 with the target of achieving a forest and tree cover of 10% by 2010 and later raising this to 20% step by step¹².

3.1.2 Consistency with the Development Needs of India

At the time of appraisal (2002) in Haryana State, a little more than 80% of state land was used for agriculture, and forest and tree cover was 6.63%, which was extremely low compared to the national average (23.03%). Deterioration of forest quality was also a serious concern, as seen in the fact that 65% of forest and tree areas were open forest. Besides, an increase in the utilization of forest resources due to rapid growths in population and livestock, a decrease in forest area as it was diverted to agriculture, and an increase in demand for lumber due to

¹⁰ Forest cover in India is classified into three categories: “very dense forest” (all land with a tree canopy density of 70% and above), “moderately dense forest” (all land with a tree canopy density of 40% and more but less than 70%) and “open forest” (all land with a tree canopy density of 10% and more but less than 40%). “Scrub,” degraded forest lands with canopy density of less than 10% is not included in forest cover.

¹¹ Joint Forest Management: a participatory mechanism introduced by the Government of India in the 1990s aiming at the achievement of forest restoration and the improvement of the livelihoods of the poor by encouraging the participation of neighboring people in forestry projects, considering that forest conservation and the living standards of peripheral residents are highly related. Under JFM, residents organize VFC and plan afforestation activities and forest management plans in their targeted area. HFD and NGO provide them advice from technical and social points of view, so that they can formulate “micro plans” together. Based on the plans, HFD provides seedlings to VFC, and jointly conducts plantation and preservation work.

¹² According to HFD, at the time of the ex-post evaluation (2016) forest and tree cover had not achieved the target of 10%, and they reset the target year for the achievement of 10% as 2020.

industrialization and urbanization were prominent. It was therefore an urgent task to restore forests and improve their quality while increasing forest and tree cover.

The poverty rate of Haryana State at the time of appraisal was 8.7%, which was lower than the national average (26.1%). The illiterate accounted for 32.1% of the total state population while the stably employed was 29.5%. Among the scheduled castes (19.3% of the total state population) the illiterate accounted for 44.6%, which was higher than the average of the state population, and the stably employed remained at 25.4%, which was lower than the state average. Bearing in mind the fact that the state has a great number of socially vulnerable people, it was found necessary to provide poverty reduction activities as job opportunities and skills training for the improvement of living standards and through this to prevent deforestation which resulted from people's destitution.

At the time of the ex-post evaluation, Haryana State was still exposed to further development pressure from population growth¹³ and urbanization. The executing agency of the project, the Haryana State Forest Department (hereinafter referred to as HFD) promotes activities to maintain and improve forest and tree cover, and to increase tree cover with local participation and for biodiversity conservation. However, forest and tree cover in the state in FY2015 remained at 6.65% as forest areas and other areas available for plantation were limited¹⁴. HFD is trying to keep the volume of existing forest cover and improve their quality by maintaining afforestation works based on annual action plans. Moreover, they are making efforts to secure tree cover in a long-term and sustainable manner through plantation work on private land or community land¹⁵.

The poverty rate of Haryana State in 2011 was 11.2%¹⁶. Although this was lower than the national average of 21.9%, there was still a significant amount of people living in poverty. Among the total state population, the illiterate account for 34.5% and stably employed population is 27.7%. However, among the scheduled castes, which are 20% of the total state population, the illiteracy rate is 43.1% and the stably employed population is 24.4%. This implies a tougher situation than is experienced by the rest of the state population¹⁷. Therefore, at the time of the ex-post evaluation, there was continuing recognition of the necessity for poverty reduction and the promotion of living improvements through providing job opportunities and skills training for the poor.

¹³ The Haryana State population as confirmed in the Population Censuses of 1991, 2001 and 2011, has shown a continuous increase for 20 years. It was 16,463,648, 21,144,56 and 25,351,462 respectively.

¹⁴ Figures are based on the Forest Status Report of India for FY2015. "Forest cover" and "tree cover" were 3.58% (1,584 km²) and 3.06% (1,355 km²) respectively. The forest and tree cover remained as 6.65% due to "development activities in areas other than forest areas", "tree felling", "periodic thinning and clear felling" and so on.

¹⁵ Planted trees on private or community lands are mainly orchards with harvests or trees with a high cash value expected.

¹⁶ Figures are from the "Handbook of Statistics on the Indian Economy 2016", the Reserve Bank of India (Sep 2016). The definition and calculation method of the poverty rate are the same as those in 1999 to 2000.

¹⁷ The Population Census in 2011. <http://www.censusindia.gov.in/2011-Common/CensusData2011.html> (accessed in June 2017)

3.1.3 Consistency with Japan's ODA Policy

The Government of Japan set “measures for poverty reduction” and “environmental conservation” as priority areas for its economic cooperation policy dialogue mission in March 2002, and expressed support for India through Japanese ODA loan assistance. In *the JICA Medium-Term Strategy for Overseas Economic Cooperation Operations (2002 to 2005)*¹⁸, “regional development beneficial to the poor” and “environmental improvement for the environment and sanitation” were given as priority areas in economic cooperation with India. Within this the forest sector was positioned as an important sector for improving the environment and assisting people in poverty. Furthermore, in *the JICA Country Assistance Strategy for India (2003)*, “poverty reduction” and “environmental conservation” were given as priority sectors for assistance, and commitment made to “consider assistance in the forest sector as increase in forest and tree cover contributes to ensuring water resources and to the betterment of the lives of the poor who depend on the forest”.

Consequently, the project, that has the objectives of forest restoration, soil conservation and improvement of the living standards of the poor, is relevant to the assistance policy of Japan.

In summary, this project has been highly relevant to the country's development plan and development needs, as well as to Japan's ODA policy. Therefore its relevance is high.

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

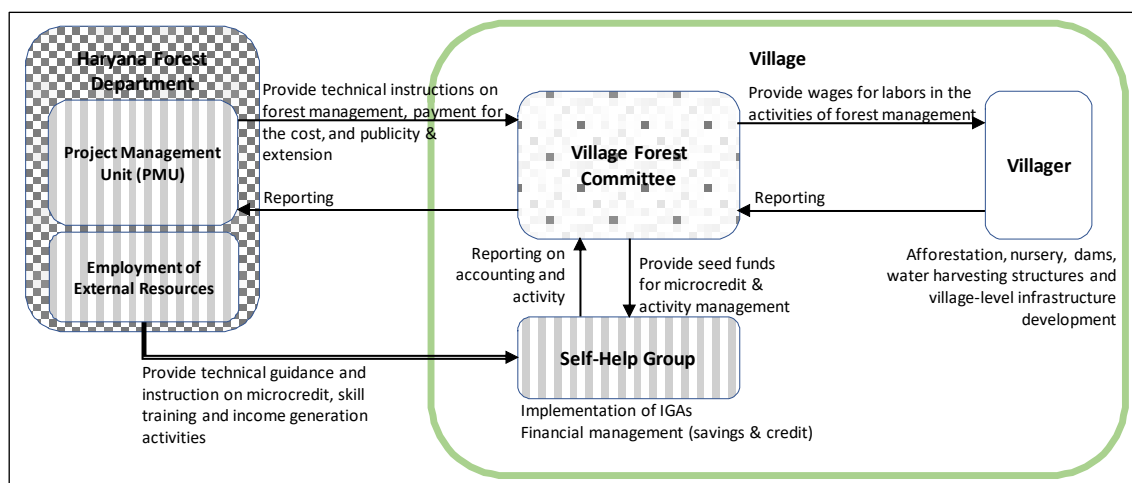
There was no major modification in the project outputs and implementation was mostly as planned. The actual project outputs against the plan are shown in the “Comparison of the Original and Actual Scope of the Project” at the end of this report. Under the project, the following activities were implemented: participatory afforestation works (including nursery modernization and the construction of dams and water harvesting structures in some districts), poverty reduction activities (village-level infrastructure development, microcredit, skills training and income generation activities), supporting activities (publicity and extension activities, school plantations and environmental campaigns and training) and technical assistance (facilitation, trainings, etc. mainly for assistance to implement poverty reduction activities)¹⁹.

The project activities centering on plantation works were implemented in the framework of the existing organizational structure of HFD. Village-level activities and JFM required as a

¹⁸ Established and published in December 1999 for the first time. This policy is the second term and the period covered is from April 2002 to March 2005.

¹⁹ When the project was implemented, there were 19 districts in Haryana State. Later some districts were divided, making 22 districts in total in 2017. Participatory afforestation works were implemented in 17 districts at that time (18 districts in total in 2017), school plantations and environmental campaigns were implemented in the remaining two districts (four districts in total in 2017).

pre-condition the participation of the VFC formed in each target village and villagers and here activities to enhance forest management capability at village level were conducted. For poverty reduction activities, “self-help groups” (hereinafter SHG) comprised mostly of females in poverty were formed in each target village with 10 to 15 members. With the condition that they would work on savings activities to a certain extent, they took small-scale loans from HFD through VFC, using these to engage in income generation activities.



Source: Developed by the Evaluator based on project relevant documents and the results of interviews with the executing agency.

Note: The Empowered Committee, Steering Committee and District Coordination Committee are excluded from the figure.

Figure 1: Project Implementation Mechanism (Diagram)

No consultant was employed to supervise the whole project, however as external resources, local consultants and NGOs were employed to support and guide the poverty reduction activities at village level. HFD organized three supervision committees (the “Empowered Committee” (state level), the “Steering Committee” (coordination committee between government agencies) and the “District Coordination Committee” (district level))²⁰ in addition to the Project Management Unit. Contact and coordination works were implemented in detail with other state government departments and discussion took place on technical collaboration and cooperation measures as well as project progress management.

²⁰ The Empowered Committee, chaired by the Chief Secretary of Haryana State, was the highest decision-making authority of the project. It met more than once a year. The Steering Committee, chaired by the Secretary of Forests, approved annual operation plans, contacted and coordinated with other state government departments and monitored the progress of the project. The District Coordination Committee, chaired by the “Deputy Commissioner” of each district (equivalent to “prefectural governor” in Japan), was held for practical discussion about coordination with other state government departments.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The actual cost of the project was 6,961 million yen against the planned cost of 7,618 million yen, which was within the plan (91.4% of the budget) (Table 1). Out of the actual expenditure of each budget item, poverty reduction, supporting activities and administration cost are lower than the plan. At the time of appraisal, they applied common unit costs for the poverty reduction cost including those for afforestation works and other activities among 800 villages in 17 districts, and for supporting activities that include cost for school plantation and environmental campaign activities at 400 schools in two districts. The gaps between the planned budget and actual expenditure occurred consequently due to the fact that activity contents were different village by village, organization by organization, and school by school. Likewise, administration cost was estimated using common unit costs, which made the actual expenditure lower than the plan. They occurred as a result of implementing the project activities based on each local context, which was judged unavoidable.

The budget items in which actual expenditures exceeded the plan are the cost for plantation, soil and water conservation, and technical assistance. The excess of plantation cost and soil and water conservation cost (around 10%) were mainly caused by depreciation of the Japanese yen during the project implementation period. Meanwhile, as more staff were employed than planned in order to implement poverty reduction activities smoothly, the actual cost for technical assistance was twice that of the budget. However, the excess cost was covered by the budget for price escalation and physical contingency, and the total amount of the project cost did not exceed the plan.

Table 1: Plan and Actual of Project Cost

Unit: million JPY

Item	Plan						Actual					
	Foreign Currency		Local Currency		Total		Foreign Currency		Local Currency		Total	
	Total	ODA loan	Total	ODA loan	Total	ODA loan	Total	ODA loan	Total	ODA loan	Total	ODA loan
Plantation and Soil and Water Conservation	0	0	4,158	4,158	4,158	4,158	0	0	4,566	4,566	4,566	4,566
Poverty Reduction	0	0	753	753	753	753	0	0	714	714	714	714
Technical Assistance	0	0	29	29	29	29	0	0	61	61	61	61
Supporting Activities	0	0	428	428	428	428	0	0	372	372	372	372
Price Escalation	0	0	413	413	413	413	0	0	39	32	39	32
Physical Contingency	0	0	288	288	288	288	0	0	2	0	2	0
Administrative Cost	0	0	1,340	0	1,340	0	0	0	991	0	991	0
Interest During Construction	211	211	0	0	211	211	211	211	0	0	211	211
Service Charge	-	-	-	-	-	-	6	6	0	0	6	6
Total	211	211	7,409	6,069	7,618	6,280	217	217	6,744	5,744	6,961	5,961

Source: Documents provided by JICA, and project completion report

Note 1: The exchange rate of the planned project cost was 1 rupee = 2.59 yen (August 2003). Physical contingency was estimated as 5% of total project cost, and price escalation was as 1.4% per annum for foreign currency and 2.2% per annum for local currency.

Note 2: The average exchange rate of the actual project cost was 1 rupee = 2.19 yen (average from 2004 to 2011).

Note 3: Price escalation and physical contingency are usually posted only in the plan of the project budget and not at the actual cost. But in the case of this project some wages were paid retrospectively in the following year or later to balance the difference due to inflation in the middle of a fiscal year or an unpaid portion of the annual unit price revision. This expenditure was counted as price escalation and physical contingency in the executing agency's expenditure report.

Note 4: Fractions of the total planned cost (7,618), local currency (6,744 and 5,744) and the total actual cost (6,941 and 5,961) do not match the sum of each item due to rounding.

3.2.2.2 Project Period

The actual project period was 85 months against the planned project period of 85 months (March 2004 to March 2011)²¹ (100% of the plan).

3.2.3 Results of Calculations for Internal Rates of Return

The Financial Internal Rate of Return (FIRR) was not calculated while the Economic Internal Rate of Return (EIRR) was 26.9% at the time of the project appraisal. The calculation basis for the EIRR is shown in Table 2.

This ex-post evaluation does not re-calculate the FIRR because it was not calculated at the time of appraisal. The re-calculation of the EIRR was not possible because the details of the project benefits could not be confirmed and therefore the information required for re-calculation was not available.

²¹ The project start was defined as the signing of the Loan Agreement. Meanwhile, the project completion was defined as "completion of all the project components".

Table 2: Calculation Basis of EIRR

Item	Contents
Cost	Initial investment, maintenance cost
Benefit	Sales of forest products, improvement in soil and water sources, CO ₂ reduction effect
Project Life	67 years after project completion

Source: Information provided by JICA.

Note: The way of counting taxes is unknown as evidence for EIRR calculation at the time of appraisal is not available.

As stated above, both the project cost and project period were within the plan. Therefore, efficiency of the project is high.

3.3 Effectiveness²² (Rating: ②)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

(1) Afforestation Area

The size of the afforestation area under the project is shown in Table 3. Each actual figure for strip forest plantations, block forest plantations, community forest plantations and farm forestry at the time of project completion (2011) reached, or mostly reached, the target figures, and the actual figure for the total afforestation area reached the target. Tree species were confirmed to have been appropriately selected considering the growth of existing trees and newly planted tree species, forest conditions and the fluctuation of climatic conditions²³. No alien species were afforested.

Table 3: Afforestation Area (Operation Indicators)

Unit: ha

Indicator	Baseline	Target	Actual
	2003	2011	2011
	Appraisal Year	Completion Year	Completion Year
Conservation Afforestation	-	20,000	22,019.3
Public Forest Afforestation	-	11,000	11,018.0
Community Forest Afforestation	-	4,000	3,916.0
Farm Forestry	-	13,800	13,861.3
Total of Afforestation Area	-	48,800	50,814.6

Source: Documents provided by JICA, project completion report, answers to questionnaire surveys with the executing agency

Note: Baseline was unset at the time of the appraisal

(2) Survival Rate of the Afforested Trees

The target for the survival rate of afforested trees was to be measured on the “5th year from afforestation” at the appraisal. Following this process, the “5th year from afforestation” for all

²² Sub-rating for Effectiveness is to be put with consideration of Impact.

²³ The selection of tree species and afforestation focusing on long-term ecosystem preservation were implemented mainly at protected forests such as block forests. As for community forests and farm forestry, fast-growing trees were mostly selected reflecting and prioritizing the intention of residents and farmers.

the afforested trees differed in a range of 5 years from 2009 to 2013, as afforestation activities were implemented from 2004 to 2008.

The average survival rates in the above period exceeded the target of 70% except that of 2013 (69%), with which it is judged that it practically achieved the target (Table 4).

Table 4: Survival Rate of Afforested Trees (Operation Indicators)

unit: %

Indicator	Baseline	Target	Actual (Average)				
	2003	-	FY2009	FY2010	FY2011	FY2012	FY2013
	Appraisal Year	5th Year From Afforestation	5th Year From Afforestation	6th Year From Afforestation	7th Year From Afforestation (Completion Year)	8th Year From Afforestation	9th Year From Afforestation
Survival Rate of Afforested Trees	-	70	78	76	73	71	69

Source: HFD

Note: Afforestation was implemented in 17 districts for strip forests, 13 for block forests, 17 for community forests and 13 for farm forestry. However, the survival rate information was available only for 11 districts for strip forests, 9 for block forests, 11 for community forests and 2 for farm forestry between 2009 and 2013. The average figure of each fiscal year in the table shows the average of the survival rate of afforested trees in these districts.

The factors affecting the survival rate of the afforested trees were confirmed by HFD as soil condition, precipitation, frosting in winter, extreme coldness, drought, damage by livestock, mountain burning, wildfires and so on. The areas of strip forest decreased due to by public works operations such as the felling of trees along roads due to road widening. However, these were recovered by alternate afforestation, so the loss of forest area was offset.

(3) Number of VFC

200 VFC were formed every year, and 800 were formed during the project period. Among these, 780 were officially approved by HFD after examination of the required qualifications, and thus the number of organizations had practically achieved the target at the time of project completion (achievement rate of 97.5%) (Table 5). The number of organizations at the time of the ex-post evaluation was not available.

Table 5: Number of VFC (Operation Indicator)

unit: organization

Indicator	Baseline	Target	Actual	
	2003	2011	FY2011	FY2016
	Appraisal Year	Completion Year	Completion Year	5 Years After Completion
Activity of VFC (No of Organization)	-	800	780	N.A.

Source: Documents provided by JICA, Project Completion Report, and answers to the questionnaire surveys with the executing agency.

(4) Annual Household Income of the Target Villages

To measure annual household income, it was planned that three villages per region would be set as samples (a total of twelve villages in four regions). However, the executing agency did not collect this information and so actual information remained unavailable.

Table 6: Annual Household Income of the Target Villages (Effect Indicators)

Indicator	Baseline	Target	Actual	
	2004	2008	FY2008	FY2016
	Appraisal Year	5th Year of the Project	5th Year of the Project	5 Years After Completion
Annual Household Income of the Target Villages	Measure in the 1st year of the Project	Income increase of more than 10% on average	N.A.	N.A.

Source: Documents provided by JICA

Data on 150 people who participated in the project implementation were extracted among residents questionnaire surveys²⁴ that reached 240 residents in the target villages to substitute information on annual household income (Table 7). Most had positive answers about their household income except those without an income. More than 70% had improved agricultural income, and a little less than 90% had improved non-agricultural income. Over 90% had improved household income overall.

²⁴ Outline of the residents questionnaire survey is as follows.

1) Survey target villages: 10 villages of 2 districts (see the footnote 7 for the background of district and village selection).

2) Features of survey target households:

<Number of target household> 240 households (122 households of 5 villages in Yamunanagar District, 118 households of 5 villages in Karnal District). <Breakdown by religion> Hindu: 211 households (87.9%), Muslim: 27 households (11.3%), Sikh: 2 households (0.01%) <Breakdown by caste> Scheduled Castes: 90 households (37.5%), Other Backward Classes: 104 households (43.3%), General: 45 households (18.8%)

3) Features of survey target people

<Gender> male: 154 (64.2%), female: 86 (35.8%), <Age Group> age of 18 to 30: 34 (14.2%), age of 31 to 40: 82 (34.2%), age of 41 to 50: 68 (28.3%), age of 51 to 60: 39 (16.3%), age of over 60: 17 (7.1%) <Education Level> high school: 68 (28.3%), secondary school: 59 (24.6%), uneducated/illiterate: 50 (20.8%), primary school :37 (15.4%), the literate without schooling: 14 (5.8%), university graduate: 10 (4.2%), preschool: 2 (0.1%) <Occupation> labor such as daily worker :82 (34.2%), agriculture: 76 (31.2%), housewife: 23 (9.6%), economic activity such as retail and wholesale: 20 (8.3%), self-employed 13: (5.4%), paid employee (private): 11 (4.6%), paid employee (government): 7 (2.9%), unemployed: 5 (2.1%), pensioner: 3 (1.3%)

4) Features of survey target household heads (Note: 157 out of 240 survey targets are household heads.)

<Gender> male 218 (90.8%), female 22 (9.2%) <average age> 44.5 years old (median is 45, youngest 22, oldest 85) <education level> the illiterate 68 (28.3%), high school 63 (26.3%), secondary school: 58 (24.2%) in decreasing order. <occupation> labor 105 (43.8%), agriculture 69 (28.8%) in decreasing order.

Table 7: Household Income Fluctuation of Project Participants

Unit: person

Status	Much increased / improved	Increased / improved	No change	Decreased / worsened	Much decreased / worsened	None	Other	Unknown	Total
Agricultural Income	1 (0.7%)	61 (40.7%)	13 (8.7%)	1 (0.7%)	6 (4.0%)	67 (44.7%)	1 (0.7%)	0 (0.0%)	150 (100.0%)
Non-agricultural Income	1 (0.7%)	123 (82.0%)	18 (12.0%)	0 (0.0%)	0 (0.0%)	8 (5.3%)	0 (0.0%)	0 (0.0%)	150 (100.0%)
Total Household Income	1 (0.7%)	140 (93.3%)	9 (6.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	150 (100.0%)

Source: Residents questionnaire survey results

Focus group discussions²⁵ were held to confirm the major reasons for income increases in thanks to participation in the project. Effects seen were a) job opportunities²⁶ during the project implementation period, and b) microcredit and income generation activities implemented on loans (livestock raising, agricultural production, sewing production, handicraft production, operation of variety stores and so on).

From the above, the annual household income of the target villages is judged to have improved in most cases, but as the precise amount was not available, a quantitative evaluation of “income increase of more than 10% on average” was not possible.

(5) Groundwater

In Haryana State, the amount of water intake was exceeding the increment amount by precipitation at the underground aquifer, which apparently led to a drawdown of the groundwater level and to further difficulties in water intake. Securing the required amount of water for agriculture and raising livestock throughout the year was also difficult as there were not enough facilities for storing surface water and rain water. With the above situation in consideration, water harvesting structures were constructed through the project to store rain water and surface water in the districts mainly around hilly areas. This was carried out along with the afforestation work, to improve the quality of forests, to contribute to improvement in agricultural productivity (the main source of local livelihoods), and to increase the increment amount of groundwater.

At the time of appraisal, an effect indicator was set to see the effects of the implementation of the component: “water level increase in wells in at least five villages out of ten villages with newly constructed water harvesting structures”. The construction of seven structures in total

²⁵ Focus group discussions were held in 10 villages in 2 districts, where residents questionnaire survey was held with: 1) VFC (10 groups in 10 villages), 2) SHG (3 groups in 4 villages with community forest afforestation out of 10 villages (there was no SHG in 1 village), 3) male groups (4 groups in 4 villages with community forest afforestation), 4) female groups (the same 4 groups).

²⁶ Wages were paid through VFC to residents engaged in afforestation works, the construction of dams and water harvesting structures and village-level infrastructure development.

in three northern districts (Panchkula, Ambala, and Yamunanagar Districts) under the project was confirmed at the ex-post evaluation, though the actual quantitative figures were not available as they were not collected during the project implementation period.

Table 8: Change in the Groundwater Table (Effect Indicator)

Indicator	Baseline	Target	Actual	
	2004	2011	2011	FY2016
	Appraisal Year	Completion Year	Completion Year	5 Years After Completion
Change in groundwater table	Measure in 1st year of the project	Water level increase to be confirmed in more than 5 villages out of 10 villages with newly constructed reservoir structures.	N.A.	N.A.

Source: Documents provided by JICA.

Meanwhile, out of all the survey targets (i.e., 240 households in ten villages from two districts), the results of those from 5 villages in the Yamunanagar District, where water harvesting structures were newly constructed, show that 74 samples (60.6%) out of 122 households say that the availability of groundwater “improved compared to the situation before project implementation (they became able to use more groundwater than before).” This figure greatly surpassed those who replied “no change” (18 households: 14.8%) and “deteriorated” (30 households: 24.6%). Therefore, an improvement is recognized. The cause of this availability was explained as “it became easier to use groundwater by making use of hand pumps and others installed under village-level infrastructure developed by the project”²⁷.

As stated above, improvements in the use of groundwater were confirmed at the residents questionnaire survey in districts with newly constructed reservoir structures, this improvement seems to have been caused mainly by using better facilities for groundwater intake. While it cannot be denied that development of the water harvesting structures causes increases in the groundwater table, as the groundwater table is also greatly affected by precipitation, regional vegetation and other factors, it is difficult to confirm causality between this project and the groundwater table.

As a result, it is not possible to evaluate the restoration of headwater conservation by project implementation.

3.3.2 Qualitative Effects

(1) Conservation and Improvement of the Forest Ecosystem

According to HFD, information related to the conservation of the forest ecosystem is not

²⁷ The village-level infrastructure development is one of the poverty reduction activities known as “Entry Point Activity” in the project. Infrastructure development (such as installation of hand pump and wells, road development and construction of community meeting places) was implemented through the villagers’ own choices and the villages provided the labor.

collected. Through routine monitoring activities, however, changes in biodiversity have been confirmed and numbers of individual types of wildlife are assumed to have approximately doubled. However, at the time of the ex-post evaluation, not enough actual data had accumulated to give long-term observation results on various issues such as the food chain status between wildlife, the climate and so on.

In focus group discussions with VFC members, the most common reply to the question about changes in the forest was that: “before project implementation, both animals and plants were scarce. They suffered from the extreme heat and there was also little precipitation. But now the number of trees has increased, more birds come flying. Precipitation, the groundwater table, agriculture and the climate have improved and become stable”. Besides, SHG members and residents who were not engaged in the project also recognized improvement in the natural environment and the increase in numbers of plants and animals.

Therefore, although it is too early to confirm the conservation and improvement of the forest ecosystem, the project is confirmed to have had some contribution to future conservation and improvement.

(2) Improvement in the Awareness of Residents regarding Forest Conservation

Included in the activities of the project were the publicity and extension activities together with training targeting the forest management skills and JFM of residents. These were implemented in 17 districts out of 19 districts in Haryana State. To confirm their effects, changes of awareness regarding forest conservation was asked about in the residents questionnaire survey, in which 175 (72.9%) out of 240 samples replied that “forest conservation awareness was much improved” or “improved”. Out of 175 samples where replies implied positive changes, improvements in awareness were more noticeable among the project participants (131 samples: 97.4%) than non-participants (44: 48.9%).

It is thus regarded that awareness of forest conservation among residents had improved.

(3) Improvement in the Living Standards of Residents

As described in 3.3.1 (4), improvement in “household income” resulting from project implementation was confirmed through the focus group discussions, with causes mentioned such as “job opportunities during the project period” and “microcredit and income generation activities”. The results of the residents questionnaire survey among project participants (150 samples) endorse these reasons. “Job opportunities” and “savings” were said to be improved (78.0% and 84.7% respectively), together with “stability of the household economy” among 76.0% of the project participants (Table 9).

Table 9: Changes in Job Opportunities and Household Economies among Project Participants

unit: person

Status Shift	Much Increased / Improved	Increased / Improved	No Change	Decreased / Worsened	Much Decreased / Worsened	None	Others	Unknown	Total
Job Opportunities	1 (0.7%)	117 (78.0%)	27 (18.0%)	3 (2.0%)	0 (0.0%)	1 (0.7%)	0 (0.0%)	1 (0.7%)	150 (100.0%)
Savings	0 (0.0%)	127 (84.7%)	17 (11.3%)	2 (1.3%)	0 (0.0%)	4 (2.7%)	0 (0.0%)	0 (0.0%)	150 (100.0%)
Stability of Household Budget	1 (0.7%)	114 (76.0%)	30 (20.0%)	5 (3.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	150 (100.0%)

Source: Residents questionnaire survey results

Meanwhile, views collected in the residents questionnaire survey on the effects of village-level infrastructures, dams and water harvesting structures developed under the project are shown in Table 10. Although it cannot be concluded that all improvements were caused by the infrastructure development of the project, the living environment in the villages where the beneficiary survey was conducted had mostly improved. In the more detailed inquiry at the focus group discussions, comments were made on village infrastructure maintenance (more easily accessible) and improvement in household income (payment capability increase). There were opinions such as “it became possible for us to send our children to schools outside our village” and “to see doctors outside our village” which both reflected aspects of improved access due to village-level infrastructure development and improvements in household income.

Therefore, the living standards of residents were confirmed to have been generally improved through project implementation.

Table 10: Changes in the Living Environment at Village Level

unit: person

Status Shift	Much Improved	Improved	No Change	Deteriorated / Worsened	Much Deteriorated / Worsened	Others	Unknown	Total
Road Accessibility	6 (2.5%)	225 (93.8%)	9 (3.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	240 (100.0%)
Water Supply at Canals / Farms	1 (0.4%)	198 (82.5%)	41 (17.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	240 (100.0%)
Drinking Water Availability	10 (4.2%)	214 (89.2%)	15 (6.3%)	1 (0.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	240 (100.0%)
Health and Sanitation	2 (0.8%)	217 (90.4%)	19 (7.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.8%)	240 (100.0%)

Source: Residents questionnaire survey results

In summary, the area of afforestation at the time of project completion, survival rates of the afforested trees five years after afforestation, and the number of VFC formed at project completion reached their targets. Annual household income among the beneficiaries was mostly improved. In particular, there was qualitative confirmation of improvement in the living standards of residents targeted by the project, though the quantitative confirmation of the extent of that improvement was not possible. Also, it was not possible to objectively confirm changes in the groundwater table in the target districts where water harvesting structures were constructed since supporting quantitative data was not available. Therefore, the effectiveness of the project is fair.



Source: Taken by Evaluator (December 2016)

Photo 1: Reservoir Dam maintained by the Project (Yamunanagar District)

3.4 Impacts

It was expected that the project activities intended for forest conservation and the improvement of local living standards would make a contribution to the conservation of forests and the promotion of sustainable forest management in Haryana State. To confirm that contribution and its degree, analysis was made regarding (1) the contribution to the improvement of forests and tree cover in Haryana State, (2) the effects of sharing the benefits of forest products, and (3) contribution to prevention of forest destruction.

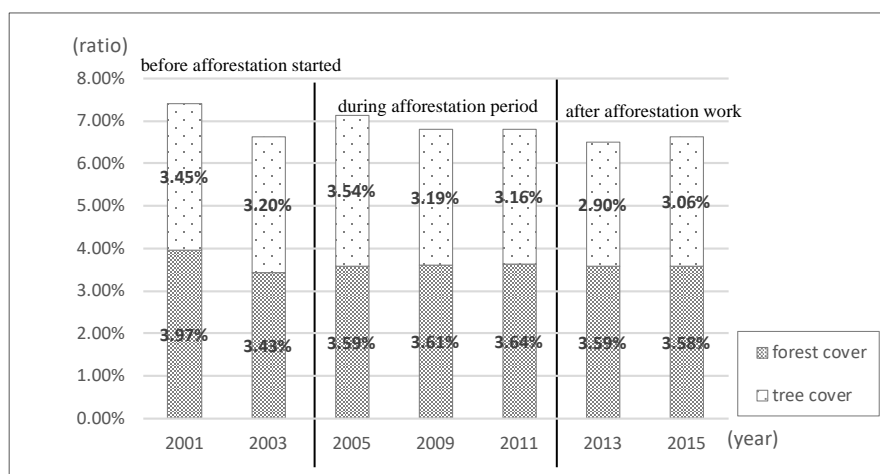
3.4.1 Intended Impacts

(1) Contribution to the Improvement of Forests and Tree Cover in Haryana State

The transition of forests and tree cover in Haryana State before, during and after the afforestation activities of the project is shown in Figure 2. Forest and tree cover both increased immediately after afforestation activity started (2005). However, afterwards, forest cover decreased slightly while tree cover increased slightly. In 2013, after the completion of afforestation activity, forest cover temporarily dropped to less than 3% but recovered afterwards. Tree cover decreased slightly.

The “India State of Forest Report” (Forest Survey of India) states the reason for the increase between 2003 (before the activity period) and 2005 as being “enhancement of afforestation activities by HFD”. Out of all afforestation activity by HFD (for the entire state area), for instance in FY2007, 10,316 ha (68%) of all 15,202 ha afforested and non-forest area had been afforested thanks to the project. In FY2008, 13,554 ha, 46% of all afforestation area (29,477

ha), was afforested under the project²⁸. From the above, it is considered that there was a contribution to “the enhancement of afforestation activity” by the project.



Source: “India State of Forest Report” issued in 2001, 2003, 2005, 2009, 2011 and 2015 (Forest Survey of India)

Note 1: Total area of the whole of Haryana State is 44,212km².

Note 2: India State of Forest Report was not issued in 2007.

Note 3: Forest cover data from FY2004 to FY2008 during afforestation activity was reflected in the India State of Forest Report issued from FY2005 to FY2011 mentioned above. Tree cover data from FY2005 to FY2011, was based on the data from 2002 to 2010.

Note 4: In ISFR 2009, they refined the methodology for forest cover mapping by considering differences in altitude zones and forest types, and switching over vector data. Along with these changes, forest cover became more specified into three categories: very dense forest, moderately dense forest, and open forest, from two categories up to ISFR 2005: dense forest (all lands with a tree canopy density of 40% and above) and open forest.

Figure 2: Transition of Forest and Tree Cover before, during and after Afforestation Work

The report pointed to causes of the slight decrease after afforestation work ended as being periodical thinning and clear cutting of forest, felling on private land and community land, conversion of land use and so on. While forest cover reached its peak, HFD implemented afforestation for the improvement of the quality of existing forests according to their action plan, attempting both improvement in forest quality and optimization. Tree cover in the state is largely on private land, in community forests and farm forestry. The area available for afforestation is therefore limited, so the expansion of tree cover is extremely difficult due to felling and the conversion of land use by developers. HFD has been attempting to secure areas for the planting of trees in the long-term by helping local people to maintain and enlarge green areas, mainly by planting particular trees with fruit and other harvests on private land, community land and farm land.

From the above, this project, which promoted community land afforestation and farm

²⁸ The afforestation area is not the same every year as the life spans of existing trees, time of thinning and clear cutting and the survival situations must be considered.

forestry as well as afforestation in forest areas, is considered to have contributed to maintaining forest and tree cover and to improving the quality of forests in Haryana State to a certain extent.

(2) Sharing of the Benefits of Forest Products

The distribution of benefits from forest products is a system to secure the motivation of villagers within the framework of JFM. HFD stipulates, by a notification²⁹ which came into effect in 1998, that profit generated from all forests and trees under JFM should be shared after deducting the costs required for felling, transportation and the sales of the final felling of timber and non-timber (undergrowth, thinned material, pruned lower branches, tree leaves and so on) between the State Government and VFC at the ratio of 70% and 30% respectively. The amount distributed to VFC is to be used for their own activities and for village development. Cutting down the trees afforested by the project are expected to be started soon after the ex-post evaluation, and the benefit from the final felling of timber is planned to be shared based on the pattern above.

In summary, the impact from the benefit brought to the villages under JFM was thus still difficult to confirm at the time of the ex-post evaluation.

(3) Contribution to the Prevention of Forest Destruction

At the time of appraisal, it had been confirmed that providing job opportunities and improving local lives at village level were necessary to prevent the occurrence of forest destruction resulted from the actions of socially vulnerable people living in poverty. At the time of the ex-post evaluation, no data or information was available to show the contribution of the project to the prevention of forest destruction. In fact, wages had been paid to residents during the project period for their engagement in the project activities of the construction of water harvesting structures, the development of village infrastructure, and afforestation, which was a huge incentive for them. Their awareness of forest conservation improved, as mentioned in 3.3.2, and their living standards also improved. The fact that wages are still being paid for forest management activities including the afforestation work of HFD and that HFD staff members were frequently visiting villages for poverty reduction activities even at the time of ex-post evaluation, is considered to be of considerable contribution to the prevention of forest destruction.

3.4.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

The “JBIC Environmental Guidelines for ODA Loans” (issued in October 1999) was applied at the project appraisal, and as the project intended afforestation aiming at

²⁹ Haryana Forest Department Notification No.3799-Ft-I-98/13358 (as of June 29, 1998).

environmental improvement³⁰, it was specified as Type B. Moreover, according to Indian laws, no Environmental Clearance or Forest Clearance was required for the project, and neither was an Environmental Impact Assessment mandatory.

At the time of the ex-post evaluation, discussions took place with the executing agency and HFD, together with on-site observation in the inspection area. There was no confirmation of an impact on the natural environment or deterioration of the natural environment caused by the project as the afforestation under the project mainly selected local species and was aligned with the local climate and the natural features of the afforestation area.

(2) Land Acquisition and Resettlement

No land acquisition or resettlement was implemented under the project.

(3) Other Positive and Negative Impacts

As part of the supporting activities, in Gurgaon and Faridabad Districts, school plantations and environment campaign³¹ activities were implemented. An NGO³² with accomplishments in these fields was actively involved in the implementation. Through these activities, there were significant attention and interest from local communities, and children educated the adults in their families. Furthermore, implementation mechanisms and systems were organized, and the teaching staff in charge were trained, which gave positive impacts such as the continuation of activities at school and firm knowledge gained by the children.

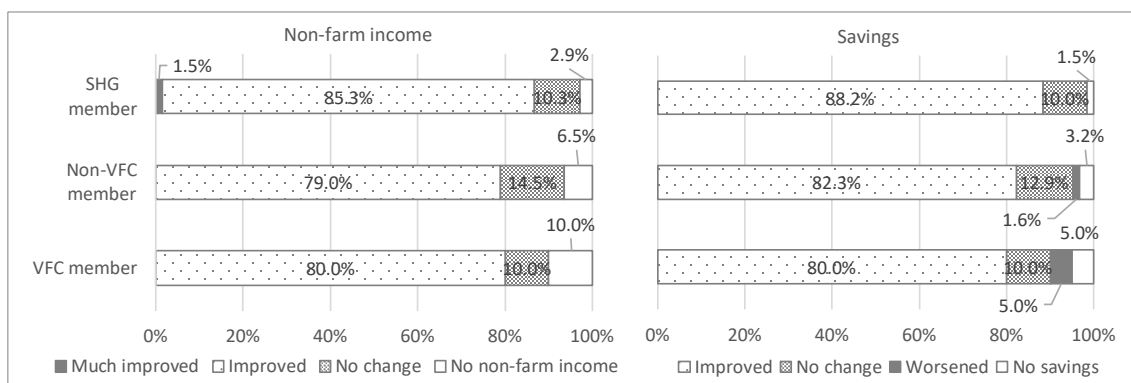
In addition, consideration was given to gender in the project. SHG were formed mainly of females in difficult poverty situations for whom microcredit, income generation activities (animal rearing, dairy product making, carpet making, sewing, store management for groceries and accessories, vermicompost making, etc.) and skill development training for such activities were provided. Improvements in non-agriculture income and savings were found more among SHG members than the rest of the project participants, according to the results of the residents questionnaire survey. Approximately 90% of the SHG members replied that they had seen “great improvements” or “improvements” (Figure 3). The immediate reasons behind this result are assumed to be that non-agricultural income was generated by income generation activities and that saving habits were developed as saving was one of the preconditions for taking

³⁰ According to the Guidelines, “Type B” is defined as not belonging to “Type A” (new or renovating projects on a large-scale, projects implemented in or with some risk of affecting the specified area and the projects with specific features (large-scale, various and irreversible environmental impact, impact on a considerable number of residents, mass consumption of non-renewable natural resources, enormous change of land use and environment, huge amount of hazardous waste generated or to be disposed of)), or with no prospect of a considerable environmental impact as in “Type A”.

³¹ Targeting school children and students of 400 private/public primary and secondary schools in total, the following activities were implemented as orientations at each school: afforestation, extension activities (art contests, speech contests, nature tours in natural parks, workshops and training seminars for teachers, and the preparation and distribution of environmental education materials (environmental calendars, posters, etc.)).

³² OISCA North India

microcredit. Moreover, one of the cases confirmed in the focus group discussion with SHG members was that women taught how to sew each other in their villages after they sat for the training under the project. It was also heard from them that their household economy was improved through SHG activities, and they nurtured the spirit of self-independence.



Source: Residents questionnaire survey results

Note: “VFC” stands for Village Forest Committee. “Non-VFC member” indicates a resident who was not a member of VFC but participated in the project activities. “SHG member” is a resident who belonged to an SHG.

Figure 3: Fluctuation of Non-agricultural Income and the Savings of Project Participants

In summary, this project has achieved its objectives to some extent. Therefore the effectiveness and impact of the project are fair.

3.5 Sustainability (Rating: ③)

Among the components implemented under the project, afforested trees other than farm forestry are managed by HFD and VFC under JFM. The operation and maintenance of farm forestry is implemented by each farm. Soil and water conservation facilities such as nurseries and water harvesting structures are operated and maintained by HFD. Furthermore, as part of the poverty reduction component, the operation and maintenance of village-level infrastructure is carried out by each village, while microcredit, skills training and income generation activities are implemented by SHG under the management of VFC, with HFD (Women Empowerment Cells) dealing with technical instructions. Table 11 shows the roles and functions of each party in the operation and maintenance of each project component, and Figure 4 shows the implementation mechanism of forest management and poverty reduction activities as at the time of the ex-post evaluation.

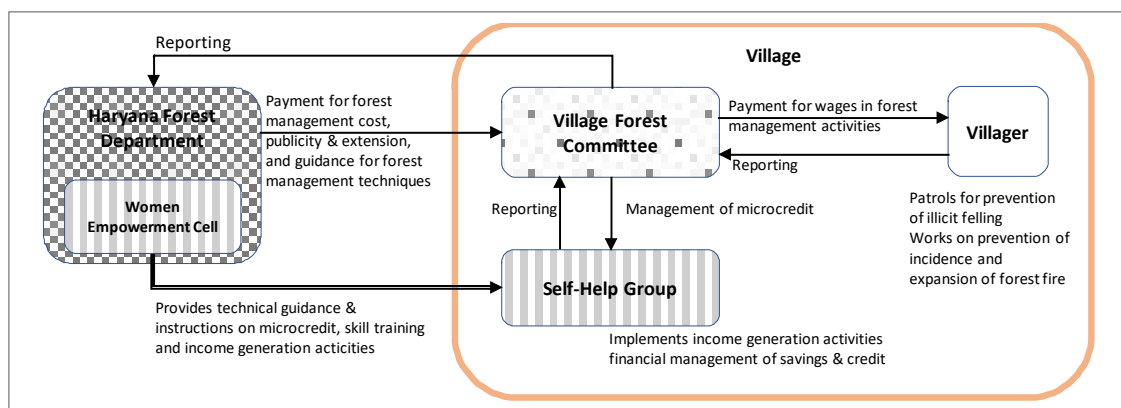
Table 11: Project Components and Agencies for their O&M

Project Component	Operation and Maintenance Agency	
1. Forest Management		
· Strip Forests / Block Forests	HFD	VFC
· Trees on Community Land		
· Farm Forestry	Each farmer	
· Nurseries, Dams and Water Harvesting Structures* ¹	HFD	
2. Poverty Reduction Activities		
· Village-Level Infrastructure* ²	Local Communities	
· Microcredit	HFD (Women Empowerment Cells)	Implemented by SHG under the Supervision of VFC
· Skills Training		
· Income Generation Activity		
3. HFD Facilities and Equipment		
MIS/GIS equipment at HFD HQ, Training Centers, equipment and vehicles	HFD	

Source: HFD

Note 1: Dams and water harvesting structures were developed under the “soil and water conservation activity” of the project.

Note 2: Village-level infrastructure was developed under the “entry point activity” of the project.



Source: The Evaluator created based on the interview survey to the executing agency.

Figure 4: O&M Structure for Forest Management and Poverty Reduction Activities at Ex-Post Evaluation Time (Diagram)

Based on the above, the institutional, technical and financial aspects and current status of operation and maintenance at HFD and each village are mentioned from 3.5.1 to 3.5.4.

3.5.1 Institutional Aspects of Operation and Maintenance

(1) Haryana Forest Department

Positions and the chain of command for the operation and maintenance of the project components in HFD are shown in Figure 5. Based on the existing organizational structure, the supervision and monitoring of forests in each village is implemented mainly by foresters and forest guards of the Department. They contact and report to range forest officers and district forest officers.

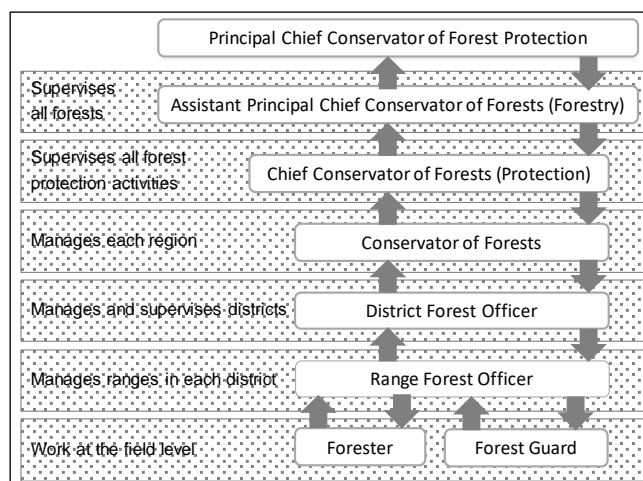
Regarding staff allocation as of December 2016, numbers in the Indian Forest Service (IFS) and the Haryana Forest Service (HFS) (46 and 45 people respectively) were less than their fixed numbers (69 and 54), although according to HFD, the required operations were satisfactory with the existing numbers. Also, the numbers of the existing personnel of range forest officers, foresters and forest guards, (83, 294, and 886 people respectively) were less than their

cadres (126, 527, and 1,547). However no particular problems have been found at the actual operation of each site as JFM is implemented with villagers, and where VFC and villagers can be employed in case of personnel shortages or where it is judged more efficient to monitor with them³³.

At the same time, some foresters and forest guards belonging to the Women Empowerment Cells under the supervision of IFS and HFS, lead poverty reduction activities and conduct monitoring. “Women Empowerment Cells” were newly established in the Department in the year of project completion to continue supporting activities for the poverty reduction of residents. The project was implemented through the employment of external resources such as local consultants and NGO. The successful model from the “Haryana Community Forestry Project” was applied, operating in 328 villages of eleven districts from 1998. It seems that more than ten years of field experience and lessons given in poverty reduction activities targeting residents under the said preceding project and this project convinced the executing agency to firmly establish an implementing structure of its own. As of the end of FY2015, there were 46 personnel in the Women Empowerment Cells.

(2) Village Forest Committees

On the village side, forest management, monitoring and reporting systems were established by VFC, and the current status and problems of forests are reported to HFD at any time. The VFC consist of around 15 male and female villagers, and residents with knowledge of, and interest in, social welfare and conservation of natural environment or with adequate time for



Source: Developed based on documents provided by HFD.

Figure 5: O&M Mechanism of the Forest Department

³³ As recruitment of HFD is managed by the Haryana Staff Selection Commission together with other posts of government, HFD is not allowed to employ on its own accord.

forest conservation activities are often selected. Among the members, there are positions such as chairperson, secretary general and accountant. Members are elected every two years at Panchayat Meetings³⁴. Approximately 800 VFC had been formed in Haryana State at the time of the ex-post evaluation.

The activities of VFC are afforestation, irrigation, forest protection, extension for residents, the prevention of illicit felling, forest fire fighting operations, substitutive afforestation and so on. In addition, they monitor SHG activities such as microcredit, skills training, and income generation activities. SHG consist of 10 to 15 people per group, mainly of women in poverty, with a strong need for an increase in income, and with the willingness to participate in social activities. At the end of FY2015, in 17 districts where poverty reduction activities were implemented under the project, 1,893³⁵ SHG were in operation (Table 12).

Table 12: Transition of Numbers and Members of SHG after Project Completion

	Unit	FY2012	FY2013	FY2014	FY2015
SHG in operation at fiscal year end	Organization	1,332	1,300	1,788	1,893
Total Number of Members	Persons	16,748	16,748	17,722	17,947

Source: Annual Activity Report (HFD Women Empowerment Cells)

Thus there is no specific issue found in the institutional aspect.

3.5.2 Technical Aspects of Operation and Maintenance

(1) Haryana Forest Department

Training programs and technical improvement courses are operated at both national and state level for IFS and HFS, experienced staff, range forest officers and so on. In two HFD training centers within Haryana State³⁶, training for department personnel is operated based on the annual training plan. Various manuals for afforestation, forest management and nurseries are prepared and are used. As well as improvement of practical skills, there is also the intention to maintain and improve the nationally standardized technical and knowledge level. HFD properly handles technical issues at dams or water harvesting structures by consulting their civil engineers. As for supporting activities for poverty reduction, “Women Empowerment Cells” monitor and promote the work of residents. Although the activities require particular knowledge and field experience which differ from forest management, there was no major technical concern about operations as at the time of the ex-post evaluation HFD staff had accumulated sufficient ground experience during the project period, and there were training program courses available for them. HFD thoroughly ensures personnel management

³⁴ VFC formed during the project period had member re-elections afterwards as well.

³⁵ “FY2015 Annual Activity Report” by HFD Women Empowerment Cell

³⁶ They are in the western area, Hisar District and in the northern area, Kurukshetra District, and were established under the project.

and technical management by annual personnel assessments and even the technical assessment of professional staff.

(2) Village Forest Committees

The technical level of forest management by residents is maintained through the technical support, mobile services and extension activities of HFD. For instance, training opportunities for VFC members are provided at all times, and VFC members give instructions to residents. Regarding the skills required for poverty reduction activities, HFD Women Empowerment Cells provide technical instructions, conduct monitoring, and provide technical support in cooperation with other government agencies. As there is a wide variety of income generation activities and microcredit requires tailor-made guidance to each member according to their skills and education levels, cooperation and support is obtained from the Agriculture Department and the Horticulture Department of Haryana State, so that skill development training can take place as required with instruction for production with high marketability.

Thus no specific concern was found in technical aspect of operation and maintenance.

3.5.3 Financial Aspects of Operation and Maintenance

(1) Haryana Forest Department

Table 13 shows the transition of the forest management budget and expenditure operated by Haryana State. According to HFD, there is no budget shortage.

Table 13: O&M Budget and Expenditure for the Project Target

	Unit: million rupees		
	FY2012	FY2013	FY2014
Budget	1,703.5	1,668.4	2,015.4
Expenditure	1,683.1	1,620.6	1,906.6

Source: HFD Annual Report

Note: Budget indicates only that related to afforestation of such as for strip forests, block forests, and community forests, improvement of open forest, social forestry, farm forestry, forest protection, etc.

(2) Village Forest Committees

The financial resources of VFC come mainly from the forest management budget paid by HFD for afforestation activities and forest maintenance works, and their wages for village-level activities are included in the Table 13. According to HFD, they employ VFCs and villagers and pay their wages based on the State Government's cost norm when their own staff cannot be deployed and when they find it more efficient for monitoring, therefore the balance in the VFC's budget is appropriate.

The forest management budget includes wages for work on various activities. VFC also

conduct financial monitoring of microcredit by SHG. SHG operate income generation activities by using revolving funds provided during the project implementation period, to which SHG members' savings are added. The results of activities in 17 districts are shown in Table 14. Issues such as delays in repayment are reported to VFC and HFD in a timely manner, and countermeasures can be discussed anytime on-site and implemented straight away. Although the actual repayment is lower than the total loan amount, income and expenditures for these activities are recorded and managed by SHG members, and after VFC have checked them, these records are kept at the district office of HFD to secure transparency. HFD provides supports such as technical counseling for those who delay in repayment on ad-hoc basis and encourages repayment taking into consideration their livelihoods.

Table 14: Achievements of Microcredit

Unit: Rupee

	FY2012	FY2013	FY2014	FY2015
Total of loan amount	99,128,689	110,892,975	116,621,177	126,983,347
Repayment at fiscal year end	38,749,396	50,857,097	71,466,973	77,033,032
Total of savings	N/A	N/A	52,627,077	61,760,906
Savings and loans	N/A	N/A	87,974,696	90,668,294
Repayment of savings and loans	N/A	N/A	49,290,611	58,581,325

Source: Annual Activity Report (HFD Women Empowerment Cells)

No specific concern was found in the financial aspect of operation and maintenance at the time of the ex-post evaluation.

3.5.4 Current Status of Operation and Maintenance

(1) Haryana Forest Department

The status of forest management is favorable. HFD operates forest maintenance and quality improvement cooperating with villages through the planting of seedlings, weeding, removing unnecessary tree species, pruning lower branches, and thinning based on the canopy density and deaths of trees in each forest. The frequency of this work differs according to tree species, tree conditions and forest status. Table 15 shows the transition of afforestation work in the whole state from FY2011.

Table 15: Transition of Afforestation Work in Haryana State after the Project Completion

unit: ha

	FY2011	FY2012	FY2013	FY2014
Afforestation Area	16,576	21,741	23,950	23,845

Source: HFD Annual Report

Forests and trees in the state are recorded and managed by an MIS/GIS system established under the project. When foresters or forest guards confirm any differences from the existing

information (for instance, when trees are missing because of illicit felling, etc.), they transmit positioning data from their smartphones to HFD headquarters, which HFD then reflects in their system to ensure that their records are kept up to date.

Publicity and extension activities for residents have continued to be operated as social forestry activities at village level after the project completion. HFD keeps a list of all facilities and equipment of dams and water harvesting structures, in which they record each structure's status in detail. As for poverty reduction activities, HFD staff members were often visiting villages vigorously at the time of the ex-post evaluation, and support was provided for the improvement in residents' lives, especially for destitute women. These activities promote further understanding of and cooperation with afforestation activities at village level and contribute to the enhancement of JFM.

(2) Village Forest Committees

The focus group discussions with VFC members, which were held in the field survey of the ex-post evaluation, found that VFC and villagers operate forest protection and activities to prevent illegal felling, and that forest management has continued in practice (Table 16). After project implementation, villagers have operated not only afforestation, but also forest management and protection activities such as forest fire prevention and firefighting activities by groups. These activities are assumed to contribute to the improvement of the survival rates of trees. Moreover, at the discussions between SHG members and residents currently participating in the activities, statements were made such as “after project implementation, we work on afforestation and protection activities such as monitoring”, “we work on preventing damage caused by animals and the expansion of forest fires by creating trenches and fences for forest protection”.

Table 16: Status of Community Forest and Villages' Activities (at the Ex-Post Evaluation)

	Activity Detail
VFC	<ul style="list-style-type: none"> • Forest management and protection activities • Training for villagers (instruction in forest management, measures to prevent damage to trees and so on). • Instructions to prevent villagers themselves from damaging trees.
Roles of Villages	<ul style="list-style-type: none"> • Based on the directions of VFC, to watch and monitor the status of forests, patrols to prevent illicit felling, prevention of damage from animals, reporting of fires and support for firefighting activities, substitutional afforestation and patrols. • Reporting immediately to HFD and VFC on any occasion. • Consulting VFC and HFD regarding irrigation times for trees and implementing proper irrigation.

Source: Results of focus group discussions

When confirming the current status of operation and maintenance through on-site inspections and field interviews in three villages in Yamunanagar District, in the northern area of the state, it was found that VFC operated patrolling activities for the prevention of forest fires and illicit felling under the instructions of HFD. Concerns at field level were reported to HFD, and countermeasures were discussed and put into operation right away. Income generation activities were continued by SHG members, such as spice making, candle making, carpet production, sewing and the raising of livestock. Products were also sold.



Source: Taken by Evaluator (December 2016)

Photo 2: Local products from income generation activities (Yamunanagar District)

No specific concern was found in current status of operation and maintenance.

In summary, no major problems were observed in the institutional, technical, financial aspects and current status of the operation and maintenance system. Therefore the sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objectives of the project were to restore forests and improve the living standards of residents in Haryana State, northern India, by afforestation, soil and water conservation, poverty reduction, technical assistance and supporting activities, thereby contributing to forest conservation and the promotion of sustainable forest management in the state. Implementation of the project was highly relevant to India's development plan and development needs, as well as to Japan's ODA policy at the time of appraisal. Through implementation of the project, afforestation area, the survival rates of planted trees and the number of VFC that were formed have all accomplished their targets. The annual household income of the beneficiaries generally improved, and in particular an improvement in living standards was qualitatively confirmed among the residents targeted by the project (although the quantitative confirmation of the extent of that improvement was not possible as the executing agency did not collect data during the project period). Quantitative data endorsing project effectiveness regarding the groundwater table in the targeted districts for the construction of water harvesting structures was not available to a sufficient extent so as to confirm the effectiveness in an objective manner. Meanwhile, the project

had a certain effect on the improvement of forest and tree cover and the prevention of forest destruction in Haryana State and a contribution to forest conservation and the promotion of sustainable management in Haryana State was confirmed. It was too early to evaluate the benefit from forest products at the time of the ex-post evaluation. Therefore, the effectiveness and impact of the project are fair. On the other hand, both project cost and project period were within the plan, so the efficiency is high. No major concerns were found in the institutional, technical, financial aspects of operation and maintenance or current status, and therefore the sustainability of the project effects is high.

Considering the above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Promotion of Afforestation on Private Land

Under the project, efforts to expand tree areas were conducted through the introduction of community forest plantations and farm forestry, and these were continued by HFD after project completion. Exposed to various development pressures such as population increase and urbanization however, in some cases the cooperation of residents becomes impossible due to such influences as fluctuations in timber prices, climate change and the higher prices fetched by superiority of other crops.

Approximately 80% of Haryana State is agricultural land, and possibility of expanding forest areas to a large extent in Haryana State is not high near future. Under this situation, HFD intends to maintain and improve the quality, greening and afforestation of private land which will be essential to maintain and increase forest and tree cover in the future. To secure a better feasibility of farm forestry, for instance, providing incentives to residents is considered increasingly important from now on, as well as countermeasures on the part of the state government such as hedging risks by harvest purchase or compensation for costs.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

(1) Setting Operation and Effect Indicators for Measurement of Project Effects

As operation and effect indicators of the project, “annual household income of target villages to increase more than 10% in average in 12 sample villages” and “the groundwater table around forests to increase in 5 villages out of 10 with newly constructed reservoir structures” were provided. However, the executing agency did not collect data and no actual figures were available. A qualitative confirmation of the improvement in the living standards of residents was made

through an residents questionnaire survey as substitutional data. However, a quantitative confirmation of the degree of improvement was not possible. Objective confirmation of the fluctuation of the groundwater table in districts targeted for the construction of water harvesting structures was not possible without supporting quantitative data. The Groundwater table varied greatly according to altitude, use of land in the vicinity, the existence of irrigation structures and season, but information on these conditions was not provided. In addition, details of the excavation and management of wells remained unknown. The details of monitoring situation during project implementation was also difficult to obtain.

Considering this situation, the effectiveness of the project was evaluated as fair. It would be desirable to keep details of examination and discussion results in the agreed documents adequately at the time of appraisal on the appropriateness of operation and effect indicators, the party mandated to collect data, a practical method of measurement, time and location, etc. It would be also preferable to appropriately keep relevant information that was collected during project implementation, and describe the results of measurement in the project completion report.

(2) Implementation and Extension of Good Practices in the Long Term and in a Large Area

The intention of the project was to improve the living standards of residents through poverty reduction activities by employing external resources such as local consultants and NGO. The activities applied in the framework of the “Haryana Community Forestry Project” started in 1998, and, together with the preceding project, supporting activities for poverty reduction of residents operated on a large scale during a period of over ten years in an area of up to 1,100 villages in total.

After the completion of project activity, budget allocation was terminated and external resources were no longer employed for the promotion of poverty reduction activities. However, HFD created “Women Empowerment Cells” within their departments in the year of project completion to continue their supporting activities for residents, activity monitoring and to promote activities further. Although these activities require particular knowledge and know-how other than forest management and are additional work for HFD staff, they have been taken on by HFD and is established within the organization as a result of the implementation of “Haryana Community Forestry Project” and this Project. This was a project in which HFD collected and accumulated experience and know-how, which gave HFD the rationale for its existence and to continue promoting local understanding of, and cooperation with, afforestation works at village level through poverty reduction activities.

In cases where there are programs assisted by other agencies, successful models in the past and on-going projects by JICA, the executing agency could nurture more self-independence organizationally and technically, if support were given to the same executing agency to implement projects in the longer term and over a larger geographical area. In this way project activities could

be expected to become more sustainable without depending on the encouragement of donors or financial assistance.

<End>

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs		
(1) Participatory Afforestation	Total: 43,526.5 ha (total 800 villages)	Total: 50,814.6 ha (total 800 villages) (breakdown of villages by afforestation type is unknown)
1) Strip Plantations	Afforestation in 500 villages of 17 districts (Total: 20,000 ha). <ul style="list-style-type: none"> ➤ Tall plantation (4,000 ha) ➤ Ridge plantation (10,000 ha) ➤ Mix plantation of medicinal species (2,000 ha) ➤ Rehabilitation of degraded strip forest (4,000 ha) 	Implemented in 17 districts (Total: 22,019.3 ha). <ul style="list-style-type: none"> ➤ Tall plantation (4,461.25 ha) ➤ Ridge plantation (11,469.5 ha) ➤ Mix plantation of medicinal species (2,049.5 ha) ➤ Rehabilitation of degraded strip forest (4,039.0 ha)
2) Block Plantations	Afforestation in block forest in 150 villages of 17 districts (Total: 11,000 ha). <ul style="list-style-type: none"> ➤ Rehabilitation of degraded block forest (7,500 ha) ➤ Alkaline land plantation (1,500 ha) ➤ Mix plantation of medicinal species (2,000 ha) 	Implemented in 13 districts (Total: 11,018.0 ha). <ul style="list-style-type: none"> ➤ Rehabilitation of degraded block forest (7,755 ha) ➤ Alkaline land plantation (1,194 ha) ➤ Mix plantation of medicinal species (2,069 ha)
3) Community Forests	Afforestation in community area in 150 villages of 10 districts (Total: 4,000 ha). <ul style="list-style-type: none"> ➤ Mix plantation of medicinal species (2,000 ha) ➤ Silvi-pasture (2,000 ha) 	Implemented in 17 districts (Total: 3,916.0 ha). <ul style="list-style-type: none"> ➤ Mix plantation of medicinal species (2,494 ha) ➤ Silvi-pasture (1,192 ha) ➤ Alkaline land plantation (230 ha)
4) Farm Forestry	Afforestation on private land in 17 districts (total: 13,800 ha).	Implemented in 14 districts (total: 13,861.3 ha).
5) Nursery Improvement	HFD nursery modernization at 70 locations in 17 districts (concrete fences, sprinklers, greenhouse installation etc.)	Implemented modernization of nurseries at 67 locations in total in 16 districts.
6) Soil and Water Conservation Activity	<ul style="list-style-type: none"> ➤ Dry stone check dams (18,000 m³) ➤ Crate-wire structures (16,000 m³) ➤ New water harvesting structures (10 nos) ➤ Rehabilitation of the existing water harvesting structures (30 nos) 	<ul style="list-style-type: none"> ➤ Dry stone check dams (19,000 m³) ➤ Crate-wire structures (10,754 m³) ➤ New water harvesting structures (7 cases) ➤ Rehabilitation of the existing water harvesting structures (28 cases) ➤ Rehabilitation of ponds (40 cases)
(2) Poverty Reduction Activity		
1) Entry Point Activity	Plan to implement 800 cases in 17 districts.	Implemented 803 cases in 17 districts (wells, village roads, hand pumps etc.).
2) Skills Training	Implementation of job training for income generation activities (with a plan to utilize external resources such as government agencies of other states as district development agencies or irrigation departments or NGO for fields of expertise that HFD do not have).	Paper plates production, embroidery, dairy skill instruction, spice pulverization skills, supplemental food production skills, dyeing, soap production, herbal processed production, fungus cultivation, candle production, livestock rearing skills, compost production etc.
3) Provision of Microcredit	Income generation activities of 2,400 SHGs	Out of 2,400 SHG formed during the project period, 1,974 were approved after qualification requirement inspection. Out of 1,539 of SHG existed at the project completion time, 1,129 SHG operated savings and credit activities and income generation activities.

Item	Plan	Actual
(3) Supporting Activities		
<p>1) Publicity and Extension</p> <p>2) School Plantations and Environmental Campaigns</p> <p>3) Training</p> <p>4) Other Support</p>	<ul style="list-style-type: none"> • Residents support by mobile publicity teams • Awareness raising <p>In Gurgaon and Faridabad Districts, implement environmental education and afforestation (5 years) in 40 elementary schools per district annually, and environmental campaigns 6 times in total.</p> <p>Training implementation for forest skills, JFM and farm forestry targeting HFD staff, general residents and NGO.</p> <ul style="list-style-type: none"> • Investigation research for the improvement of tree species and conduct of experiments. • MIS/GIS development • Facility maintenance • The following facility maintenance was estimated: Training center improvement (2 locations), Range Offices (5 locations), Range residences (5 locations), Forester residences (10 locations), Forest guard huts (25 locations), Seed stores in nurseries (20 locations) • Equipment Maintenance, Vehicle Procurement The following equipment maintenance was estimated: Tractors (17), Tankers (17), Mini buses (2), Jeeps (9), Mini trolleys (17), Mobile irrigation systems (200) 	<p>Implemented activity monitoring at village level and provided guidance through mobile services.</p> <p>Through the “Children’s Forest” Program of OISCA North India, environmental education was implemented as planned.</p> <p>Training implemented targeting HFD staff and residents.</p> <ul style="list-style-type: none"> • Investigation research for the improvement of tree species and conduct of experiments: Implementation to improve various tree species and work to improve quality (tissue culture etc.) • MIS/GIS development: Installation of equipment such as computer and software. • Facility maintenance: Training center improvement (2 locations), Range offices (3 locations), Range residences (3 locations), Forester residences (5 locations), Forest guard huts (16 locations), Seed stores in nurseries (11 locations) • Equipment Maintenance, Vehicle Procurement: Tractors (12), Tankers (13), Mini Trolleys (12), Jeeps (10), Vehicle for firefighting (1), General Bus (1), Mini Buses (4), Official vehicle for staff (1), Mobile irrigation systems (144), Engine pumps (11), Pump Sets (3), Greenhouse (1), Projector (1), Computer (1)
(4) Technical Support	<p>Technical support for Implementation of Poverty Reduction Activities</p> <ol style="list-style-type: none"> 1) Lead Consultant (17 M/M): Needs research at VFC formation, JFM system formulation, creation of operation framework, coordination 2) Supporting activity consultant (19 M/M): Research of training needs for HFD staff and project beneficiary, program preparation, selection of on-site instructor 3) Poverty reduction consultant (88 M/M): SHG formation, activity support, specification and implementation of poverty reduction activities 4) Soil and water conservation baseline research consultant (planned workload unknown): Implementation of technical confirmation survey at construction of dam or reservoir structure 	<p>Implemented as planned. Total workload was added as below.</p> <ol style="list-style-type: none"> 1) Lead consultant 23 M/M 2) Supporting activity consultant 11 M/M 3) Poverty reduction consultant 604 M/M 4) Soil and water conservation baseline survey consultant 13 M/M
2. Project Period	March 2004 - March 2011 (85 months)	March 2004 - March 2011 (85 months)

Item	Plan	Actual
3. Project Cost		
Amount Paid in Foreign Currency	211 million yen	217 million yen
Amount Paid in Local Currency	7,407 million yen (2,860 million rupee)	6,744 million yen
Total	7,618 million yen	6,961 million yen
ODA Loan Portion	6,280 million yen	5,961 million yen
Exchange Rate	1 Indian rupee=2.59 Japanese yen (As of August 2003)	1 Indian rupee=2.19 Japanese yen (Average between 2004 and 2011)
4. Final Disbursement	June 2014	

<Column>

A case of school plantation and environmental campaign activities implemented through collaboration with an NGO

Skills training, income generation activities using small scale start-up funds, and school plantation and environmental campaign activities were implemented by the project, assuming use of field experiences, expertise, knowledge and know-how of local resource persons and national NGO.

This column introduces the school plantation and environmental campaign activities and is based on interviews with collaborating NGO, information collected and reports. It also summarizes the outcomes of the activities and accomplishments through collaboration with NGO in the project, and describes the evaluator's insights.

1. Outline of School Plantation and Environmental Campaign

- Name of activities: Children's Forest Program³⁷
- Organization: OISCA North India³⁸
- Period of activities: FY 2004 to FY 2008 (Five years)
- Target Area: Gurgaon and Faridabad Districts, Haryana State³⁹
- Target beneficiaries: 5th to 9th grade pupils at 400 primary and secondary schools in total (private and government)
- Activities: Orientation, plantation, advocacy activities (picture contests, speech contests, etc.), nature tours at national parks, training and seminars for teachers, development and distribution of environmental education materials (environmental calendars, posters, etc.)

³⁷ A program which OISCA International initiated in 1991. 4,891 schools in 36 countries and regions have participated in the program as of March 2017. Children plant and grow seedlings in their school complexes and neighboring sites, through which they nurture a caring mind toward the natural environment and desire to take care of greenery, to promote more greenery on the earth. It aims to promote region-wise development not only of the school children who participate in the program but also of their families and other residents in local communities.

³⁸ OISCA North India is based in Delhi and they have conducted their activities since 1991. With the vision of creating a world where all people coexist despite a variety of differences, and where they protect and build a platform for every kind of life on earth, OISCA International, established in 1961, extended its operations to 34 countries and regions mainly in Asian and Pacific regions as of March 2017. The majority of their collaboration is found in the field of rural development and environmental conservation, as found in their four pillars of activities: Children's forest programs (which was introduced in the project), human resources development programs, advocacy and dissemination programs, and overseas development programs. There is another OISCA organization in India: OISCA South India based in Kerala State, which started its activities in 1985. OISCA's children's forest program was adopted in the project since JICA had a keen interest in working together with OISCA in the project, according to the OISCA International Headquarters in Japan, as they had known of OISCA's programs in the Philippines which JICA highly evaluated, and that OISCA North India had already launched its activities in Haryana State at that time. The Children's forest program was adopted into the project as suggested by JICA.

³⁹ According to the administrative borders as of the ex-post evaluation, the two districts were divided into four: Gurgaon and Mewat Districts (divided from former Gurgaon in 2005), and Faridabad and Palwal (divided from former Faridabad in 2008).

2. Position of school plantations and environmental campaigns in the Project

The Gurgaon and Faridabad Districts are geographically adjacent to New Delhi, the country's capital, where rapid urbanization has taken place due to its prominent economic growth. Since the local situation was very different from the rest of the districts in Haryana State, it was decided at the time of the project appraisal that, after a series of various examinations on which measures should be applied to the two districts, that school-based plantations and environmental education be implemented.

The school plantations and environmental campaign activities, therefore, were not intended to directly affect the achievement of the project objectives (forest conservation and improvement in the life standard of local people). The Forest Department of Haryana State (HFD) did not intervene much except for providing technical advice and guidance.

3. Effects of the Activities

The major effects of the school plantations and environmental campaign activities are described as below.

3.1 Effect #1: Raising of Awareness in Local Communities

- Keen attention to and interest in the activities by local communities

Most of the schools where the activities were conducted are in the rural areas of both districts. It is rare at rural schools to have the opportunity to conduct plantation activities in an organized manner, or to participate in advocacy classes. To have people from outside their villages, which is also rare in rural areas, helped the activities to gain the attention of the local community. The fact that Haryana State Government people often visited their villages with OISCA North India staff and other outsiders was a very good reason for the adults and others of the parents' generation to be interested in the activities.



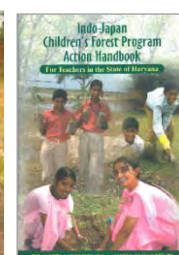
School children looking at the photos of children's forest program activities in other countries



OISCA staff explaining the outlook of the forest



Female pupil digging a hole to plant seedlings



Handbook for teachers (front cover)

Source: OISCA International Headquarters Tokyo

Photo 1: Snapshots of the activities

- Advocacy from children to their parents at home

Children reported what they had learned about forest conservation at school to their parents back home in the context where not all parents necessarily had good knowledge or awareness of forest conservation and environmental issues. It gave the parents a chance to learn through their children by the sharing of what they did not know at home, thus promoting their understanding of the activities.

3.2 Effect #2: Building roots for the activities at school

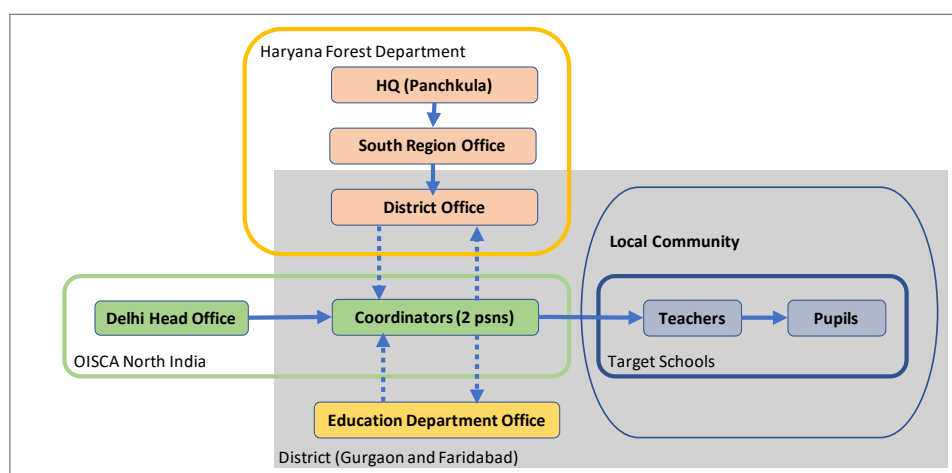
- Framework building and implementation mechanism development

OISCA North India deployed two coordinators at each district, who reported and coordinated with the Forest Department and Education Department to conduct school plantations and advocacy campaigns in Gurgaon and Faridabad.

They developed a plan of action at each school's convenience taking into consideration their annual events. Further, they donated relevant books to school libraries, provided plantation calendars, and tools for plantation (scoops, shovels, watering pots and buckets) to maintain and promote motivation as well as mitigate the financial burdens of schools.

- Training of teachers in charge

It was not children who were directly educated. OISCA North India created a framework for teachers to train children by training teachers in the know-how of the activities. An Action Handbook for teachers was developed and distributed so they could keep it at hand to refer to and use. The Handbook was elaborated by OISCA North India through discussions and exchanges of opinion with the project stakeholders, intellectuals and teachers in charge. They published English and Hindi editions in which many photos, pictures and figures are found to help attract the attention of readers and enhance learning effectiveness.



Source: Developed by the Evaluator based on the interview results with the project stakeholders.

Figure 6: Implementation Mechanism of OISCA North India

3.3 Effect #3: Laying the foundations for the sinking in of children's knowledge of forest conservation

Children continuously participated in the activities from 5th grade to 9th grade. OISCA's aim to focus on the same children for five years was so that they could make sure that the children's knowledge of plantations and forests would sink in by taking a certain period of time to continue teaching them. The elder children shared their knowledge and experiences with younger children in the same schools, and built roots of the activities.

4. Effects of collaboration with an NGO in the project

(1) Benefits of the Haryana State Forest Department

There were continual visitors from Japan to the project schools, which helped the Government of Japan know more about the Haryana State Forest Department. The local communities of Gurgaon and Faridabad Districts in which the target schools were located increased their understanding about the forest conservation through afforestation.

(2) Benefits to JICA

Publicity was enhanced since the activities in the two districts were implemented nearby the capital Delhi, and were regarded as a good practice of government and non-government partnership. Since the successful completion of the project in Haryana, JICA has applied collaboration models with NGO in forestry sector projects in other states based on the accomplishments in Haryana⁴⁰. The experience of working together with NGO in the forest sector projects, and examination of how they should collaborate with each other in those project components which have been accumulated up to the present have presented a valuable lesson.

(3) Benefits to OISCA North India

i. Accumulation of project experience

Upon implementation of the activities, OISCA obtained technical guidance and advice from the Haryana State Forest Department. More precisely, the Haryana State Forest Department gave interpretation of the soil quality and conditions of the two target districts to OISCA North India staff, and provided selection, recommendation and the distribution of several local species suitable for plantation in both districts. OISCA North India, based on technical advice given by the Forest department, distributed seedlings at target schools and gave instructions on the plantation.

⁴⁰ OISCA South India and OISCA North India participated in the "Karnataka Sustainable Forest Management and Biodiversity Conservation Project" (FY 2004 ODA loan project), and the "Uttar Pradesh Participatory Forest Management and Poverty Alleviation Project" (FY 2007 ODA loan project) respectively.

ii. Effects on publicity

Not only JICA representatives from their office of Delhi and headquarters Tokyo, but Members of the Diet, Ministers, university students, and secretaries of the Embassy of Japan visited the two districts as there was an increasing interest in the activities from the Government of Japan. Along with the project activities which OISCA North India implemented, their work in the country became better-known, and their popularity also increased.

iii. Ensuring reliability and credibility

OISCA North India gained a better understanding of their activities on the part of the Haryana State Forest Department, and their reliability and credibility increased.

5. Discussion

The Evaluator concludes that the project secured better effects in its school plantation and environmental campaigns through contracting OISCA North India. On the other hand, there is space for improvement and future tasks in making further and better use of the knowledge and experiences of NGOs for achieving the objectives of ODA projects, and building roots in their field activities in the future. The sections (1) and (2) below describe the rationale for this.

(1) OISCA North India's efforts for the accomplishment of the activity effects

- Collaboration with relevant organizations at ground level

It is worth mentioning that OISCA North India had good contacts and coordination with government organizations in Gurgaon and Faridabad Districts at the commencement of the school plantation and environmental campaigns of the project. According to OISCA North India, they directly got in touch with the Haryana State Education Department when they started the school activities to obtain a permit for the implementation of activities and a school list. Although the project was under the forest sector, coordination with relevant organizations within a short period was essential for smooth implementation of such multi-sector activities as found in the project and which included environmental education and school plantations. OISCA North India knew, from its long field experience in India, that endorsement by important government departments would be the key in the longer-term for smooth implementation. The activities were conducted as part of the project run by the Forest Department, while collaboration between the Education Department and OISCA was essential in the field. It is considered that OISCA's tacit knowledge and amount of experience helped things go smoothly with the Education Department, which was essential for the school-based activities.

- Activities targeting teachers

It is also considered that the activity framework worked well where OISCA trained teachers instead of children directly. The activity target was children at primary and secondary school, but sustainability depends on the extent to which teachers are committed to the project activities and how much effort they make. OISCA North India recognized well that activity sustainability depended on the school principals and teachers.

(2) Necessity of having a long-term vision

The school plantation and environmental campaign has not been continued by the Haryana Forest Department as their own program since the project ended. The following issues are some of the reasons behind this.

- i. The activities were planned with the prior assumption of having collaboration with an NGO, and started in Gurgaon and Faridabad Districts without a clear vision of a long-term dissemination.
- ii. The Forest Department did not have the chance to make use of the education effects achieved in the local communities in the two districts where target schools are located.
- iii. The activities of OISCA North India were not linked with those of the Forest Department (forest conservation works, afforestation works out of school, poverty alleviation activities, etc.).
- iv. The project period, five years, was too short for the Forest Department to develop know-how and a basic framework to continue the activities while the inputs (budget and human resources from outside of the department) ended upon project completion.
- v. The activities had accomplishments in only two districts, and these did not apply in the rest of the districts of Haryana State. There was no vision to disseminate the successful model of the activities in other districts apart from Gurgaon and Faridabad (or for other NGO to conduct the activities in parallel). (Note: As it is considered that being actively involved at 40 schools per year in two districts was the maximum extent possible for an NGO, it is not proposed to increase the number of schools per year.)
- vi. Taking the above i to v into consideration, the activity effects did not finally convince Haryana Forest Department that they were worth allocating a budget and continuing them as one of the Department's programs.

To summarize the above, by having a long-term vision to further try experimental activities that involve local organizations such as OISCA and to target a wider geographical area in Haryana State, it would have been possible to make more use of the know-how of OISCA North India and adopt them into ODA projects to ensure sustainability of the activities, i.e., succession and implementation by the Forest Department or the Education Department on their own initiatives.

According to OISCA North India, some private schools applied the school plantation and environmental campaign as one of their formal class programs since they highly appreciated the effects. On the other hand, most of the target 400 schools did not continue the activities after the project was over. In government schools, particularly, it is the quality and beliefs of principals and teachers that makes a big difference in the effects and sustainability of the activities, which implies that the activity's effectiveness and sustainability depends on individual efforts. Furthermore, the turnover of school staff every several years does not easily allow schools to continue activities. These are problems which are often faced by not only OISCA North India but NGOs and civil society organizations working at grass-root level. They are structural issues that make it difficult to promote good practices on the ground level into official systems and frameworks.

If NGO activities are adopted in future ODA projects, it would be desirable to support NGO in tackling their glass ceilings: the ODA side is expected to continue its efforts with the longer-term vision of working with the Forest Department and Education Department to take the successful model from field level into the official framework of cooperation projects between governments, thus being able to make proposals for the long-term in an effective manner that can influence the decision making of the State Government.

<End>

Democratic Socialist Republic of Sri Lanka

FY2016 Ex-Post Evaluation of Japanese ODA Loan Project

“Provincial Road Improvement Project & Provincial/Rural Road Development Project
(Central Province and Sabaragamuwa Province)”

External Evaluator: Keishi Miyazaki, OPMAC Corporation

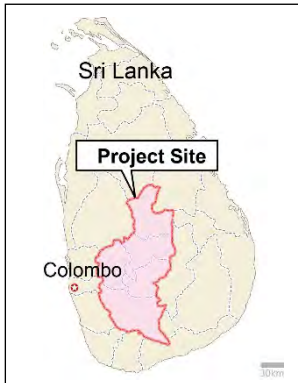
0. Summary

The objectives of this project are to enhance transport efficiency and accessibility to socio-economic services in Central Province and Sabaragamuwa Province in Sri Lanka by rehabilitating and upgrading the remarkably deteriorated provincial and rural roads¹ and bridges, and to strengthen their road maintenance system, thereby contributing to local economic development. The relevance is high, as the objectives were consistent with Sri Lanka’s development policies and development needs as well as with Japanese aid policies. The operation and effect indicators of this project such as increased daily average traffic volume, reduced vehicle operating cost and reduced travel time have largely attained their target values, and the project had qualitative effects such as improvements in accessibility to socio-economic services. There was also a positive impact on the activation of local economies. No negative impact on the natural environment was observed, and no land acquisition or resident resettlement was executed. Therefore, the effectiveness and impacts of this project are high. The efficiency of this project is fair, as both the project cost and project period exceeded the plan. Meanwhile, a minor problem has been observed in the institutional and financial aspects of the operation and maintenance system, therefore the sustainability of the project’s effect is evaluated to be fair.

In light of the above, this project is evaluated to be satisfactory.

¹ The road network in Sri Lanka is classified into Class A to Class E roads according to the road function. “Class A” roads are inter-provincial roads connecting major cities and ports, “Class B” roads are roads connecting major urban areas, “Class C” roads are major feeder roads connecting residential areas and markets, “Class D” roads are minor feeder roads connecting residential areas and markets, “Class E” roads are rural access roads to particular locations, and “Other roads” are plantation, forest and irrigation roads.

1. Project Description



Project Location



Provincial Road improved by the project in Nuwara Eliya, Central Province (Ketabulawa Thispane Road)

1.1 Background

In Sri Lanka, road transportation accounted for approximately 90% of the country's land transportation (passenger and cargo), and thus the road sector played a very important role in social and economic activities. On the other hand, the construction of new roads between urban areas and other main cities had been delayed, and in provincial/rural areas, there were many arterial roads between the main cities and road networks in the rural areas that had needed rehabilitation or widening. For this reason, the transportation efficiency of existing roads has remained low.

The central government was responsible for national roads, and the provincial government was responsible for provincial/rural roads in Sri Lanka. Although the government of Sri Lanka increased its investment in the road sector in the 1990s, provincial/rural roads suffered significant deterioration compared to national roads which caused problems in land transportation in rural areas. This was because provincial governments had greater budget restrictions and the departments in charge of the road sector lacked skills. Problems such as deterioration of the road surface were aggravated for approximately 550km in Central Province and 700km in Sabaragamuwa Province, and the rehabilitation was urgently necessary.

1.2 Project Outline

The objectives of this project are to enhance transport efficiency and accessibility to socio-economic services in Central Province and Sabaragamuwa Province in Sri Lanka by rehabilitating and upgrading the remarkably deteriorated provincial/rural roads and bridges and to strengthen their road maintenance system, thereby contributing to local economic development².

² This ex-post evaluation evaluates two related projects as one package project, and re-examines the explanation of the project objective by considering assumed steps for achieving the project objectives based on the logical sequence of "Input-Output-Outcome". The explanation was modified as shown in 1.2 Project Outline.

Project Name	Rural Road Improvement Project	Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province)
L/A No.	SL-P76	SL-P96
Loan Approved Amount/ Disbursed Amount	5,811 million yen / 5,787 million yen	9,156 million yen / 9,143 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 2003 / March 2003	March 2010 / March 2010
Terms and Conditions	Interest Rate: 2.20% Repayment Period: 30 years (Grace Period:10 years) Conditions for Procurement: General Untied	Interest Rate: 1.40% (Main Contract) Interest Rate: 0.01% (Consulting Services) Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied
Borrower / Executing Agency(ies)	Democratic Socialist Republic of Sri Lanka / Ministry of Local Government and Provincial Council	
Project Completion	April 2010	December 2015
Main Contractor(s) (Over 1 billion yen)	—	—
Main Consultant(s) (Over 100 million yen)	Joint Venture: Nippon Koei Co., Ltd (Japan) / Engineering Consultants Ltd. (Sri Lanka) / Halcrow Group Ltd. (U.K.)	Joint Venture: Engineering Consultants Ltd. (Sri Lanka) / MG Consultants (PVT), Ltd. (Sri Lanka)
Feasibility Studies, etc.	United Nations Development Program, “Mid Country Rural Roads Network Feasibility Study for Central and Sabaragamuwa Provinces” (2001).	Asian Development Bank, “Road Project Preparatory Facility”, (2008).
Related Projects	[ODA Loan] <ul style="list-style-type: none"> • Pro-Poor Rural Development Project (2007) • Provincial/Rural Road Development Project (Eastern Province) (2010) [Asian Development Bank] <ul style="list-style-type: none"> • Road Sector Development Project (2003-2008) 	

2. Outline of the Evaluation Study

2.1 External Evaluator

Keishi Miyazaki (OPMAC Corporation)

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted as follows:

Duration of the Study: September 2016 – October 2017

Duration of the Field Study: January 5 – February 4, 2017, May 1 – May 13, 2017

3. Results of the Evaluation (Overall Rating: B³)

3.1 Relevance (Rating: ③⁴)

3.1.1 Consistency with the Development Plan of Sri Lanka

At the time of the appraisal for the Rural Road Improvement Project (2003), *the Poverty Reduction Strategy Paper*⁵ (December 2002), which was a national development strategy focusing on poverty reduction, listed the transportation sector, along with the communication sector, as important sectors that promoted the participation of the poor in the economic growth process. In particular, it outlined a policy for facilitating an environment that reduced the cost of accessibility to the market for the poor, making it easier to mobilize labor by constructing a highway network, maintaining the existing road network, improving bus and railway services, and improving transportation from rural areas to the cities. *The National Road Policy (1997)* of the Ministry of Highways identified the need for designed road network development in order to contribute to the social and economic development of Sri Lanka. For this purpose, reduced travel time with safety, improved comfort during transportation, and a response to the traffic volume of domestic passengers and cargos for the present and the future were all included. Furthermore, *the National Transportation Policy (2000)* identified the following challenges for the road sector: (i) systematic planning with consideration of the needs of development projects, (ii) coordination of strategies and policies in the transportation sector, (iii) development of the road network between Colombo and other regions, (iv) alleviation of traffic congestion in the Colombo region, (v) the finding of countermeasures against air pollution caused by exhaust gas, and (vi) strengthening of the maintenance system. Improvement of the operation and maintenance skills for the two target provincial roads was included in the scope of the Rural Road Improvement Project, which matched with (vi) above.

At the time of the appraisal for the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province) (2010), *the Ten-Year Development Plan (2006-2016)*

³ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory.

⁴ ③: High, ②: Fair, ①: Low.

⁵ Connecting to Growth: Sri Lanka's Poverty Reduction Strategy.

(*Mahinda Chintana*) indicated the need for the development of road networks to sustain regionally balanced economic growth. In particular it identified the improvement of deteriorated provincial and rural roads as an urgent issue. Also, *the National Road Master Plan (2007-2017)* proposed the development of road networks connecting the hubs of economic growth in the country.

At the time of the ex-post evaluation, *the Ten-Year Development Plan (2006-2016)* aimed at doubling the per-capita income. The development of road infrastructure to vitalize economic activities was set as an important agenda. In *the Public Investment Program (2017-2020)* established in February 2017, the road sector accounts for 20% of investment budget, which is the greatest percentage of all investment budget for the three years. The road sector is thus considered as important in Sri Lanka. Currently, there is no particular provincial road development plan in Central Province and in Sabaragamuwa Province. However, according to the provincial governments, the improvement and development of the provincial and rural road networks have the highest priority.

3.1.2 Consistency with the Development Needs of Sri Lanka

At the time of the appraisal for the Rural Road Improvement Project, maintenance of provincial/rural roads had been delayed compared to that of national roads, although the government of Sri Lanka had been increasing investment in the road sector since 1990s. The Asian Development Bank (ADB) began supporting the rehabilitation of provincial/rural roads in the Western Province, the North Western Province, the North Central Province and Uva Province during *the Road Sector Development Project (2003-2008)*. However, in the Central Province and Sabaragamuwa Province, which were not included in the ADB project, deterioration of the road surface was aggravated for distances of approximately 550km and 700km respectively, and the need for rehabilitation was urgent. In order to respond to this need, the Japanese ODA loan, the “Rural Road Improvement Project” aiming at rehabilitating deteriorated each approximately 300km (total approximately 600km) of provincial/rural roads in Central Province and Sabaragamuwa Province was implemented. The “Rural Road Improvement Project” and the above mentioned ADB project had much in common in the following points such as the contents of civil engineering and the skill improvement of the executing agencies, as well as the demarcation of the target provinces. Thus, both agencies were to work together to facilitate the progress of project implementation as well as to improve the project effects.

However, there was a significant budget shortage due to a steep rise in the price of construction materials and equipment which led to an inevitable cutback in the plan. As a result, the project was only able to rehabilitate approximately 140km of provincial/rural roads in the Central Province and 160km of provincial/rural roads in Sabaragamuwa Province. For this

reason, it was necessary to improve approximately 300km of unrehabilitated provincial/rural roads in the two target provinces. A feasibility study⁶ of provincial roads throughout Sri Lanka conducted in 2008 had again indicated the urgent need for the rehabilitation of provincial roads in the Central Province and Sabaragamuwa Province for approximately 300km and 250km respectively. This was in consideration of regional balance based on population, poverty rate and traffic volume. From these, the “Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province)” was implemented as a subsequent project after the “Rural Road Improvement Project”.

The total length of the road network within the two target provinces at the time of the ex-post evaluation was 10,056km in the Central Province (1,747km of national roads and 8,309km of provincial/rural roads) and 15,826km in Sabaragamuwa Province (1,220km of national roads and 14,606km of provincial/rural roads). The percentage of provincial/rural roads in each province was extremely high, accounting for 83% and 92% of the overall roads (Table 1). However, there were quite a few provincial or rural roads that were in need of continuous rehabilitation due to deterioration of the pavement. According to the Sabaragamuwa Provincial Road Development Department (PRDD), 54% of its provincial roads (approximately 1,500km) were in need for rehabilitation. Also, most of the rural roads in the two target provinces remained unpaved. The ongoing ADB project the “*Integrated Road Investment Program*”⁷ (2014-) is in the process of improving national, provincial and rural roads in five provinces, including the Central Province and Sabaragamuwa Province. The ADB project includes the provincial/rural roads in great need for rehabilitation in the Central Province and Sabaragamuwa Province which could not be accommodated in the two target projects.

Table 1: National, Provincial and Rural Roads in Central and Sabaragamuwa Provinces

Unit: km

	National Roads			Provincial Roads			Rural Roads	Total
	Class A	Class B	Sub total	Class C	Class D	Sub total	Class E Other roads	
Central Province	409	1,338	1,747	1,666	578	2,244	6,065	10,056
Sabaragamuwa Province	416	804	1,220	1,247	1,544	2,791	11,815	15,826

Source: Central Bank of Sri Lanka, Department of Census and Statistics Sri Lanka

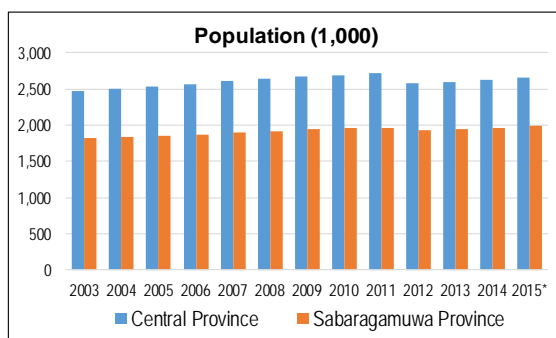
Note: The above figures are based on the data of 2016.

⁶ Road Project Preparatory Facility (RPPF) supported by ADB. However, the RPPF does not include the target roads of the Rural Road Improvement Project (SL-P76).

⁷ Integrated Road Investment Program. The ADP project plans to rehabilitate 300km of national roads in Central Province, Sabaragamuwa Province, North Central Province, North Western Province and Kalutara District (Western Province) as well as 3,100km of provincial/rural roads.

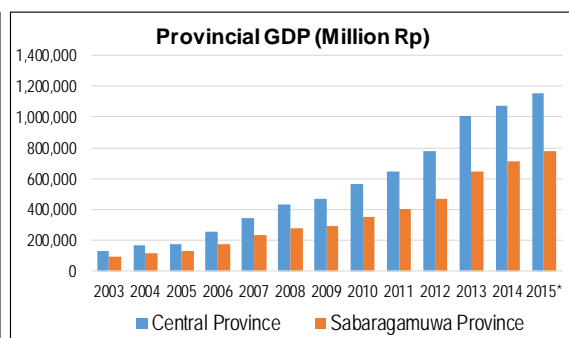
While the population of the two target provinces did not show a significant change in the 12 years between 2003 and 2015, their economies continued to expand with their provincial GDP showing the high growth rate of 19% annually on average during the same period. In addition, the number of registered vehicles increased 4 times from approximately 91,000 to 365,000 in the Central Province and 5.3 times from 58,000 to 310,000 in Sabaragamuwa Province during the same period (Figure 1, Figure 2, and Figure 3). Because railroad infrastructure is underdeveloped in Sri Lanka, roads are the main means of transportation and there is expected to be further demands for expansion of road traffic and transportation due to the development of local economies and an increase in the number of registered vehicles. Therefore, there is a high need for the continuous rehabilitation and improvement of the provincial/rural road network, including provincial and rural roads, in the two target provinces.

Figure 1: Population of the Two Target Provinces



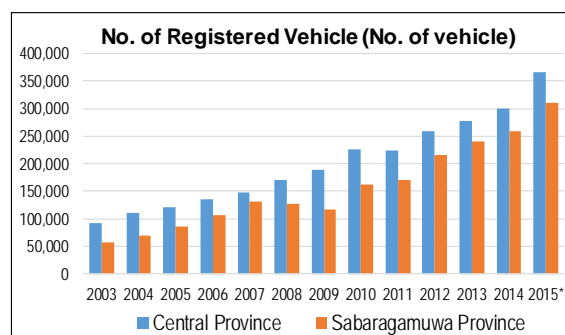
Source: Central Bank of Sri Lanka
Note: Data in 2015 are estimates.

Figure 2: Provincial GDP of the Two Target Provinces



Source: Central Bank of Sri Lanka
Note: Data in 2015 are estimates.

Figure 3: Number of Registered Vehicles in the Two Target Provinces



Source: Central Bank of Sri Lanka
Note: Data in 2015 are estimates.

3.1.3 Consistency with Japan's ODA Policy

At the time of the appraisal for the Rural Road Improvement Project, *the Country Assistance Program for Sri Lanka (April 2004)* had not yet been prepared. However, the priority areas of Japan's ODA policy to Sri Lanka at that time focused on the two main pillars of "support for the establishment and restoration of peace" and a "support plan with a vision for mid and long-term development". The latter included "institutional reform and support for the development of an economic foundation"⁸. Furthermore, *JICA's Country Assistance Strategy for Sri Lanka (2002)* included its policy to support the improvement of skills of the executing agencies in planning and maintenance for the development of the provincial/rural road network which was one of the factors that had caused delay in rural development.

At the time of the appraisal for the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province), *the Country Assistance Program for Sri Lanka (April 2004)* showed the same priority areas as it had at the time of the appraisal for the Rural Road Improvement Project. *JICA's Country Assistance Strategy for Sri Lanka (2008)* mentioned the need to "develop infrastructure for mid and long-term economic growth which contributes to the elimination of regional disparities". The aim of this project was to improve the significantly deteriorated surface of provincial/rural roads, and to develop the basic economic infrastructure for daily life. Therefore, it is consistent with the priority areas of Japan's ODA policy to Sri Lanka, *the Country Assistance Program for Sri Lanka (April 2004)* and with *JICA's Country Assistance Strategy for Sri Lanka (2002 and 2008)* at the time of the appraisal of two target projects.

In light of the above, this project has been highly relevant with Sri Lankan development plan, development needs, as well as Japan's ODA policy. Therefore, its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

A comparison between the Plan and Actual of the project output summary for the two target projects is shown in Table 2.

⁸ Source: *Japan's ODA Data by Country (2004)*, Ministry of Foreign Affairs

Table 2: Project Output (Plan/Actual)

Item	Plan	Actual
[Rural Road Improvement Project (SL-P76)]		
(1) Rehabilitation and upgrading of roads	<ul style="list-style-type: none"> Central Province: 308km Sabaragamuwa Province: 304km Total: 612km 	<ul style="list-style-type: none"> Central Province: 143.2km Sabaragamuwa Province: 159.4km Total: 302.6km
(2) Rehabilitation and upgrading of bridges	<ul style="list-style-type: none"> Central Province: 28 Sabaragamuwa Province: 12 Total: 40 	<ul style="list-style-type: none"> Central Province: 5 Sabaragamuwa Province: 12 Total: 17
(3) Renovation of office buildings	<ul style="list-style-type: none"> Renovation and expansion of PRDA/PRDD head office and district offices 	<ul style="list-style-type: none"> Same as planned
(4) Procurement of equipment	<ul style="list-style-type: none"> Equipment for mobile emergency road maintenance teams Operation and maintenance equipment Equipment for provincial training centers and laboratories 	<ul style="list-style-type: none"> Same as planned
(5) Rectification of flood damages (Additional scope)	—	<ul style="list-style-type: none"> Rectification of target roads which were damaged by floods after project completion
(6) Consulting services	<ul style="list-style-type: none"> Review of feasibility study, assistance in bidding, supervision of civil works, and environmental monitoring Capacity building Collaboration with Community-based Organizations (CBO) (rehabilitation of rural access roads, etc.) Work volume: 1,637.0M/M 	<ul style="list-style-type: none"> Same as planned Same as planned Same as planned 2,016.6M/M
[Provincial/Rural Roads Development Projects (Central Province & Sabaragamuwa Province) (SL-P96)]		
(1) Rehabilitation and upgrading of roads	<ul style="list-style-type: none"> Central Province: 170km Sabaragamuwa Province: 180km Total: 350km 	<ul style="list-style-type: none"> Central Province: 163.5km Sabaragamuwa Province: 137.5km Total: 301km
(2) Rehabilitation and upgrading of bridges	<ul style="list-style-type: none"> Central Province: 46 Sabaragamuwa Province: 75 Total: 121 	Total: 104
(3) Procurement of equipment	<ul style="list-style-type: none"> Equipment for road pavement, and operation and maintenance 	<ul style="list-style-type: none"> Same as planned
(4) Rectification of flood damages (Additional scope)	—	<ul style="list-style-type: none"> Rectification of target roads which were damaged by floods after project completion
(5) Consulting services	<ul style="list-style-type: none"> Review of feasibility study, assistance in procurement, supervision of civil works, and environmental monitoring Technical transfer for operation and maintenance of roads Rehabilitation of 25 rural roads (CBO roads) connecting to provincial roads Work volume: 1,738M/M 	<ul style="list-style-type: none"> Same as planned Same as planned Same as planned 2,531.3M/M

Source: JICA internal documents, Ministry of Local Government and Provincial Council.

Note: Information on the breakdown of 104 bridges actually rehabilitated and upgraded by the project could not be obtained from the executing agency.

When the Rural Roads Improvement Project was first planned in 2003, it was supposed to improve the significantly deteriorated road surface of 612km provincial and rural roads (308km in the Central Province, and 304km in Sabaragamuwa Province). However, there was a steep rise in the cost of road improvement caused by the following three factors: (i) a steep rise in the cost of construction materials, (ii) increase in fuel costs caused by a steep rise in oil prices, and (iii) a steep rise in domestic labor costs. For these reasons, the total extension of the target roads had to be reduced from the planned 612km to 302.6km. In addition, the rehabilitation of bridges was reduced from the planned 40 locations to 17 locations. The improvement of the remaining 309.4km provincial/rural roads in the two target provinces (164.8km in the Central Province, and 144.6km in Sabaragamuwa Province) was taken over and implemented by the subsequent Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province). However, 81.2km of 144.6km of roads in Sabaragamuwa Province was in urgent need of rehabilitation and this was therefore implemented with the Sri Lankan government's own funds and was thus excluded from the scope of the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province). Instead, the Sabaragamuwa provincial government requested that 92.3km of road which was in great need of rehabilitation be included in the project target based on the results of the feasibility study of provincial roads nationwide (2008) mentioned earlier. Thus, this became eligible for the project.

In the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province), the planned rehabilitation of roads was 350km (170km in the Central Province, and 180km in Sabaragamuwa Province) while the actual distance was 301km (163.5km in the Central Province and 137.5km in Sabaragamuwa Province). The planned rehabilitation of bridges was 121 locations while the actual number was 104. The reason for the actual road rehabilitation being shorter by 49km was that the project target length had to be reduced from 350km to 301km due to the increase in construction costs between 2010 and 2012. This was caused by the restoration of public safety after the end of the civil war in 2009, and the construction and restoration boom that came as a result.

Considering the above, a total of 623.1km, was identified as the planned output for the road rehabilitation component of the overall two target projects. This was made up of the planned value of 612km target road extension of the Rural Road Improvement Project, plus the difference of 11.1km ($= 92.3\text{km} - 81.2\text{km}$) generated by the replacement of the target roads in Sabaragamuwa Province at the time of the project planning for Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province). Meanwhile, the actual output for the Rural Road Improvement Project was 302.6km and the actual output for the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province) was 301km. Therefore, the actual output of the road rehabilitation component for the overall

two target projects became 603.6km (96.9% against the plan). At the time of the ex-post evaluation, the above two projects were evaluated in an integrated manner, and from that point of view, the road rehabilitation component was implemented almost as planned. The overall 603.6km of the improved roads from the two target projects were all provincial roads.

For the Rural Road Improvement Project, although the rehabilitation of 302.6km provincial roads was completed in December 2009, some provincial roads in the two target provinces were damaged by floods caused by severe rainstorms occurring at the end of 2010 and the beginning of 2011 and were in need of rehabilitation. The project therefore repaired the damaged parts (sand sealing, repair of potholes, etc.) as an additional scope utilizing the residual funds of the loan, targeting 186.4km provincial road. The Road Development Authorities of the two target provinces were directly in charge of supervising this additional scope. Similarly, the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province) implemented the rehabilitation of some provincial roads in the Central Province that had been damaged by floods following the improvement of the roads. These additional scopes were in response to the flood damage to completed roads, and were measures that were relevant in sustaining the project effects.

In addition to the improvement of roads and bridges, the two projects implemented the renovation and expansion of the Provincial Road Development Authority headquarters and regional offices, as well as the purchase of materials and equipment including equipment for mobile emergency road maintenance teams, operation and maintenance equipment and equipment for provincial training centers and experimental materials, as planned.

Consulting services were also implemented as planned. For the capacity building component in particular, strengthening of the capacity of the implementing agencies was conducted, including technology transfer for road operation and maintenance for the Road Development Authorities in the two target provinces. To be more precise, the project introduced the Road Maintenance Management System (RMMS⁹) to the Road Development Authorities in the two target provinces through with the development and customization of RMMS, the creation of an RMMS user's manual, the creation of provincial road maps, the collection of provincial road inventory data, and the implementation of training. For the capacity building component, a training program was implemented for 1,141 staff members in total for the two projects (65 in oversea training and 1,076 in domestic training). Furthermore, for the consulting services, the activities of Community-Based Organizations (CBO) within the target regions were given support, work was carried out together for the synergetic effects of the projects. To be precise, support was given for improvement work on the access roads (equivalent of class E roads) that connect the rural areas and sub-artery roads, and for the

⁹ RMMS is a system which prioritizes maintenance from the view point of economic efficiency, based on road surface data and traffic volume.

construction of community halls, as suggested by the CBO of the target regions¹⁰. The Provincial Road Development Authorities provided technical guidance and support in payment for the necessary materials and equipment. As the result, 23 rural access roads (CBO roads) in the Central Province and 10 rural access roads in Sabaragamuwa Province were improved.

Implementation Scheme of the Project

The executing agency of this project was the Ministry of Local Government and Provincial Council (MLGPC). It was responsible for advice for and supervision of local government policies and project implementation, the distribution of subsidies from central to local governments, and coordination between central and local governments. The Development Department of MLGPC handling development projects in the rural areas was responsible for this project. Meanwhile, each Provincial Road Development Authority/Department in the Central Province and Sabaragamuwa Province was in charge of the tenders for the rehabilitation, for construction supervision and the maintenance of the provincial/rural roads and bridges in the two target provinces. A Project Management Unit (PMU¹¹) was set up in the Development Department of MLGPC, and under their supervision, Project Implementation Units (PIU) were set up in each of the two target provinces. The PMU was responsible for the coordination between organizations and provinces, project planning, project management, financial management and the procurement procedure in hiring construction-supervising consultants. The PIU were responsible for project management at the provincial level, procurement for civil engineering work and project monitoring. A National Project Steering Committee (NPSC) was set up at the central level, and a Provincial Project Steering Committee (PPSC) was set up at the provincial level for the purpose of project monitoring.

According to interviews with MLGPC, the Central Province and Sabaragamuwa Province, demarcation of the responsibilities and roles of PMU and PIU was clear, the NPSC and PPSC met monthly or quarterly to discuss project monitoring and issues, and all necessary coordination was conducted smoothly under this implementation scheme. Thus, this implementation scheme has functioned effectively.

¹⁰ For the tie-up projects with CBO, applications were submitted by the CBO, and the target projects were refined through proposal evaluation. For the financial sources of the target projects, the NGO collaboration fund which was funded by the grant money allocated from a part of consulting service costs was utilized.

¹¹ The PMU consists of senior members such as the project director appointed by the deputy secretary of the Ministry of Local Government and Provincial Council, procurement experts, engineers, accountants, internal auditors, and secretaries, as well as supporting staff.

Provincial Roads Rehabilitated and Equipment Procured by the Project



Provincial Road in Kandy District,
Central Province
(Hanthana Udawela Road)



Provincial Road in Matale District,
Central Province
(Kaduwela Wehigala Leliambe Road)



Provincial Road in Ratnapura District,
Sabaragamuwa Province
(Mahagalahena Silidunkanda
Hettikanda Road)



Testing Equipment in Laboratory
(PRDA, Central Province)



Maintenance Equipment
(PRDA, Central Province)



Head Office of PRDA, Central
Province renovated by the Project

3.2.2 Project Inputs

3.2.2.1 Project Cost

For the Rural Road Improvement Project, the actual project cost was 8,636 million yen against the planned cost of 7,748 million yen (Table 3). For the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province), the actual project cost was 10,410 million yen against the planned cost of 11,171 million yen (Table 4).

The main reason for the cost overrun in the Rural Road Improvement Project was a sharp increase in the civil engineering cost caused by (i) a steep rise in the price of construction materials (mostly asphalt and cement aggregate), (ii) an increase in fuel price caused by a steep rise in oil prices, and (iii) a steep rise in labor costs.

For this reason, the total road extension was reduced by half of what was originally planned. Meanwhile, the rectification of flood damage was implemented as an additional scope using 347 million yen which consists of residual fund of the loan (mostly from unused budget for consulting services) and an additional share by the government of Sri Lanka. For the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province), the restoration boom after the end of the civil war in 2009 resulted in increased construction costs, and therefore the total road extension was cut back by 49km in order to adjust the actual project cost within the planned cost.

Table 3: Project Cost for Rural Road Improvement Project (Plan/Actual)

Item	Plan (2003)			Actual (2011)
	Foreign Currency	Local Currency	Total	Total
	(Million Yen)	(Million Yen)	(Million Yen)	(Million Yen)
Civil Works	1,394	3,510	4,904	5,898
Rectification of flood damage (Additional scope)	—	—	—	533
Contingency	139	351	490	0
Consulting services	702	233	935	911
Administration costs	0	127	127	0
Tax and duties	0	949	949	1,069
Interest during construction	343	0	343	225
Total	2,578	5,170	7,748	8,636

Source: The internal documents of JICA and the Ministry of Local Government and Provincial Council.

Note: The exchange rate used for the planned project cost is 1 rupee = 1.29 yen (as of November 2002). The exchange rate used for the actual project cost is 1 rupee = 0.979 yen (average between 2003-2011).

Table 4: Project Cost for Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province) (Plan/Actual)

Item	Plan (2010)			Actual (2015)
	Foreign Currency	Local Currency	Total	Total
	(Million Yen)	(Million Yen)	(Million Yen)	(Million Yen)
Civil works and procurement of equipment	0	6,310	6,310	9,270
Consulting services	147	526	673	673
Price escalation	0	1,798	1,798	0
Contingency	0	405	405	0
Land acquisition	0	0	0	0
Administration costs	0	459	459	210
Tax and duties	0	1,129	1,129	0
Commitment charge	44	0	44	30
Interest during construction	352	0	352	227
Total	543	10,627	11,171	10,410

Source: The internal documents of JICA and the Ministry of Local Government and Provincial Council.

Note 1: The exchange rate used for the planned project cost is 1 rupee = 0.786 yen (as of December 2009). The exchange rate used for the actual project cost is 1 rupee = 0.764 yen (average between 2010-2015).

Note 2: As the figures are rounded by million unit, some of the total numbers do not match the total value in the above table.

At the time of the ex-post evaluation, the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province) was regarded as a subsequent project to attain the original project scope planned by the Rural Road Improvement Project (improvement of approximately 600km provincial/rural roads in the two target provinces). An additional loan was therefore granted for the unimplemented part of the preceding project. For this reason, it was considered that the necessary investments had been made in order to complete the original project scope although there had been a split into two projects. Therefore, in the evaluation of the sub-rating of the project cost, these two projects were integrated as one. The comparison of the planned project cost and the actual project cost

was made after adjustment of the planned project cost for each project, based on the achievement rate of the actual output (actual road extension) against the planned output (planned road extension) for each project¹². As its result, the revised actual total project cost was 18,513 million yen (138% against the plan), which exceeded the revised planned project budget of 13,404 million yen (Table 5).

Table 5: Revised Project Cost of Two Target Projects

Project Name	Revised Planned Project Cost	Revised Actual Project Cost
Rural Road Improvement Project	3,797 million yen (=7,748 million yen x 49%)	8,103.5 million yen (Excluding cost for rectification of flood damage)
Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province)	9,607 million yen (=11,171 million yen x 86%)	10,409.6 million yen
Total	13,404 million yen	18,513.1 million yen

Source: Prepared by the evaluator.

Note 1: The achievement rate of the outputs of the Rural Road Improvement Project was 49% as the actual total road length was 302.6km against the planned total road length of 612km.

Note 2: The achievement rate of the outputs of the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province) was 86% as the actual total road length was 301km against the planned total road length of 350km.

Note 3: The cost for the restoration from flood damage spent in the Rural Road Improvement Project was excluded from the revised actual project cost as it did not have any direct relationship with the achievement of the planned outputs.

3.2.2.2 Project Period

For the Rural Road Improvement Project, the actual project period was 86 months (from March 2003 to April 2010) against the planned project period of 67 months (from March 2003 to September 2008) (equivalent to 128% of the original plan) (Table 6). For the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province), the planned project period was 47 months (from March 2010 to January 2014) against the actual project period of 70 months (from March 2010 to December 2015) (equivalent to 149% of the original plan) (Table 7).

¹² The total road extension was used as the baseline for the planned and actual outputs when obtaining the project's sub-rating for the project's cost, and the bridges were not taken into consideration as they were relatively small in scale and their proportion within the project cost was small.

Table 6: Project Period of Rural Road Improvement Project (Plan/Actual)

Item	Plan	Actual	Actual (Revised)
1. Signing of L/A	Mar. 2003	Mar. 2003	Mar. 2003
2. Procurement of consultants	Apr. 2003 – Mar. 2004	Mar. 2003 – Feb. 2005	Mar. 2003 – Feb. 2005
3. Consulting services	Apr. 2003 – Sep. 2008	Mar. 2005 - Dec. 2009	Mar. 2005 – Dec. 2009
4. Procurement of main contracts	July 2004 – Sep. 2006	Phase 1: End in Apr. 2006 Phase 2-1: End in Sep. 2007	Phase 1: End in Apr. 2006 Phase 2-1: Sep. 2007
5. Civil works	Apr. 2005 – Sep. 2008	End in Dec. 2009	End in Dec. 2009
(Rectification of flood damage)	—	Mar. 2011 – May 2011	
6. Project completion	Sep. 2008	May 2011 ^(Note 1)	Apr. 2010 ^(Note2)
7. Total project period	Mar. 2003 – Sep. 2008 (67 months)	Mar. 2003 – May 2011 (98 months)	Mar. 2003 – Apr. 2010 (86 months)

Source: The internal documents of JICA and Ministry of Local Government and Provincial Council.

Note 1: The project completion of the actual project period is deemed to be the expiry data of loan agreement.

Note 2: The project completion of the revised actual project period is the time when all civil works were once completed. The period spent for the rectification of flood damage which took place after that is not included in the revised actual project period.

Table 7: Project Period of the Provincial/Rural Road Development Project
(Central Province and Sabaragamuwa Province) (Plan/Actual)

Item	Plan	Actual	
		Central Province	Sabaragamuwa Province
1. Signing of L/A	Mar. 2010	Mar. 2010	
2. Procurement of consultants	Jan. 2010 – Sep. 2010	Jan. 2010 – Oct. 2011	
3. Consulting services	Oct. 2010 – Jan. 2014	Nov. 2011 – Oct. 2015	
4. Procurement of main contracts			
Phase I	Apr. 2010 – Sep. 2010	Oct. 2010 – Mar. 2011	Dec. 2010 – May 2011
Phase II-1	Jan. 2011 – June 2011	Oct. 2011 – Nov. 2012	Oct. 2011 – Mar. 2012
Phase II-2	July 2011 – Dec. 2011	July 2012 – Dec. 2012	Oct. 2011 – Mar. 2012
Phase III	Jan. 2012 – June 2012	Jan. 2015 – Apr. 2015	Oct. 2011 – Mar. 2012
5. Civil works			
Phase I	Oct. 2010 – Apr. 2012	Aug. 2011 – Feb. 2015	Oct. 2011 – Feb. 2015
Phase II-1	July 2011 – Jan. 2013	Apr. 2012 – Apr. 2015	Sep. 2012 – Feb. 2015
Phase II-2	Jan. 2012 – July 2013	Dec. 2012 – July 2015	Nov. 2012 – Oct. 2015
Phase III	July 2012 – Jan. 2014	—	Dec. 2013 – Dec. 2015
(Rectification of flood damage)	—	Apr. 2015 – July 2015	—
6. Defect liability period	Jan. 2014 – Jan. 2015	End in July 2016	End in Jan. 2017
7. Project completion ^(Note)	Jan. 2014	Dec. 2015	
8. Total project period	Mar. 2010 – Jan. 2014 (47 months)	Mar. 2010 – Dec. 2015 (70 months)	

Source: The internal documents of JICA and the Ministry of Local Government and Provincial Council.

Note: The project completion of the actual project period is the completion of all civil works.

This ex-post evaluation examined the sub-rating of the project period as a single project by weighting the average of the two different results comparing the planned and actual project periods of the two target projects with the actual/planned output ratio, i.e. 50% for the Rural Road Improvement Project and 50% for the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province). As the result, the actual project period of the two target projects overall was 139% of the planned period, which exceeded the plan.

3.2.3 Results of the Calculations for Internal Rates of Return (Reference only)

The Economic Internal Rate of Return (EIRR) was 27.2% for the Rural Road Improvement Project, and 21.6% for the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province) at the appraisal. For the EIRR of each project, 10 sample roads (5 roads from the Central Province, 5 roads from Sabaragamuwa Province) were selected from the target roads, their individual EIRR was calculated, and then their average was taken as the EIRR of each project. The preconditions for calculating the EIRR are shown in Table 8. The Financial Internal Rates of Return (FIRR) were not calculated at the appraisal.

Table 8: Economic Internal Rate of Return (EIRR) of the Target Projects at Project Appraisal

Item	Rural Road Improvement Project	Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province)
L/A No.	SL-P76	SL-P96
Financial Internal Rate of Return (FIRR)	FIRR is not calculated as toll collection will not be adopted for the target roads	FIRR is not calculated as toll collection will not be adopted for the target roads
Economic Internal Rate of Return (EIRR)	27.2% (Average of 10 sample roads)	21.6% (Average of 10 sample roads)
Cost	Project cost and operation and maintenance cost	Project cost and operation and maintenance cost
Benefit	Reduction of vehicle operating cost and travel time.	Reduction of vehicle operating cost and travel time.
Project life	20 years	20 years

Source: The internal documents of JICA.

A recalculation of the EIRR for the two target projects was attempted at the time of the ex-post evaluation. However, for the Rural Road Improvement Project, there was no detailed information for the EIRR calculation at the appraisal, which made recalculation difficult. For the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province), the original calculation sheets used to calculate the EIRR for the 7 sample roads out of 10 sample roads were obtained and the EIRR was recalculated based on this information. Although there were 7 sample roads for which EIRR recalculation attempts were made (4 roads in Central Province and 3 roads in Sabaragamuwa Province), 2 sample roads in Sabaragamuwa Province were excluded from the project as improvement of these 2 roads had been conducted as a matter of urgency by the Sri Lankan government with its own funds. Therefore, recalculation of the EIRR was limited to only 5 out of the 10 sample roads (4 roads in the Central Province and 1 line in Sabaragamuwa Province). For the recalculation of the EIRR, correction was made based on performance of traffic volume and project cost, while the same preconditions used at the appraisal were applied to other items. The results of the recalculation are shown in Table 9. Out of the 5 sample roads with results of their EIRR recalculation 3 have exceeded the EIRR value at appraisal. The main reason for this is that the actual traffic volume after project completion increased more than estimated at the time of the

appraisal. On the other hand, for Madawala Lewella Road, the actual traffic volume after completion did not reach its target value (its actual traffic volume in 2016 was approximately 73% of the target value), and therefore its EIRR recalculation value was 10% lower than the EIRR value at the appraisal. The actual traffic volume of Sumanatissa Mawatha Road slightly exceeded the planned volume and therefore the EIRR recalculation value was slightly lower than its planned value due to increase in the project cost.

Table 9: Results of the recalculation of EIRR for the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province)

Road Code	Road Name	Length (km)	EIRR (%)		Remarks
			Appraisal	Ex-post Evaluation	
[Central Province]					
AD7KD	Madawala Lewella Raod	4.8	42.4	31.4	
CP/KD/037	Sumanatissa Mawatha Road	5.8	21.3	19.9	
AD8NE	Bogahawatta Maldeniya Hedunawa Road	17.5	16.5	N.A.	The original data at project appraisal is not available.
CP/NE/089	Hanguranketa Adikarigama Road	8.4	20.0	25.8	
CP/MT/134	Tenna Ovilikanda Dodandeniya Road	9.6	22.7	23.3	
[Sabaragamuwa Province]					
SB/KG/146	Panawala Maniyangamuwa Raod	10.2	24.2	N.A.	The original data at project appraisal is not available.
AD9RP	Pallebedda Bulutota Road	22.4	15.7	N.A.	The original data at project appraisal is not available.
SB/RP/065	Kotamulla Karawita Road	10.5	20.6	N.A.	Excluded from the project scope
SB/RP/005	Getahetta Karadana Madala Road	21.0	16.6	N.A.	Excluded from the project scope
SB/KG/101	Utuwkanda Ussapitiya Road	6.8	16.0	21.9	
Average of 10 Sample Roads			21.6	N.A.	

Source: The internal documents of JICA, PRDA, Central Province and PRDD, Sabaragamuwa Province.

In light of the above, both the project cost and project period exceeded the plan, therefore, efficiency of this project is fair.

3.3 Effectiveness¹³ (Rating:③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

(1) Daily Average Traffic Volume

For the daily average traffic volume, 10 sample roads (5 roads in each province) were selected for the two target projects at the appraisal and target values were set for two years after project completion

The actual daily average traffic volume for each sample road at the time of the ex-post evaluation is shown in Table 10 and Table 11.

¹³ Effectiveness is to be evaluated together with consideration of Impact.

Table 10: Daily Average Traffic of the Rural Road Improvement Project (10 Sample Roads)

Unit: Number of vehicles/12 hours

Road Code	Road Name	Baseline	Target	Actual					
		2000	2010	2011	2012	2013	2015	2016	2017
			2 years after project completion	Project completion year	1 year after project completion	2 years after project completion (Target year)	4 years after project completion	5 years after project completion	6 years after project completion
[Central Province]									
CP/KD/325	Nawayalatenna Jambugahapitiya (4.2km)	1,462	2,164	1,510	1,600	1,635	1,708	1,802	N.A.
CP/KD/344	Teldeniya Corbests Gap (14.0km)	733	1,086	1,860	2,015	2,420	2,984	3,050	N.A.
CP/MT/042	Beligamuwa Nilagama Dewahuwa (17.1km)	418	619	726	865	988	1,123	1,324	N.A.
CP/MT/060	Dambuila Kandalama Kumbukkadanwela (9.2km)	438	648	548	570	632	696	750	N.A.
CP/NE/048	Barthford Valley Road (10.6km)	834	1,235	1,010	1,339	1,670	1,812	2,086	N.A.
[Sabaragamuwa Province]									
SP/KG/078	Andiramada Narambedde Imbutgassdeniya (8.8km)	331	490	N.A.	N.A.	N.A.	N.A.	N.A.	3,089
SB/KG/027	Morontota Arandara	451	667						
SP/KG/035	Yatagoda Beligala Batuwatta (11.9km)	531	786	N.A.	N.A.	N.A.	N.A.	N.A.	807
SP/RP/032	Kahawatta Haupe Manandola (7.4km)	1,336	1,977	N.A.	N.A.	N.A.	N.A.	N.A.	3,797
SP/RP/052	Kaltota Right Bank Roads (15.9km)	236	349	N.A.	N.A.	N.A.	N.A.	N.A.	531

Source: The internal documents of JICA, PRDA, Central Province and PRDD, Sabaragamuwa Province.

Note: Morontota-Arandara section in Sabaragamuwa Province was excluded from the project target roads.

Table 11: Daily Average Traffic Volume of the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province) (10 Sample Roads)

Unit: Number of vehicles/12 hours

Road Code	Road Name	Baseline	Target	Actual		
		2009	2016	2015	2016	2017
			2 years after project completion	Project completion year	1 year after project completion	2 years after project completion (Target year)
[Central Province]						
AD7KD	Madawala Lewella Raod (4.8km)	2,961	6,009	4,157	4,394	N.A.
CP/KD/037	Sumanatissa Mawatha Road (5.8km)	784	1,591	1,502	1,796	N.A.
AD8NE	Bogahawatta Maldeniya Hedunawa Road (17.5km)	374	833	436	492	N.A.
CP/NE/089	Hanguranketa Adikarigama Road (8.4km)	828	1,681	1,895	2,117	N.A.
CP/MT/134	Tenna Ovilikanda Dodandeniya Road (9.6km)	1,557	3,165	2,924	3,337	N.A.
[Sabaragamuwa Province]						
SB/KG/146	Panawala Maniyangamuwa Raod (10.2km)	1,438	2,922	N.A.	N.A.	2,610
AD9RP	Pallebedda Bulutota Road (22.4km)	581	1,292	N.A.	N.A.	1,512
SB/RP/065	Kotamulla Karawita Road (10.5km)	1,026	2,084			
SB/RP/005	Getahetta Karadana Madala Road (21.0km)	661	1,469			
SB/KG/101	Utunwanda Ussapitiya Road (6.8km)	716	1,526	N.A.	N.A.	2,518

Source: The internal documents of JICA, PRDA, Central Province and PRDD, Sabaragamuwa Province.

Note: Kotamulla Karawita Road and Getahetta Karadana Madala Road in Sabaragamuwa Province were excluded from the project target roads.

As for the Rural Road Improvement Project, the actual traffic volume (2 years after project completion) in 4 of the 5 sample roads in Central Province (Teldeniya Corbests Gap section, Beligamuwa Nilagama Dewahuwa section, Dambuila Kandalama Kumbukkadanwela section, and Barthford Valley Road) attained 223%, 160%, 98%, and 135% against the target values, therefore met the targets¹⁴. According to the Central Provincial Road Development Authority, this increase in traffic volume is mostly due to an increase in tourist traffic thanks to the development of tourism. As for the Nawayalatenna Jambugahapitiya section which did not attain its target value, the actual traffic volume remains at 76% of the target value due to the diversion of traffic volume to the bypass road leading to Jambugahapitiya. One of the 5 sample roads in Sabaragamuwa Province (Morontota Arandara section) was rehabilitated by the Sri Lankan government with their own funds and thus was excluded from the project scope. For the rest of the four sample roads (Andiramada Narambedde Imbutgassdeniya section, Yatagoda Beligala Batuwatta section, Kahawatta Haupe Manandola section, and Kaltota Right Bank Roads), data from 2 years after the project completion (2013), which was the target year could not be obtained, and therefore actual data of 6 years after the project completion was available and used. This demonstrated achievement rates of 630%, 103%, 192% and 152%, respectively, and the all four sample roads achieved their respective targets. In particular, the Andiramada Narambedde Imbutgassdeniya section had an increase in traffic volume of 6.3 times more than its target value. According to the Sabaragamuwa Provincial Road Development Department, the above mentioned 4 roads showed an increase in traffic volume after the implementation of the project due to an increased number of migrants in the surrounding areas, development of neighboring road networks such as link roads and bypass roads, and usage as shortcuts to tourist spots.

Meanwhile, for the 5 sample roads in the Central Province section of the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province), the actual data from two years after project completion (2017, which was the target year) could not be obtained, so a comparison was made with the available actual data of the 5 roads from a year after project completion (2016), which revealed that the achievement rate of the 3 roads (Sumanatissa Mawatha Road, Hanguranketa Adikarigama Road and Tenna Ovilikanda Dodandeniya Road) against their target values (2 years after project completion) were 113%, 126%, and 105%, respectively. According to the Central Provincial Road Development Authority, these roads demonstrate an increase in traffic volume due to their use as bypass roads or the development of the surrounding areas. Failure to achieve the target on the other 2 roads (Madawala Lewella Road, Bogahawatta Maldeniya Hedunawa Road), could be because some of the traffic volume went to the other roads. Two of the 5 sample roads in

¹⁴ At the ex-post evaluation, it is considered as “achieved” when the achievement rate is over 80% against the target value.

Sabaragamuwa Province (Kotamulla Karawita Road, Getahetta Karadana Madala Road) were rehabilitated by the Sri Lankan government using its own funds and therefore they were excluded from the project. The achievement rates of the remaining 3 sample roads (Panawala Maniyangamuwa Road, Pallebedda Bulutota Road, Utuwnkanda Ussapitiya Road) were 89%, 117% and 165% respectively, thus meeting the target goals. These 3 roads had increases in traffic volume for the same reasons as in the Rural Road Improvement Project.

(2) Reduced Vehicles Operating Cost (VOC) and Reduced Travel Time

Regarding the effects of reduced vehicle operating cost and reduced travel time, 10 sample roads (5 roads from each province) were selected for the two target projects at appraisal, and the target values were set for 2 years after project completion. At the time of the ex-post evaluation, calculation was attempted to demonstrate the effects of reduced vehicle operating cost and reduced travel time for both of the two target projects. However, only the effects for the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province) could be calculated due to the reasons described in 3.2.3 *Internal Rates of Return (Reference only)*. As shown in Table 12 and Table 13, it was revealed that 4 out of the 5 sample roads that were calculable (Sumanatissa Mawatha Road, Tenna Ovilikanda Dodandeniya Road, Utuwnkanda Ussapitiya Road, Madawala Lewella Road¹⁵) achieved the target values for reduced vehicle operating cost and reduced travel time, while the remaining 1 road (Hanguranketa Adikarigama Road) almost achieved the target value (93% for reduced vehicle operating cost and 75% for reduced travel time). This one road did not meet the target value for the daily average traffic volume¹⁶.

¹⁵ For Madawala Lewella Road, the target achievement rate for reduced vehicle operating cost was 82%, and for reduced travel time was 92%. Because both were more than 80% of the achievement rate, they are regarded as having met the goal.

¹⁶ The effects of reduced vehicle operating cost and reduced travel time increase in proportion to the increase in traffic volume. Therefore, if the traffic volume does not reach its planned value/predicted value, the effects of reduced vehicle operating cost and reduced travel time also fall below the predicted values.

Table 12: Reduced Vehicle Operating Cost for the Provincial/Rural Road Development Project
(Central Province and Sabaragamuwa Province) (10 Sample Roads)

Unit: Million rupees/year

Road Code	Road Name	Length (km)	Target	Actual	Remarks
			2016	2017	
			2 years after project completion	2 years after project completion	
[Central Province]					
AD7KD	Madawala Lewella Road	4.8	40.08	32.74	
CP/KD/037	Sumanatissa Mawatha Road	5.8	17.59	22.25	
AD8NE	Bogahawatta Maldeniya Hedunawa Road	17.5	51.92	N.A.	The original data at project appraisal is not available.
CP/NE/089	Hanguranketa Adikarigama Road	8.4	34.23	31.77	
CP/MT/134	Tenna Ovilikanda Dodandeniya Road	9.6	32.60	38.15	
[Sabaragamuwa Province]					
SB/KG/146	Panawala Maniyangamuwa Road	10.2	38.62	N.A.	The original data at project appraisal is not available.
AD9RP	Pallebedda Bulutota Road	22.4	46.85	N.A.	The original data at project appraisal is not available.
SB/RP/065	Kotamulla Karawita Road	10.5	32.15	N.A.	Excluded from the project scope
SB/RP/005	Getahetta Karadana Madala Road	21.0	46.89	N.A.	Excluded from the project scope
SB/KG/101	Utunwanda Ussapitiya Road	6.8	14.19	24.65	
Average of 10 Sample Roads			36.68	N.A.	

Source: The internal documents of JICA, PRDA, Central Province and PRDD, Sabaragamuwa Province.

Table 13: Reduced Travel Time for the Provincial/Rural Road Development Project (Central Province and Sabaragamuwa Province) (10 Sample Roads)

Unit: Million rupees/year

Road Code	Road Name	Length (km)	Target	Actual	Remarks
			2016	2017	
			2 years after project completion	2 years after project completion	
[Central Province]					
AD7KD	Madawala Lewella Raod	4.8	4.22	3.82	
CP/KD/037	Sumanatissa Mawatha Road	5.8	2.53	3.59	
AD8NE	Bogahawatta Maldeniya Hedunawa Road	17.5	17.40	N.A.	The original data at project appraisal is not available.
CP/NE/089	Hanguranketa Adikarigama Road	8.4	11.45	8.57	
CP/MT/134	Tenna Ovilikanda Dodandeniya Road	9.6	5.48	7.07	
[Sabaragamuwa Province]					
SB/KG/146	Panawala Maniyangamuwa Raod	10.2	7.78	N.A.	The original data at project appraisal is not available.
AD9RP	Pallebedda Bulutota Road	22.4	12.72	N.A.	The original data at project appraisal is not available.
SB/RP/065	Kotamulla Karawita Road	10.5	5.14	N.A.	Excluded from the project scope
SB/RP/005	Getahetta Karadana Madala Road	21.0	6.78	N.A.	Excluded from the project scope
SB/KG/101	Utunwanda Ussapitiya Road	6.8	2.19	4.29	
Average of 10 Sample Roads			7.57	N.A.	

Source: The internal documents of JICA, PRDA, Central Province and PRDD, Sabaragamuwa Province.

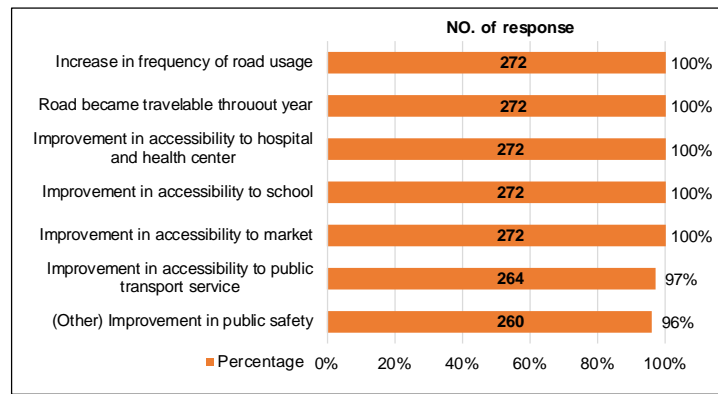
3.3.2 Qualitative Effects (Other Effects)

(1) Improved Accessibility to Socio-Economic Services

At the time of the ex-post evaluation, Focus Group Discussions (FGD) with 272 residents (168 males, 103 females) living along the project target roads were conducted in order to identify the effects and impacts of the project¹⁷. As for the improved accessibility to socio-economic services, most of the residents participating in the FGD identified some effects such as (i) increased frequency of road usage, (ii) better road accessibility throughout the year, (iii) better accessibility to the hospitals and health centers, (iv) better accessibility to schools, (v) better accessibility to markets, and (vi) better accessibility to public transportation services.

Furthermore, improved public safety was also noted as the police started patrolling around villages after road improvement (Figure 4). In addition to the above, some positive changes such as reduced travel time, increased traffic volume and reduced vehicle maintenance costs were identified as results of the improvement and widening of pavements. Increased asset value was also noted, caused by the appreciation in land price along the roads due to improved traffic accessibility.

Figure 4: Improvement in Accessibility to Socio-Economic Services



Source: The result of FGD.

3.4 Impacts

3.4.1 Intended Impacts

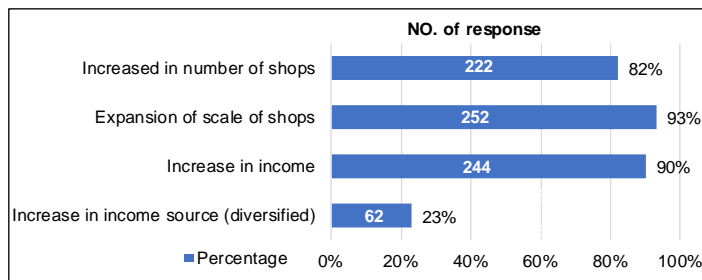
(1) Vitalization of the Local Economy

Most of the residents living along the road sides who participated in FGD acknowledged a vitalization of local economies. This was experienced in such ways as an (i) increased number of or expansion in the scale of shops in the neighborhood and (ii) increased income (Figure 5). After road improvement, commercial vehicles and middlemen/brokers distributing merchandise began to come into the villages. As there are many tourist facilities such as Kandy,

¹⁷ FGD were conducted on a total of 23 occasions (11 in the Central Province and 12 in Sabaragamuwa Province), and there were 272 participating residents who lived along the road sites (168 males and 103 females). When conducting FGD, the facilitator went to each research site without a prior announcement, seeking participants in the FGD from residents living around the research sites together with those who agreed with the purpose of the research. The occupations of FGD participants varied from farmers to the self-employed, store owners, businessmen, housewives, and students, their age group including young people and seniors. The Central Province and Sabaragamuwa Provinces are dominated by Sinhalese, and therefore the participants were all Sinhalese except in one location.

home of the last dynasty, world heritage sites such as Sigiriya Rock and Buddhist temples, the Central Province is one of the foremost tourist sites in Sri Lanka with many tourists throughout the year. Local

Figure 5: Vitalization of Local Economy



Source: The result of FGD.

residents in the Central Province who participated in the FGD pointed out that there were more tourists after improvement, as the target roads lead to many tourist sites. It is assumed that increased commodity distribution and traffic volume resulting from road improvement has led to the vitalization of commercial activities in the villages and towns.

According to the Central as well as the Sabaragamuwa Provincial Road Development Authorities/Departments, development, especially housing development is facilitated around the target roads after the implementation of this project. Therefore, it is considered that this project has had positive impacts on the vitalization of local economies.

3.4.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

This project was given a Category B based on the “*JBIC Guidelines for the Confirmation of Environmental and Social Considerations*” (1999) for its sector, regional and project characteristics. As the target sub-project was the improvement of existing facilities, an Environmental Impact Assessment (EIA) was not compulsory according to the Environmental Law of Sri Lanka (1980), and an EIA was not conducted. However, a voluntary Initial Environmental Examination (IEE) was conducted by the implementing agencies. The disposal of debris and waste generated during road construction were properly dealt with, while environmental experts (consultants) gave guidance to contractors for disposal at designated disposal sites. In addition, the environmental experts (consultants) regularly patrolled the project sites during project implementation in order to monitor the construction works and provide guidance and instruction to contractors according to the environmental management plans. No negative impacts were identified on the natural environment during project implementation according to the interviews with the implementing agencies and reviews of related documents such as project progress reports.

No regular environmental monitoring of the target provincial roads and rural access roads has been conducted by the Provincial Road Development Authorities/Departments since project completion. Each province provides the opportunity for a monthly meeting in which the Road Development Authority (RDA), the Divisional Secretary, local governments and the

police discuss various issues including issues on the roads. If any environmental problem were to arise, it would be reported through the above-mentioned monthly meeting, and necessary measures would be taken as needed. No negative impact on the natural environment caused by this project was identified from the results of FGD (99% of FGD participants responded that there was no negative impact).

Therefore, no negative impact on the natural environment is observed.

(2) Land Acquisition and Resettlement

There was no land acquisition or resettlement for this project.

(3) Others

In August and September 2012, during project implementation, two fatal accidents in which contractors' field workers died during construction were reported in Sabaragamuwa. It was also reported that there was no damage to the public. In order to respond to the accidents, necessary countermeasures such as safety education and safety guidance to contractors and field workers were taken by the safety experts (consultants).

From the above, it can be seen that the operation and effect indicators such as the daily average traffic volume, the reduction of vehicle operating cost and the reduction of travel time have almost achieved their target values. Meanwhile, qualitative effects such as improved accessibility to socio-economic services were observed. Furthermore, there was a positive impact on the vitalization of local economies. There was no negative impact on the natural environment, and no land acquisition or resettlement for this project. Necessary safety measures were taken when accidents occurred during project implementation.

In light of the above, expected effects of this project have been mostly realized as planned. Therefore, the effectiveness and impacts of this project are high.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

<Provincial Roads>

The Provincial Road Development Authority (PRDA) of the Central Province and the Provincial Road Development Department (PRDD) of Sabaragamuwa Province are responsible for the operation and maintenance (O&M) of the provincial roads (Class C and Class D roads). The staff allocation of each PRDA/PRDD is shown in Table 14. The PRDA/PRDD of the two target provinces consider that their staff allocation and staff numbers are appropriate and that there are no problems. Daily and periodic maintenance of the

provincial roads are conducted directly in the two target provinces, and some of the maintenance work is outsourced to private companies and CBO as needed. The PRDA/ PRDD of the two target provinces were given information and documents regarding the project by the PMU.

Therefore, no major issues have been observed in terms of the institutional aspects of operation and maintenance in the PRDA/PRDD of the two target provinces.

Table 14: Number of Staff in the PRDA/PRDD of Two Target Provinces

Province	Department	Total length of provincial roads (km)	Number of staff ^(Note)
Central Province	PRDA	2,244	235
Sabaragamuwa Province	PRDD	2,791	239

Source: PRDA, Central Province and PRDD, Sabaragamuwa Province.

Note: The above number of staff does not include temporary workers employed for road construction and maintenance works.

<Rural Roads>

Local governments¹⁸ are responsible for the O&M of rural access roads at 23 locations in the Central Province and 10 locations in Sabaragamuwa Province where improvements were conducted in coordination with the CBO. The 33 Pradeshiya Sabha¹⁹ (23 in the Central Province and 10 in Sabaragamuwa Province) in the two target provinces are responsible for the O&M of the rural access roads rehabilitated by the project as all are located in rural areas.

Although the two Pradeshiya Sabha interviewed - Ukuwela Pradeshiya Sabha in Kandy District, Central Province and Ratnapura Prareshiya Sabha in Ratnapura District, Sabaragamuwa Province - differ in scale, there are 7-11 staff members and 2-3 technical officers allocated in their technical divisions who are in charge of roads, water and garbage collection. Meanwhile, there are 801km and 422km of rural roads including rural access roads (Class E and other roads) within the jurisdiction of Ukuwela Pradeshiya Sabha and Ratnapura Praredeiya Sabha, respectively, and 80-90% of these are gravel or unsurfaced roads. The gravel or unsurfaced roads are more likely to get damaged by the weather compared to concrete roads, and they require repair works every year after the monsoon season. However, the number of staff, especially workers in the technical divisions of each Pradeshiya Sabha, is

¹⁸ The local government administrative system of Sri Lanka is made up of a parallel system of two different lines: (i) an administrative system under the control of central government based on Districts (the country is divided into 25 districts), and (ii) an administrative system under the Provincial Council and the other local councils as local governments. The local administrative system based on Districts was passed on from the British colonial era, while the Provincial Council system was introduced to solve ethnic problems in 1987. There are 9 Provincial Councils in Sri Lanka and other local councils underneath them serve as local municipalities. The local councils are mainly responsible for the provision of environmental and social services such as public health, sanitation, water supply, garbage disposal, sewage, etc.

¹⁹ The Local Councils are divided into three categories, municipal Councils, Urban Councils and Pradeshiya Sabha when they are located in municipal areas, urban areas and rural areas, respectively. The Local Councils are under the supervision of the Commissioner of Local Government (CLG). The organizational structure of the Local Councils in each municipality is almost the same, and there are about 80 staff in each Municipal Council and 20 staff in each Pradeshiya Sabha.

limited compared to the total road extensions that they manage. Therefore, there is an insufficiency in terms of the institutional aspect for the appropriate maintenance (periodic maintenance) of all the rural roads.

Moreover, the two Pradeshiya Sabha interviewed were not given information and documents regarding the improved rural access roads, such as design drawings, by either the PMU or the provincial government. It is assumed that this was also the case in the other Pradeshiya Sabha where interviews did not take place. However, the maintenance of the rural access roads which were rehabilitated or improved by the project, was limited to sand sealing or the weeding of road shoulders, as PRDA/PRDD would be responsible for larger-scale rehabilitation. Therefore the lack of information such as design drawings would not be a major interference in periodic maintenance.

Therefore, there are some issues observed in terms of the institutional aspects of the two Pradeshiya Sabha interviewed, such as the limited number of staff in the technical divisions of each Pradeshiya Sahaba compared to the total road extension.

3.5.2 Technical Aspects of Operation and Maintenance

<Provincial Roads>

The engineers (chief engineers and executive engineers) at the PRDA/PRDD in the two target provinces have technical degrees in civil engineering or similar fields (bachelor's degrees or higher) and they are “Chartered Engineers” certified by the Institution of Engineers Sri Lanka (IESL). The RMMS was introduced to the PRDA/PRDD of the two target provinces as a part of the consulting services of this project. However, only the Central Provincial Road Development Authority was utilizing the RMMS for the maintenance of provincial roads at the time of the ex-post evaluation. In the Sabaragamuwa Provincial Road Development Department, there were few people who could use the RMMS and activities such as data collection have not continued. Therefore, hardly any maintenance of the provincial roads is implemented based on the RMMS. Advantages of introducing the RMMS include being able to plan road maintenance based on more scientific grounds, to prioritize target roads and to distribute budgets. Also, effective and efficient maintenance work can be conducted within a limited maintenance budget. However, it is possible to conduct maintenance of the provincial roads without the RMMS. Both the Central and Sabaragamuwa Provincial Road Development Authorities/Departments provide training programs for their technical staff on a regular basis (Table 15). In addition to these, the PRDA/PRDD of the two target provinces share and transfer technology and experiences proactively between senior and junior staff members through On the Job Training (OJT) and guidance in practical work. Furthermore, the PRDA/PRDD of the two target provinces conduct maintenance work based on the Standard Specifications for Construction and Maintenance for Roads and Bridges established by RDA, the Ministry of

Higher Education and Highways.

Therefore, there is no issue observed in terms of the technical aspects of the PRDA/PRDD of the two target provinces.

Table 15: Training Programs organized by the PRDA/PRDD of the Two Target Provinces

Training Program	Contents	Target	No. of trainees	Frequency
<Central Province>				
Supervisor Training	Supervisory work	Supervisors	44	3 times/ year
Workshop	Positive thinking	Technical and management staff	164	Once a year
<Sabaragamuwa Province>				
Road Construction Training	Review and update of the latest technology for road construction	Engineers and technical officers	50	Once a year
Road Maintenance Training	Review and update of the latest technology for road maintenance	Engineers and technical officers	50	Once a year

Source: PRDA, Central Province and PRDD, Sabaragamuwa Province.

<Rural Roads>

Generally, there are one or two road managers/engineers and a dozen or more skilled workers allocated in the local governments, and they were similarly allocated in the two Pradeshiya Sabha interviewed. The engineers at the Pradeshiya Sabha hold qualifications which are equivalent to the completion of technical training schools (polytechnics). The Pradeshiya Sabha interviewed own maintenance equipment such as loading shovels, concrete mixer plants and grass cutting machines. The engineers at the Pradeshiya Sabha receive technical training from the provincial government on a regular basis and they get technical support from engineers in the provincial government when necessary. For this reason, it is considered that the staff at the technical divisions of the Pradeshiya Sabha has sufficient knowledge and technical skills required for the maintenance of the concrete surface roads.

Therefore, there is no issue observed in terms of the technical aspects of the two Pradeshiya Sabha interviewed.

3.5.3 Financial Aspects of Operation and Maintenance

<Provincial Roads>

The operation and maintenance budgets of the provincial roads in the two target provinces for the past three years are shown in Table 16. As more than 75% of the maintenance works in the Central Province is conducted directly by the PRDA, the maintenance budget is smaller than that of Sabaragamuwa Province which outsources the daily maintenance of its major provincial roads. The main financial source of the maintenance budget for the provincial roads is the provincial government, and the PRDA/PRDD do not have their own financial sources. Furthermore, there is no distribution from the Road Maintenance Trust Fund for the

maintenance of the provincial roads, as there is for the maintenance budget of the national roads. For this reason, a shortage in the maintenance budget for the provincial roads has been identified as an issue. Each of the PRDA/PRDD of the two target provinces requires a different maintenance budget for the provincial roads as these provincial roads have different lengths and geographical conditions. The road maintenance unit price is higher for the Central Province than for other provinces as most of the provincial roads are located in mountains and hilly areas. According to the Central Provincial Road Development Authority, 1,200 million rupees of maintenance budget is required annually in order to provide daily or periodic maintenance appropriately according to the regulations applied to all provincial roads within the province. Currently, there is a big gap compared with the actual maintenance budget. On the other hand, the Sabaragamuwa Provincial Road Development Department had reported no issue regarding its current maintenance budget.

Therefore, there are issues observed in terms of the financial aspects of the Central Provincial Road Development Authority, as the distribution of the maintenance budget is not sufficient.

Table 16: Maintenance Budgets of the PRDA/PRDD of the Two Target Provinces
for Provincial Roads

Unit: Million rupees

	2014		2015		2016	
	Plan	Actual	Plan	Actual	Plan	Actual
Central Province	400.0	374.0	400.0	302.0	400.0	190.0
Sabaragamuwa Province	1,240.0	1,223.4	1,126.0	1,087.2	1,218.7	858.9

Source: PRDA, Central Province and PRDD, Sabaragamuwa Province.

Note: The maintenance cost does not include the personnel cost of PRDA/PRDD staff.

<Rural Roads>

The financial resources of Pradeshiya Sabha consist of the budget distributed from the provincial government as well as their own tax revenue (such as property tax). The maintenance budget for the rural roads is distributed from this. According to the two Pradeshiya Sabha interviewed, it is difficult to conduct maintenance of the rural roads appropriately with the current number of staff members in the technical divisions, and shortage of labor is an issue. However, it is not possible to outsource the maintenance work and hire additional workers as the current maintenance budget is limited. Furthermore, the maintenance budget of Pradeshiya Sabha is used mostly on the maintenance of gravel and unsurfaced roads, and spending on surfaced roads, including concrete roads, is extremely limited. Therefore, there are issues observed in terms of the financial aspects of the two Pradeshiya Sabha interviewed.

3.5.4 Current Status of Operation and Maintenance

<Provincial Roads>

The contents of the daily maintenance and periodic maintenance conducted by each Provincial Road Development Authority/Department are shown in Table 17. The maintenance is conducted based on the standards of the RDA Ministry of Higher Education and Highways. The PRDA/PRDD are responsible for the final quality control of the maintenance work outsourced to the CBO and the private sector and therefore there is no issue. The roads in the target provinces are kept in good condition.

In Sabaragamuwa Province, some parts of the roads with Double Bituminous Surface Treatment (DBST)²⁰ that were rehabilitated by the Rural Road Improvement Project were damaged by floods. However, they were later improved by making them into concrete roads using the provincial government budget. The maintenance equipment and testing equipment that was procured for laboratories is still used, and kept in good condition.

Because the maintenance budget distributed by the provincial governments is limited, the budget is allocated for the rehabilitation of deteriorated roads and emergency rehabilitations on a priority basis. The maintenance budget allocated for new or improved roads is extremely small. For this reason, it is difficult to conduct appropriate daily maintenance or periodic maintenance programs for the provincial roads received rehabilitation or improvement and passed only for few years. However, as described earlier, the target provincial roads were kept in a good condition at the time of the ex-post evaluation.

Table 17: Contents of the Maintenance Activities for Provincial Roads
by the PRDA/PRDD of the Two Target Provinces

Type of Maintenance	Contents
Routine Maintenance	Weeding on road shoulders, cleaning of drains, crack repair and pot hole patching
Periodic Maintenance	Sealing and patching of the road surface, repair of road shoulders, painting of guardrails, repair, color and white washing of road signs, repair of structures damaged by accidents

Source: PRDA, Central Province and PRDD, Sabaragamuwa Province.

<Rural Roads>

The maintenance work on concrete surface roads conducted by Pradeshiya Sabha is mostly surface treatment (sand sealing) of damaged roads, or weeding of road shoulders. However, as described earlier, Pradeshiya Sabha has a very limited maintenance budget for surfaced roads such as concrete roads. Also, the life cycle of concrete roads is approximately 20 years, which is longer and receive less damage than gravel or unsurfaced roads. Therefore, almost no maintenance of concrete roads has been conducted. However, the rural access roads

²⁰ The Double Bituminous Surface Treatment is a simple two-layered treatment by surface compaction of sprinkle aggregate on bituminous materials. It is usually used for repair or temporary pavement, but is often used for a permanent pavement in developing countries.

maintained by the two Pradeshiya Sabha interviewed were kept in a good condition at the time of the ex-post evaluation.

In light of the above, there are some issues in terms of institutional and financial aspects of the project's operation and maintenance system, such as staff shortage of Pradeshiya Sabha or maintenance budget shortage of the Central Provincial Road Development Authority as well as Pradeshiya Sabha. On the other hand, the provincial roads and rural access roads rehabilitated by this project are kept in good conditions at the time of the ex-post evaluation. Therefore, the sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objectives of this project are to enhance transport efficiency and accessibility to socio-economic services in Central Province and Sabaragamuwa Province in Sri Lanka by rehabilitating and upgrading the remarkably deteriorated provincial and rural roads and bridges, and to strengthen their road maintenance system, thereby contributing to local economic development. The relevance is high, as the objectives were consistent with Sri Lanka's development policies and development needs as well as with Japanese aid policies. The operation and effect indicators of this project such as increased daily average traffic volume, reduced vehicle operating cost and reduced travel time have largely attained their target values, and the project had qualitative effects such as improvements in accessibility to socio-economic services. There was also a positive impact on the activation of local economies. No negative impact on the natural environment was observed, and no land acquisition or resident resettlement was executed. Therefore, the effectiveness and impacts of this project are high. The efficiency of this project is fair, as both the project cost and project period exceeded the plan. Meanwhile, a minor problem has been observed in the institutional and financial aspects of the operation and maintenance system, therefore the sustainability of the project's effect is evaluated to be fair.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Recommendations to Sabaragamuwa Provincial Council

This project provided technical support for the introduction and operation of RMMS for the Road Development Authorities/Departments in the Central Province and Sabaragamuwa Province. The Central Province still utilizes this system for the maintenance of the provincial roads. On the other hand, the RMMS is not utilized in Sabaragamuwa Province, as there is insufficient staff to operate and manage the system, as well as a lack of technical capacity. As

the introduction of the RMMS contributes to effective and efficient road maintenance, it is recommended that the RMMS is utilized by cooperating with the Central Provincial Road Development Authority in sharing information on the RMMS, creating interaction among staff and dispatching staff to training programs, in order to improve the maintenance capacity of the Sabaragamuwa Provincial Road Development Department. It is expected that through this, there will be an increase in human resources who can utilize the RMMS in the Sabaragamuwa Provincial Road Development Department.

(2) Recommendations to Pradeshiya Sabha

Each Pradeshiya Sabha is responsible for hundreds of kilometers of rural road maintenance, approximately 80-90% of which are mostly still gravel and unsurfaced roads. The burden is great as these gravel and unsurfaced roads require maintenance after getting damaged during every monsoon season. On the other hand, the institutional setting and maintenance budgets of Pradeshiya Sabha are limited, and there is almost no maintenance work conducted for concrete roads. It is recommended that a review is made of the possibility of introducing a participatory maintenance system where residents living along the roads are asked to weed the road shoulders or clean the sewage systems in order to secure the minimum road maintenance within the limited institutional and financial capacity of Pradeshiya Sabha.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

(1) Effective Project Implementation Scheme in Cooperation with the Central and Provincial Governments

There are multiple implementing agencies involved in this project from the central government and provincial governments, including the Ministry of Local Government and Provincial Council (MLGPC) and the Provincial Road Development Authorities/Departments in the Central Province and Sabaragamuwa Province. For this reason, MLGPC served as the representing implementing agency to coordinate the overall project implementation and conduct project management. It established PMU within MLGPC, as well as the PIU within each provincial government. This implementation scheme functioned well and there was smooth coordination between the related agencies. The MLGPC is a line ministry between each provincial government, and MLGPC and each provincial government work closely together in terms of budget distribution and other administrative procedures, thus it is common to see development projects with the implementation scheme described above. It is considered that the good practice of this project will be referenced when there are similar projects in Sri Lanka involving multiple agencies at the

central and provincial government levels in the future.

<End>

Comparison of the Original and Actual Scope of the Project

Rural Road Improvement Project (SL-P76)

Item	Plan	Actual
1. Project Outputs		
(1) Civil works and equipment procurement	<ul style="list-style-type: none"> • Central Province: 308km • Sabaragamuwa Province: 304km • Total: 612km 	<ul style="list-style-type: none"> • Central Province:143.2km • Sabaragamuwa Province: 159.4km • Total: 302.6km
(a) Rehabilitation and upgrading of roads		
(b) Rehabilitation and upgrading of bridges	<ul style="list-style-type: none"> • Central Province:28 • Sabaragamuwa Province: 12 • Total: 40 	<ul style="list-style-type: none"> • Central Province:5 • Sabaragamuwa Province: 12 • Total: 17
(c) Renovation of office buildings of PRDA/PRDD	<ul style="list-style-type: none"> • Renovation and expansion of PRDA/PRDD head office and district offices 	Same as Planned
(d) Procurement of equipment	<ul style="list-style-type: none"> • Equipment for mobile emergency road maintenance teams • Operation and maintenance equipment • Equipment for provincial training centers and materials testing laboratories 	Same as Planned
[Additional Scope] (e) Rectification of flood damage	—	Rectification of target roads in the target two provinces which were damaged by floods after project completion (186.4km)
2. Consulting Services		
(1) Road and bridge improvement component	<ul style="list-style-type: none"> • Review of feasibility study, assistance of procurement, supervision of civil works, and environmental monitoring. 	Same as planned
(2) Capacity building component	<ul style="list-style-type: none"> • Assistance to reorganize PRDA/PRDD, to streamline the work procedures and to improve the utilization of equipment procured by the project • Assistance to capacity building on project and procurement management for staff of provincial councils • Strengthening of PRDA/PRDD operation and maintenance capacity 	Same as planned <ul style="list-style-type: none"> • Overseas training: 28 persons • Domestic training: 263 persons
(3) Collaboration with CBO	<ul style="list-style-type: none"> • Support for CBO activities in the project target area utilizing project funds for consulting services 	<ul style="list-style-type: none"> • Improvement of rural access roads and construction of community halls in 8 locations in the Central Province.
(4) Work volume	<ul style="list-style-type: none"> • International consultants: 111.2M/M • Local consultants: 1,417.6M/M • Local staff: 144.2M/M • Total: 1,673M/M 	<ul style="list-style-type: none"> • International consultants: 112.9M/M • Local consultants: 1,759.5M/M • Local staff: 144.2M/M • Total: 2,016.6M/M
2. Project Period	March 2003 – September 2008 (67 months)	March 2003 – April 2010 (86 months) * Excluding additional scope (rectification of flood damage)
3. Project Cost		
Amount Paid in Foreign Currency	2,578 million yen	N.A.
Amount Paid in Local Currency	5,170 million yen (4,008 million rupees)	N.A.
Total	7,748 million yen	8,636.3 million yen
ODA Loan Portion	5,811 million yen	5,787 million yen
Exchange Rate	1 rupee = 1.29 yen (As of November 2002)	1 rupee = 0.979 yen (Average between 2003 and 2011)
4. Final Disbursement	May 2011	

Provincial/Rural Road Development Project (Central Province & Sabaragamuwa Province)
(SL-P96)

Item	Plan	Actual
1. Project Outputs		
(1) Civil works and equipment procurement	<ul style="list-style-type: none"> Central Province: 170km Sabaragamuwa Province: 180km Total: 350km 	<ul style="list-style-type: none"> Central Province: 163.5km Sabaragamuwa Province: 137.5km Total: 301km
(a) Rehabilitation and upgrading of roads		
(b) Rehabilitation and upgrading of bridges	<ul style="list-style-type: none"> Central Province: 46 Sabaragamuwa Province: 75 Total: 121 	<ul style="list-style-type: none"> Total: 104
(c) Procurement of equipment	<ul style="list-style-type: none"> Equipment for road pavement, operation and maintenance (Specific procured equipment will be decided by the Project Steering Committee during project implementation) 	<ul style="list-style-type: none"> Equipment for road pavement (double drums, mobile asphalt plant, plate compactors, asphalt sprayers), bush cutting machines, testing equipment for laboratories
[Additional Scope]	—	Rectification of target roads in the Central Province which were damaged by floods after project completion
(d) Rectification of flood damage		
2. Consulting services		
(1) Road and bridge component	<ul style="list-style-type: none"> Review of feasibility study, assistance in procurement, supervision of civil works and environmental monitoring. 	Same as planned
(2) Technical transfer component	<ul style="list-style-type: none"> Technical transfer of operation and maintenance 	Same as planned <ul style="list-style-type: none"> Overseas training: 37 persons Domestic training: 813 persons
(3) CBO component	<ul style="list-style-type: none"> Improvement of 25 rural roads (CBO roads) connecting to provincial roads 	Same as planned <ul style="list-style-type: none"> Central Province: 15 Sabaragamuwa Province: 10
(4) Work volume	<ul style="list-style-type: none"> Professional A: 40M/M Professional B: 98M/M Supporting staff: 1,600M/M Total: 1,738M/M 	<ul style="list-style-type: none"> Professional A: 39.7M/M Professional B: 300.6M/M Supporting staff: 2,191.0M/M Total: 2,531.3M/M
2. Project Period	March 2010 – January 2014 (47 months)	March 2010 – December 2015 (70 months)
3. Project Cost		
Amount Paid in Foreign Currency	543 million yen	N.A.
Amount Paid in Local Currency	10,627 million yen (13,520 million rupees)	N.A.
Total	11,171 million yen	10,409.6 million yen
ODA Loan Portion	9,156 million yen	9,143 million yen
Exchange Rate	1 rupee = 0.786 yen (As of December 2009)	1 rupee = 0.764 yen (Average between 2010 and 2015)
4. Final Disbursement	January 2016 (one month extension from original final disbursement date of December 2015)	

Democratic Socialist Republic of Sri Lanka

FY2016 Ex-Post Evaluation of Japanese ODA Loan Project

“Emergency Natural Disaster Rehabilitation Project”

External Evaluator: Keishi Miyazaki, OPMAC Corporation

0. Summary

The objective of this project was to recover its previous level of function for the road and irrigation infrastructure in disaster-affected areas in the Central, North Central and Eastern Provinces of Sri Lanka by the rehabilitation of flood damaged roads and irrigation facilities, thereby contributing to the prompt recovery of economic and social activities, the improvement in the safety of residents, and the prevention of further damage and loss. The relevance of the project is high, as the objective was consistent with Sri Lanka’s development policies and development needs as well as with Japan’s ODA policies. Each function has been recovered. The annual average daily traffic on the rehabilitated national and provincial roads by the project, benefited areas, cultivated areas and the volume of rice production where there were irrigation schemes have all reached, or overtaken the pre-disaster level. The safety level in the surrounding areas has improved due to improvements in road safety and decrease in traffic accidents. Meanwhile, there has been an enhancement in the capacity of reservoirs as well as improvements in flood control since implementation of this project; therefore, the project has contributed to the safety assurance of the residents in the disaster-affected areas to some extent. Decreased transportation costs for agricultural products, decreased time for road closure during floods, reduced risks of water shortage as the result of the improvement in reservoir capacity, recovery of business activities, recovered livelihoods, restored health and educational services were all observed. Therefore, it is considered that the project has contributed to the prompt recovery of the economic and social activities of the disaster-affected areas. No negative impact on the natural environment was observed, and no land acquisition was executed. However, 26 households were resettled for the irrigation component of the project, and the resettlement was executed according to related Sri Lankan domestic laws. Therefore, the effectiveness and impacts of the project were high. The efficiency of the project was high as the project cost and project period were both within the plan. On the other hand, a minor problem was observed in the institutional and financial aspects of the operation and maintenance system. Therefore, the sustainability of the project effects is evaluated to be fair.

In the light of the above, this project is evaluated to be highly satisfactory.

1. Project Description



Project Location



National Road (Deegavapi Temple Road) in Ampara District, Eastern Province rehabilitated by the project

1.1 Background

Severe rainstorms hit five Sri Lankan provinces, the Northern, North Central, Central, Eastern and Uva provinces, during December 2010 and February 2011, and this was reported to be the greatest disaster since the Indian Ocean earthquake in December 2004. One million two hundred thousand people were killed or listed as missing, and more than 50,000 houses were completely or partially destroyed. In particular, the Central, North Central and Eastern provinces had some regions that experienced their annual rainfall capacity (1,600 mm) in two weeks, and were severely damaged. From February to March of 2011, the government of Sri Lanka conducted needs assessment for recovery targeting mainly the rehabilitation of damaged public infrastructure and the results revealed that the great flood damaged approximately 18,237 km of roads and 1,752 agricultural and irrigation facilities, as well as the agricultural lands that were responsible for one-third of national rice production. The lives and the livelihoods of residents in the area were greatly affected. According to the estimate of the above needs assessment, the total recovery cost was 85,400 million yen (approximately 110,000 million Sri Lankan rupees), which was roughly 2% of Sri Lanka's GDP.

The government of Sri Lanka formed an emergency / mid-to-long term rehabilitation program based on the above needs assessment, and requested funding for rehabilitation from donors including the Japan International Cooperation Agency (JICA). JICA agreed to this request for the provision of rehabilitation of most affected and high urgency roads and irrigation facilities as a particularly high priority.

1.2 Project Outline¹

The objective of the project was to recover to its previous level the function of road and irrigation infrastructure in disaster-affected areas in the Central, North Central and Eastern Provinces of Sri Lanka by the rehabilitation of flood damaged roads and irrigation facilities, thereby contributing to the prompt recovery of economic and social activities, the improvement in the safety of residents, and the prevention of further damage and loss.

Loan Approved Amount/ Disbursed Amount	7,000 million Yen / 6,987 million Yen						
Exchange of Notes Date/ Loan Agreement Signing Date	September 2011 / September 2011						
Terms and Conditions	<table> <tr> <td>Interest Rate</td> <td>0.01%</td> </tr> <tr> <td>Repayment Period (Grace Period</td> <td>40 years 10 years)</td> </tr> <tr> <td>Conditions for Procurement</td> <td>General untied</td> </tr> </table>	Interest Rate	0.01%	Repayment Period (Grace Period	40 years 10 years)	Conditions for Procurement	General untied
Interest Rate	0.01%						
Repayment Period (Grace Period	40 years 10 years)						
Conditions for Procurement	General untied						
Borrower / Executing Agency(ies)	Democratic Socialist Republic of Sri Lanka/ Ministry of Finance and Planning (current Ministry of National Policies and Economic Affairs)						
Project Completion	June 2014						
Main Contractor(s) (Over 1 billion yen)	—						
Main Consultant(s) (Over 100 million yen)	—						
Feasibility Studies, etc.	—						
Related Projects	[Technical Cooperation] Disaster Management Capacity Enhancement Project Adaptable to Climate Change (2010-2013)						

2. Outline of the Evaluation Study

2.1 External Evaluator

Keishi Miyazaki (OPMAC Corporation)

¹ The project objective mentioned in the ex-ante evaluation summary sheet (2011) was “to promptly recover economic and social activities and to prevent further damage and losses in the damaged areas by rehabilitating damaged roads and irrigation facilities in Central, North Central and Eastern Provinces of Sri Lanka, thereby contributing to the recovery of safety and the livelihood of residents together with rehabilitation of the post-disaster economy and society”. However, the ex-post evaluation re-examined the explanation of the project objective by considering assumed steps for achieving the project objectives based on the logical relationship sequence of “Input-Output-Outcome”. The explanation was then modified as shown in 1.2 Project Outline.

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted as follows:

Duration of the Study: September 2016 – October 2017

Duration of the Field Survey: January 5 – February 4, 2017, May 1 – May 13, 2017

3. Results of the Evaluation (Overall Rating: A²)

3.1 Relevance (Rating: ③³)

3.1.1 Consistency with the Development Plan of Sri Lanka

At the time of project appraisal (2011), the government of Sri Lanka had established a Presidential Task Force for flood rehabilitation of damage in the five provinces, the Northern, North Central, Central, Eastern and Uva Provinces, which had been caused by the rainstorms of December 2010 and February 2011. Under the said Task Force, the Department of National Planning and the Ministry of Finance and Planning (as it was at that time) implemented needs assessment targeting the rehabilitation and reconstruction of damaged public infrastructure, identified the damage situation and planned an emergency / mid- to long-term rehabilitation program. The government of Sri Lanka then requested rehabilitation funding for this rehabilitation project plan.

At the time of the ex-post evaluation, *the Ten-Year Development Plan (2006-2016) (Mahinda Chintana)* aimed at doubling per-capita income, and the development of road infrastructure to activate economic activities is set as an important development agenda for the achievement of this goal. In *the Public Investment Program (2017-2020)* established in February 2017, 20% of the total investment budget in the three years is to go to the road sector which accounts for the largest share. The irrigation sector accounts for 9.3% which has the third highest percentage among all sectors. This means that the road and irrigation sectors are positioned as important sectors in Sri Lanka. *The Comprehensive Disaster Management Programme (2014-2018)* prepared by the Ministry of Disaster Management referred to the “securing [of] Sri Lanka's safety thorough reduction of potential disaster risk and reduction of disaster impact on human life, property, and economy” as its disaster management policy.

3.1.2 Consistence with the Development Needs of Sri Lanka

At the time of project appraisal, the North Central, Central and Eastern Provinces, which were the target areas of the project, had been damaged by rainstorms which occurred during December 2010 and February 2011. Prompt recovery of the infrastructure of the affected areas was therefore an urgent task for the recovery of the livelihoods of local residents and

² A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory.

³ ③: High, ②: Fair, ①: Low.

the rebuilding of the lives of farmers affected, who rely on agriculture, and the recovery of regional economic activities, as described in *1.1 Background*. In addition, there was an urgent need for the rehabilitation of the access roads and irrigation facilities in the disaster-affected areas at least to the situation that they were in previous to the disaster in order to protect human lives and property from further damage.

At the time of the ex-post evaluation, Sri Lanka had been experiencing floods every year, even after 2011, due to the effects of global warming. These have been damaging domestic roads and irrigation facilities, and therefore the importance of designing and building roads and irrigation infrastructure, which are resistant to natural disasters has increased. On the other hand, the rehabilitation and improvement of roads with some focus on disaster prevention, such as anti-landslide measures (construction work to prevent landslides) on high-risk roads in mountain and hilly areas, require a significant amount of additional budget. Therefore, it would not be easy to upgrade all road and irrigation infrastructure to be disaster resistant using only a limited government budget. It is, however, important and necessary to continue to rehabilitate the socio-economic infrastructure that has been affected by natural disasters and to take measures for disaster prevention. JICA's related technical cooperation project, "The Disaster Management Capacity Enhancement Project Adaptable to Climate Change (2010-2013)" (DiMCEP Technical Cooperation Project) created a Disaster Impact Assessment Checklist and provided a training program for the Road Development Authority (RDA) staff. Currently, the RDA utilizes this checklist and introduces appropriate techniques for road design that take into account the aspects of disaster prevention.

3.1.3 Consistency with Japan's ODA Policy

At the time of the appraisal, one of the priority issues of *Japan's Country Assistance Program for Sri Lanka* (established in April 2004) was "assistance that is in line with the country's mid- to long-term vision for development", in which the "development of economic infrastructure" was promoted. *JICA's Country Assistance Strategy for Sri Lanka* (established in March 2009) put priority on "development of economic infrastructure", and emphasized that JICA should promote disaster management and assist vulnerable people affected by natural disasters from the viewpoint of adaptation to climate change. Since this project was aimed at the restoration and development of the road and irrigation infrastructure as it was basic to the livelihoods of local people affected by natural disasters, this project was consistent with the above Japan ODA policy.

In this way, this project has been highly relevant to Sri Lanka's development plan and development needs, as well as to Japan's ODA policy. Therefore, its relevance is high.

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

The project outputs were implemented as planned. As for the road components, the actual output was 390.5 km against the planned output of 330.5 km, which was more than in the original plan. For the irrigation components, the actual output was 248 subprojects (the targeted irrigation scheme was 220 areas) against the planned output of 244 subprojects (the targeted irrigation scheme was 216 areas), which was again more than the original plan (Table 1). Because this project was the implementation of the emergency rehabilitation of flood affected roads and irrigation facilities, which did not require a high level of construction skills, there was no need to hire a consultant in charge of procurement support and construction management.

Table 1: Project Output (Plan/Actual)

Item	Plan	Actual	Gap
1. Rehabilitation of Roads			
(1) National Roads	Total length: 71.7 km	Total length: 92.0 km	+20.3 km
(2) Provincial Roads	Total length: 216.1 km	Total length: 253.6 km	+37.5 km
(3) Rural Roads	Total length: 42.7 km	Total length: 44.9 km	+2.2 km
2. Rehabilitation of Irrigation Facilities			
(1) Large and Medium-scale Irrigation Schemes	No. of subprojects: 167	Same as planned	—
(2) Small-scale Irrigation Schemes	No. of subprojects: 77	No. of subprojects: 81	+4

Source: JICA, National Planning Department, MNPEA

Note 1: In the ex-ante evaluation summary sheet of this project, it was mentioned that the total length of the target roads was approximately 1,018 km. However, this was the total length of candidate roads. The specific target roads were to be identified by the commencement of the project. For this reason, this ex-post evaluation deemed the planned output of this project should be the total length of national, provincial and rural roads mentioned in the first quarterly progress report in 2012. There was no modification in the planned outputs for irrigation facilities.

Note 2: According to the definitions of the Irrigation Department of the Ministry of Irrigation and Water Resource Management (MIWRM), (i) a large-scale irrigation scheme has more than 1,000 acres (approximately 404 hectares) of benefitted area, (ii) a medium-scale irrigation scheme has more than 200 acres (approximately 81 hectares) but less than 1,000 acres of benefitted area, and (iii) a small-scale irrigation scheme has less than 200 acres of benefitted area. On the one hand, the Department of Irrigation, MIWRM is responsible for irrigation schemes with more than 200 acres (more than medium-scale), on the other hand, the Provincial Irrigation Departments of each province are in charge of small-scale irrigation schemes with less than 200 acres.

Furthermore, although the signing date of the loan agreement was September 29, 2011, but start of eligibility was adjusted retroactively to August 22 in 2011. This was a pledge date, and if there was any construction for which the bidding evaluation had been completed by then and which met the subproject selection criteria⁴ of the project, it became eligible for

⁴ At the first stage, the candidate subprojects were to be selected according to the following seven criteria: (i) Damaged by the natural disasters (floods, landslides, etc.) that occurred during December 2010 and February 2011, (ii) Had a need for rehabilitation, (iii) Not included in any other foreign funded programmes/projects, (iv) Exclusion of projects which are classified as “Category A” under JICA’s Guidelines for Environmental and Social Considerations, (v) No land acquisition, (vi) No involuntarily resident resettlement, and (vii) Contractors to be procured in compliance with local competitive bidding. At the second stage, the target subprojects were to be finally selected by the each implementing agency from among the candidate projects of the first selection which were chosen according to needs and priorities of the target areas.

the loan. In addition, the subprojects were scattered in the target provinces and there were many of them; each payment amount was small and it was very likely that many payments would be made. Therefore, the Special Account Procedure applying Statement of Expenditure (SOE) method was employed in order to simplify the process of voucher submission and verification, and to make loan disbursement smoothly. In order to conduct procurement support and project implementation promotion for the above retroactive parts of the project, experts from JICA in charge of procurement and audit were sent to the Project Management Unit (PMU) and the Project Implementation Unit (PIU) (See Column below).

Meanwhile, at the time of project appraisal, JICA' DiMCEP Technical Cooperation Project was ongoing in Sri Lanka. At the beginning of the project, the plan assumed that the disaster prevention technical experts of the said project would have provided a direction in design techniques that could have given a consideration of disaster prevention in the design of the project target roads and irrigation schemes that was taking place. However, the period of the design of the project target facilities and the dispatch of the disaster prevention experts did not overlap due to a delay in the dispatch of the disaster prevention experts. The original plan for cooperation between this project and the DiMCEP Technical Cooperation Project therefore was not realized.

Roads and Irrigation Facilities rehabilitated by the Project (Examples)



National Road in Kandy District, Central Province (Gelioya-Embakka Road)



Provincial Road in Batticaloa District, Eastern Province (Beach Road)



Provincial Road in Polonnaruwa District, North Central Province (D1 North Channel Band Road)



Rural Road in Trincomalee District, Eastern Province (Origant Bridge West Cross Road)



Tank Bund in Ampara District, Eastern Province (Namal Oya Irrigation Scheme)



Anicut in Ampara District, Eastern Province (Sagama Irrigation Scheme)



Tank Bund in Batticaloa District, Eastern Province (Kadukamunai Kulam Irrigation Scheme)



Tank Bund in Polonnaruwa District, North Central Province (Kambukunawale Irrigation Scheme)

3.2.2 Project Inputs

3.2.2.1 Project Cost

The actual project cost amounted to 8,085 million yen against the planned cost of 8,254 million yen. There was an increase of scope in the actual project outputs (Table 2), nevertheless this was within the plan (equivalent to 98% of the original plan).

Table 2: Project Cost (Plan/Actual)

Item	Plan			Actual		
	Foreign Currency	Local Currency	Total	Foreign Currency	Local Currency	Total
	(Mill. Yen)	(Mill. Yen)	(Mill. Yen)	(Mill. Yen)	(Mill. Yen)	(Mill. Yen)
Civil Works (Road)	0	4,550	4,550		5,904.50	5,904.50
Civil Works (Irrigation)	0	1,135	1,135		1,242.10	1,242.10
Price Escalation	0	946	946			0.00
Contingency	0	332	332			0.00
Interest during construction	2	0	2	2.19		2.19
Commitment charge	35	0	35		14.57	14.57
Administration cost	0	0	418	155.92		155.92
Tax and duties	0	0	836		765.78	765.78
Total	37	6,963	8,254	158.11	7,926.95	8,085.06

Source: JICA, National Planning Department, MNPEA

Note: The exchange rate used for planned project cost is 1 rupee = 0.786 yen (as of May 2015). The exchange rate used for actual project cost is 1 rupee = 0.729 yen (average between 2011-2014).

3.2.2.2 Project Period

The planned project period was 37 months (September 2011-September 2014) against the actual project period of 35 months (September 2011-July 2014) which was within the plan (equivalent to 94.6% of the original plan) (Table 3).

Table 3: Project Period (Plan/Actual)

Item	Plan	Actual
1. Signing of Loan Agreement	Sep. 2011	Sep. 2011
2. Procurement and Construction of Road Component	Sep. 2011 – Sep. 2014	Sep. 2011 – July 2014
3. Procurement and Construction of Irrigation Component	Sep. 2011 - Sep. 2014	Sep. 2011 – July 2014
4. Project Completion	Sep. 2014	July 2014
5. Project Period (Entire Period)	Sep. 2011 - Sep. 2014 (37 months)	Sep. 2011 – July 2014 (35 months)

Source: JICA, National Planning Department, MNPEA

Note: The project completion is defined as the completion of procurement and construction for all subprojects.

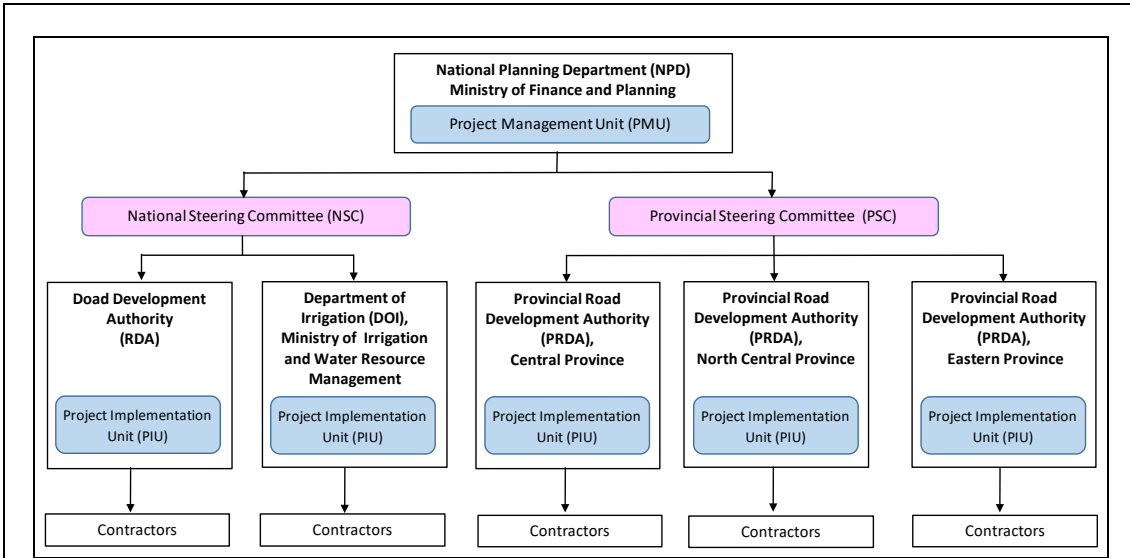
As for recovery construction of large and medium-scale irrigation schemes under the management of the Irrigation Department, Ministry of Irrigation and Water Resources Management (MIWRM), the project was implemented promptly while flexible measures were applied such as allowing the change in procurement rules of the Sri Lankan government as well as the introduction of a direct management method. It was

exceptional made from an emergency perspective, and they are one of the contributing factors to the actual project period being within the plan. For example, the government procurement rule usually requires that orders are to be made by competitive tendering for constructions that exceed 2 million rupees (approximately 1,440,000 yen). However, for construction under the management of the Irrigation Department, the minimum price for competitive tendering was expanded to 5 million rupees (approximately 3.6 million yen). For this reason, it became possible to sign a direct contract with registered contractors without undergoing the tender process if the construction cost was under 5 million rupees. If the construction cost was under 2 million rupees, it was possible to sign a direct contract with a farmers' organization. Because of this exception, the procurement procedure, which normally took about three months, was shortened to about two weeks. Furthermore, due to the introduction of the direct management method, the Irrigation Department designed, estimated the project costs, procured materials, supervised construction, used their own heavy equipment, and resourced workers from the farmers' organization, making it possible to manage small-scale construction promptly. In addition, the introduction of the Special Account Procedure with SOE method contributed to the simplification of administrative procedures.

Meanwhile, other construction works, except for works carried out by the Irrigation Department (e.g. works for national roads for which RDA was responsible, works for small-scale irrigation schemes, provincial roads and rural roads of provincial governments) were implemented in compliance with the usual government procurement rules.

Box: The Project Implementation Schemes

The implementing agency of this project was the Department of National Planning, Ministry of Finance and Planning, (current Ministry of National Policies and Economic Affairs). However, the implementation of each subproject had different agencies depending on the component. National roads were managed by RDA, provincial and rural roads by the Provincial Road Development Authority (PRDA) of each province, large and medium-scale irrigation schemes by the Irrigation Department, MIWRM, and small-scale irrigation schemes by the Provincial Irrigation Department (PID) of each province, respectively. For this reason, the project established the Project Management Unit (PMU) within the Department of National Planning, and a Project Implementation Unit (PIU) within each implementing agency. The PMU gave advice and coordinated with the PIU, and was responsible for the overall implementation of the project, such as fund management and project monitoring. The PIU was responsible for detailed design, procurement procedures, construction supervision for each subproject, and for submitting a monthly progress report to the PMU. On the other hand, people who were involved in the project were spread across national and provincial administrative levels and the sites of the subprojects were wide spread. For this reason, a National Steering Committee (NSC) consisting of representatives from related agencies was established at the national level, and a Provincial Steering Committee (PSC) was established at the provincial level in order to implement the project smoothly. Meetings were organized every three months and two months respectively to monitor the project (Figure 1). Thus, coordination among the related agencies was smoothly carried out.



Source: Prepared by the evaluator based on the JICA’s project documents.

Figure 1: Project Implementation Schemes

3.2.3 Results of Calculations for Internal Rates of Return (As a reference only)

This project was an emergency natural disaster rehabilitation assistance and due to its characteristics, the Internal Rates of Return were not calculated at the time of the appraisal. Therefore, there was no recalculation of the Internal Rates of Return at the time of the ex-post evaluation.

In the light of the above, the project cost and the project period were within the plan; therefore, the efficiency of the project is high.

3.3 Effectiveness⁵ (Rating: ③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

(1) Function of the Rehabilitated Roads and Irrigation Facilities

At the time of appraisal, “quantitative data which show the function of the rehabilitated roads and irrigation facilities have recovered to their previous level” were set as an indicator to measure the quantitative effects of the project, and it was “essentially comparable to the design specification of the target facilities”. The design specifications of some provincial roads of the North Central and Eastern Provinces and irrigation facilities in the North Central Province were checked as samples, and they showed that the design of the rehabilitated roads and irrigation facilities was improved and that they were functioning above the pre-disaster level. Specifically, roads were widened and the surface was improved (from macadam to asphalt pavement, and from gravel to concrete pavement), and drainage was newly built or

⁵ Sub-rating for Effectiveness is to be evaluated together with Impact.

improved. The function of these rehabilitated roads has improved compared to the pre-disaster level. As for the irrigation facilities, the project not only rehabilitated damaged facilities, but also improved them (e.g. the raising of damaged embankments), and the function of these rehabilitated irrigation facilities has improved compared to the pre-disaster level.

However, when the local offices of the implementing agencies (district offices, regional offices) were visited at the time of the ex-post evaluation, not all of them were ready to store and provide browsing of the design specifications of the project target facilities. Therefore, the above sample check had to be carried out within a limited range⁶. In addition, none of the implementing agencies had records of the pre-disaster design specifications and therefore they could not be checked directly. On the other hand, based on the results of interviews with the directors and chief engineers at each local office of the implementing agencies where the design specification could not be confirmed, it was revealed that the rehabilitated roads and irrigation facilities were improved compared to the pre-disaster level and that conditions were better than pre-disaster.

(2) Traffic Volume

The objective of this project was the emergency rehabilitation of road and irrigation infrastructure affected by a natural disaster and therefore project formulation and appraisal were not based on feasibility studies as it was for other usual infrastructure development projects. For this reason, at the time of the appraisal, operational and effect indicators with pre-project baseline values and post-implementation target values were not set. On the other hand, at the time of the ex-post evaluation, it was considered necessary to confirm whether or not the volume of road traffic had recovered to the pre-disaster level and therefore data for pre and post traffic volume of the project target national roads and provincial roads were collected to the extent available and the condition of their recovery was analyzed.

A comparison was made of the annual average daily traffic on the Kekirawa-Thalawa section (the project target section was 9km) from the North Central Province and the Ampara-Uhana Mahaoya section (the project target section was 13km) from the Eastern Province using data from RDA prior to project implementation (before 2013) and after project completion in 2015 and 2016. It was revealed that the traffic volume for both sections increased by 30% after project completion (Table 4).

⁶ The evaluator visited 17 of the 20 district and regional offices of each implementing agency which manage the project target roads and irrigation facilities. However, out of those district and regional offices, there were only 3 locations where the design specification of the project's target facilities could be confirmed.

Table 4: Annual Average Daily Traffic on Target National Roads (Two Sample Roads)

Unit: No. of vehicles/day

Section	Province	Target road length (km)	Survey point (km)	Baseline	Actual		
				Before 2013	2014	2015	2016
					Completion year	1 year after completion	2 years after completion
Kekirawa – Thalawa	North	9.0	20	6,294	N.A.	N.A.	N.A.
	Central		13	3,146	N.A.	4,106	N.A.
Ampara – Uhana Mahaoya	Eastern	13.0	5	4,771	6,208	N.A.	N.A.

Source: RDA

The annual average daily traffics of the 19 provincial roads were also compared using data provided by the Provincial Road Development Authority of three target provinces prior to project implementation (before 2010) and after project completion (after June 2014). It was revealed that the traffic volumes after project completion had increased to the level prior to project implementation or more in all sections. In particular, the rates of increase in traffic volume on the provincial roads from the Eastern Province were significant and traffic volumes increased more than twice in 6 out of 9 sections (table 5).

Table 5: Annual Average Daily Traffic on Target Provincial Roads (19 Sample Roads)

Unit: No. of Vehicle/day

Province	Section	District	Target road length (km)	Baseline	Actual
				Before 2010	After June 2014 (After project completion)
Eastern	Pallikudiyiruppu Internal Road	Ampara	0.45	105	320
	Malayadi Pansala Road - Damana	Ampara	0.30	92	380
	Jamaliya Road - Addalachenai	Ampara	0.80	305	675
	Konawatha Road	Ampara	2.50	290	860
	Amaravayal Thennamaravadi Road	Trincomalee	8.40	282	428
	Mavadichennai- illankaithurai- Navaladi Road	Trincomalee	9.00	196	352
	Valayiravu Link Road	Batticaloa	1.02	1,000	2,000
	Beach Road Kattankudy	Batticaloa	1.48	2,000	3,000
	Kaluwanchikudy Kurumanvely Ferry Road	Batticaloa	0.75	1,000	2,000
North Central	Rathmale - Nachchaduwa Road	Anuradhapura	11.00	1,700	2,100
	Galkiriyagama - Meewewa Road	Anuradhapura	5.83	1,550	2,050
	Seppukulama - Galenbindunuwewa Road	Anuradhapura	3.95	1,150	1,500
	D1 North Channel Bund Road	Polonnaruwa	3.78	1,100	1,500
	Welikanda - Singhapura - Katuwanvila Road	Polonnaruwa	5.00	950	1,300
Central	Hedeniy Bolagala Road	Kandy	2.40	1,522	1,640
	Kalunthanna Tammitiyana Dewahandiya Road	Kandy	9.39	986	1,012
	Piligalla Dawlagala Road	Kandy	3.60	1,630	1,821
	Wahuge Pitiya Wahigala Road	Matale	1.20	138	210
	Aban Opalgama Road	Matale	4.80	214	321

Source: Provincial Road Development Authorities of the Eastern Province, the North Central Province and the Central Province.

Note: As each Provincial Road Development Authority has not necessarily conducted periodic traffic volume surveys, some of the traffic data shown in the above table may include data calculated based on a specific assumption referring to the available actual traffic data for vicinal roads.

This project rehabilitated 92.0 km of national roads and 253.6 km of provincial roads. The two sample national roads mentioned above (total of 22 km) were equivalent to 24% of the total length of the target national roads and the 19 sample provincial roads (total of 75.65 km) were equivalent to 30% of the total length of the target provincial roads. Furthermore, later focus group discussions for residents living along the target roads (150 residents) in the three target provinces revealed that those residents acknowledged an increase in traffic volume after project completion. Therefore, it is considered that traffic volume on the roads rehabilitated by this project has increased to exceed the previous level.

(3) Benefited Area, Cultivated Area and Agricultural Production Volume

As for the traffic volume mentioned above, data for the benefited areas, cultivated areas and volume of agricultural production at the irrigation schemes rehabilitated by the project were collected and analyzed in order to understand the recovery of function after project implementation in a quantitative manner. Because the subprojects of this project rehabilitated only parts of the irrigation facilities from each irrigation scheme, and as the rehabilitated irrigation areas could not be identified, the data of the overall irrigation scheme were analyzed.

<Large and Medium-Scale Irrigation Schemes>

The benefited areas, cultivated areas and agricultural production volume of the overall targeted large and medium-scale irrigation schemes in 57 locations under the management of Irrigation Department, MIWRM in 2016 (2 years after the project completion) had recovered as almost same as the pre-disaster level (2010). However, by district, the cultivated area and agricultural production volume of the irrigation scheme in Trincomalee district (Eastern Province) was below the pre-disaster level due to water shortages according to the implementing agency (Table 6).

Table 6: Benefited Areas, Cultivated Areas and Agricultural Production Volume of Large and Medium-scale Irrigation Schemes under the Management of Irrigation Department, MIWRM

Indicator	District / Province	Baseline	Actual		
		2010	2014	2015	2016
			Project completion	1 year after project completion	2 years after project completion
Areas benefited by the project (ha)	Trincomalee (Eastern Province)	41,650	41,650	41,650	41,650
	Batticaloa (Eastern Province)	7,025	8,462	8,583	8,826
	Ampara (Eastern Province)	85,933	85,933	85,933	85,933
	Anuradhapura (North Central Province)	26,275.4	26,275.4	26,275.4	26,275.4
	Polonnaruwa (North Central Province)	34,249	34,249	34,249	34,249
	Total	195,132	196,569	196,690	196,933
Cultivated Areas (ha)	Trincomalee (Eastern Province)	41,650	30,710	40,483	39,680
	Batticaloa (Eastern Province)	7,025	8,462	8,583	8,826
	Ampara (Eastern Province)	85,933	85,933	85,933	85,933
	Anuradhapura (North Central Province)	26,275.4	26,275.4	26,275.4	26,275.4
	Polonnaruwa (North Central Province)	34,249	34,249	34,249	34,249
	Total	195,132	185,629	195,523	194,963
Volume of Agricultural Production (t)	Trincomalee (Eastern Province)	331,110	204,745	263,415	267,380
	Batticaloa (Eastern Province)	100,984	129,488	139,392	159,192
	Ampara (Eastern Province)	392,350	398,150	406,370	410,140
	Anuradhapura (North Central Province)	193,225.5	197,554.0	160,722.0	203,691.0
	Polonnaruwa (North Central Province)	353,330	278,410	370,820	375,260
	Total	1,371,000	1,208,347	1,340,719	1,415,663

Source: Irrigation Department, MIWRM

Note: This project implemented 167 subprojects for the rehabilitation of irrigation facilities in 57 large and medium-scale irrigation schemes in the Eastern Province and the North Central Province under the management of the Irrigation Department, MIWRM. The breakdown of 57 large and medium-scale irrigation schemes is 8 in Trincomalee district, 3 in Batticaloa district, 17 in Ampara district, 24 in Anuradhapura district, and 5 in Polonnaruwa district.

<Small-Scale Irrigation Schemes>

The benefited areas, cultivated areas and agricultural production volume of the overall targeted small-scale irrigation schemes in 21 locations under the management of the Eastern Provincial Irrigation Department in 2016 (2 years after the project completion) had increased by 24% each when compared to the pre-disaster level (2010) (Table 7).

On the other hand, the benefited areas, cultivated areas and agricultural production volume of the overall targeted small-scaled irrigation schemes in 34 locations under the management of the Northern Central Provincial Irrigation Department in 2016 (two years after project completion) recovered almost to the same level as pre-disaster (2010) (Table 8).

Table 7: Benefited Areas, Cultivated Areas and Agricultural Production Volume of Small-scale Irrigation Schemes under the Management of Eastern Provincial Irrigation Department

Indicator	District	Baseline	Actual		
		2010	2014	2015	2016
			Project completion	1 year after project completion	2 years after project completion
Areas benefited by the project (ha)	Trincomalee District	1462.81	1723.82	1723.82	1821.07
	Batticaloa District	1931.19	2215.81	2378.54	2378.54
	Ampara District	615.4	730.78	730.78	769.24
	Total	4,009.4	4,670.4	4,833.1	4,968.9
Cultivated Areas (ha)	Trincomalee District	1462.81	1723.82	1723.82	1821.07
	Batticaloa District	1931.19	2215.81	2378.54	2378.54
	Ampara District	615.4	730.78	730.78	769.24
	Total	4,009.4	4,670.4	4,833.1	4,968.9
Volume of Agricultural Production (t)	Trincomalee District	6582.65	7757.24	7757.24	8194.55
	Batticaloa District	8690.5	9971.1	10703.43	10703.43
	Ampara District	3076.95	3653.9	3653.9	3846.2
	Total	18,350.1	21,382.2	22,114.6	22,744.2

Source: Provincial Irrigation Department (PID), Eastern Province

Note: This project implemented 47 subprojects for the rehabilitation of irrigation facilities in 21 small-scale irrigation schemes (8 in Trincomalee district, 7 in Batticaloa district, 6 in Ampara district) under the management of PID, Eastern Province.

Table 8: Benefited Areas, Cultivated Areas and Agricultural Production Volume of Small-scale Irrigation Schemes under the Management of the North Central Provincial Irrigation Department

Indicator	District	Baseline	Actual		
		2010	2014	2015	2016
			Project completion	1 year after project completion	2 years after project completion
Areas benefited by the project (ha)	Anuradhapura District	1,057.9	1,067.5	1,067.5	1,067.5
	Polonnaruwa District	364.0	393.5	393.5	393.5
	Total	1,421.9	1,461.0	1,461.0	1,461.0
Cultivated Areas (ha)	Anuradhapura District	1,057.9	1,067.5	1,067.5	1,067.5
	Polonnaruwa District	364.0	393.5	393.5	393.5
	Total	1,421.9	1,461.0	1,461.0	1,461.0
Volume of Agricultural Production (t)	Anuradhapura District	4,753.0	4,857.0	4,964.0	5,043.0
	Polonnaruwa District	1,632.0	1,775.0	1,821.0	1,861.0
	Total	6,385.0	6,632.0	6,785.0	6,904.0

Source: PID, North Central Province

Note: This project implemented 34 subprojects for the rehabilitation of irrigation facilities in 34 small-scale irrigation schemes (29 in Anuradhapura district and 5 in Polonnaruwa district) under the management of PID, North Central Province.

Although the cultivated areas and agricultural production volume are highly influenced by the climate conditions of each year, the implementing agencies believe that the rehabilitation and improvement of the irrigation facilities by this project have been contributing factors to

the above results. The Eastern Province had been under the control of the Liberation Tigers of Tamil Eelam (LTTE) for a long time, and therefore it was difficult to access and cultivate some parts of the irrigation schemes. However, the return of farmers as a result of the end of the civil war and the restoration of public safety, as well as there being a good agricultural environment ready for the farmers could be one of the reasons which has influenced the increase in the benefited areas, cultivated areas and agricultural production volume in the Eastern Province. Meanwhile, the Irrigation Department, MIWRM and the Provincial Irrigation Departments have provided continuous maintenance and improvement of the irrigation facilities, and capacity building support for farmers' organizations using their own budget. These efforts may have contributed to the recovery of the benefited areas, cultivated areas and agricultural production volume of the rehabilitated irrigation schemes.

3.3.2 Qualitative Effects (Other Effects)

At the time of the appraisal, “the prompt recovery of the economic and social activities in the disaster-affected areas” was listed as a qualitative effect of the project. However, the ex-post evaluation decided that the above effect is an indirect effect of the project, and therefore to treat it as an impact.

Rehabilitation of Roads and Irrigation Facilities by the Project



Source: PRDA, Eastern Province, PRDA, North Central Province, PRDA, Central Province.

3.4 Impacts

3.4.1 Intended Impacts

(1) Securing the safety of residents in the disaster-affected areas

According to RDA and each Provincial Road Development Authority, driving at night was dangerous as the condition of road surfaces had previously been bad. However, road paving was improved by the project and the number of traffic accidents has decreased due to smooth

driving compared to before project implementation. Road signs, road marking, pedestrian crossings, hard shoulders and sidewalks were put in place, and the traffic safety measures were enhanced, all of which has contributed to improvements in safety for residents. Furthermore, roads and bridges used to be inundated during the flood, and were impassable for a few days or a week in some cases, but after project implementation, this is no longer the case, and safe and smooth access is now possible even during the monsoon season.

According to the Irrigation Department, MIWRM, two reservoirs in the irrigation scheme in Ampara district, Eastern Province were damaged by floods, and the area in the lower reach and the road system were affected. The project rehabilitated the damaged bund, and the safety of the areas surrounding the reservoirs was secured. In the Kaudulla irrigation scheme in the Polonnaruwa district of North Central Province, some of the paddy fields (1,000 acres (approximately 404 ha) paddy fields) and more than 500 farmers' households in the area often had suffered from floods during the monsoon season. The project built a causeway (a road that directly crosses a river, and it is often built where the flow rate is low) which made it easier to carry out flood control during the monsoon season, saving the above mentioned paddy fields and farmers' households from flooding. In addition, rehabilitation of the 34 water reservoirs (including bunds and diversion channels) damaged by floods in the North Central Province has secured the safety of the areas surrounding the reservoirs.

According to the results of the Focus Group Discussion (FGD)⁷ conducted at the ex-post evaluation, all 299 participants (100%) said that the safety of residents of the affected areas has improved following implementation of the project. According to the residents of the irrigation sites, natural disasters such as floods can be a big risk that may cause damage to the irrigation facilities and agricultural activities. They acknowledged that the project had contributed greatly to minimizing the risk of damage by natural disasters to the irrigation facilities as well as to the overall safety of residents in some areas.

From the above, it can be seen that the project has contributed to securing the safety of residents in the disaster-affected areas to some extent.

(2) Prompt Recovery of Economic and Social Activities

According to the Provincial Road Development Authorities of the three target provinces, the prompt transportation of agricultural inputs and outputs has become possible due to the rehabilitation and reconstruction of roads affected by disaster, which has had the effect of reducing transportation costs. This cost reduction has made it possible for farmers to sell their agricultural products at competitive prices.

⁷ At the time of the ex-post evaluation, FGD were conducted with residents living along the target roads and residents (mostly farmers) using the irrigation facilities, in order to investigate the project effects and impacts. A total of 21 FGD were conducted (8 in the Eastern Province, 7 in the North Central Province and 6 in the Central Province) and there was a total of 299 participants (residents from the irrigation sites: 149, residents from the road sites:150).

According to the Irrigation Department, MIWRM, the rehabilitation and improvement of the irrigation facilities affected by the disaster was completed in less than 3 years (35 months) and the short duration of this minimized the damage to agricultural production. Since the capacity of the Naakiri water reservoir of Batticaloa district in Eastern Province has improved, it is now possible to supply stable agricultural water throughout the year and the risk of water shortages has been reduced.

All 299 participants of FGD (100%) responded that the implementation of the project has promoted the prompt recovery of economic activities in the disaster-affected areas. From individual responses, it can be seen that 93-97% of the FGD participants acknowledged positive impacts of the project, such as the recovery of business activities and livelihoods, as well as health and educational services. As a reason for the recovery of health and educational services, they listed improvements in public transportation such as more frequent public transportation services due to the rehabilitation and improvement of the roads. Farmers in the irrigation scheme reported that the rehabilitation and improvement of bunds meant better convenience for those living within the irrigation scheme and nearby areas, as the bunds in the scheme were used as roads for agricultural and transit purposes.

Residents living on the road sites pointed out: (1) reduced driving time, (2) improved public transportation services (increased number and frequency of buses), (3) increased traffic volume, (4) improved road access (new access to important locations), (5) improved agricultural activities, especially capacity for transporting of agricultural products, and (6) reduced periods when roads were impassable during floods, as significant shared changes after the implementation of the project. Also, some residents from the irrigation sites pointed out (1) expanded irrigation areas, (2) the securing of means of transportation (the bunds of water reservoirs and the revetments of canals are also used as roads within the irrigation schemes), and (3) improvements in reservoir capacity as some additional effects brought by the project.

On the other hand, the residents from the road sites noted maintenance issues in the road drainage facilities. This project also developed new drainage facilities in many target sections while rehabilitating disaster-affected roads. However, the maintenance of these drainage facilities has not been sufficient, and there have been some reported cases where drainage channels have flooded, damaging the road shoulders and making some roads impassable because of the water overflowing on the surface after heavy rain. These problems were often seen in the roads between mountains in hilly areas of the Central Province. Some of the FGD participants requested appropriate maintenance of such drainage facilities.

From the above, it can be seen that this project has contributed to the prompt recovery of the economic and social activities of the disaster-affected areas.

(3) Prevention of Further Damage and Losses

As described above, collaboration with the disaster prevention experts of JICA's DiMCEP Technical Cooperation Project did not take place. Therefore, impacts related to the prevention of further damage and losses in collaboration with the DiMCEP Technical Cooperation Project were not seen in this project.

3.4.2 Other Positive and Negative Impacts

(1) Impacts on Natural Environment

This project was categorized as FI⁸ in *the Japan International Cooperation Agency Guidelines for Environmental and Social Considerations* (April 2010). For this reason, the implementing agencies categorized each subproject based on Sri Lankan domestic laws and the JICA Guidelines, implementing necessary counter measures as well as monitoring for the corresponding categories. The target subprojects of the project were the rehabilitation of existing facilities, and the implementing agencies did not conduct an Environmental Impact Assessment (EIA). The subprojects, which were classified in Category A, did not qualify in the end as a target of this project. Since the project target roads and irrigation facilities were all existing facilities, an Environmental Management Plan or an Environmental Monitoring Plan was not prepared at the time of project appraisal as well as during the project implementation. However, a periodic environmental monitoring was conducted during the project implementation by the environmental monitoring teams composed of engineers and officers of each implementation agencies responsible for environmental issues. During implementation of the project, necessary environmental protection measures were taken such as the minimum felling of trees and the management of waste from construction.

After completion of the project, no periodical environmental monitoring of the target national roads, provincial roads and rural roads was conducted by any of the implementing agencies. Each province organizes a monthly meeting where RDA, divisional secretaries, local government and the police discuss various issues including the issues of roads. If there is an environmental issue, it would be reported through the monthly meeting, and necessary measures would then be taken. Meanwhile, a divisional engineer from each district office of the Irrigation Department, MIWRM will take responsibility for the environmental monitoring of the large and medium-scale irrigation schemes and if there is a serious environmental issue, it should be taken care of according to advice given by the Environmental Section from the Irrigation Department Headquarters. According to the FGD,

⁸ The project was classified as Category FI since it satisfied the following requirements: JICA's funding of projects was provided to the Ministry of Finance and Planning (at that time); the selection and appraisal of the subprojects were substantially undertaken by an institution only after JICA's approval of the funding, so that the subprojects could not be specified prior to JICA's approval of funding (or project appraisal); the subprojects were expected to have a potential impact on the environment.

there was no negative impact of the project on the natural environment.

From the above, it can be seen that there is no negative impact on the natural environment from the project.

(2) Land Acquisition and Resettlement

There was no land acquisition for this project as its objective was to rehabilitate the existing facilities. When roads were widened, it was within the range of what had been already acquired. However, at the request of local residents, when widening of disaster-affected roads was conducted in addition to rehabilitation in some parts of the mountain areas of the Kandy district in the Central Province, land was donated voluntarily by the local residents.

In the irrigation scheme in the Pollonaruwa district of the North Central Province, 26 households⁹ living near the diversion channel of the Kadulla water reservoir were resettled. The district secretary was in charge of the resettlement procedure, and land and residential buildings were provided to the resettled households. This resettlement procedure was carried out based on Sri Lankan domestic laws, and the compensation was made based on the replacement cost. According to the Irrigation Department, the place where the resettled residents used to live was near the diversion channel and there were frequent floods. However after the resettlement, they were provided with residential buildings and land in a safe location, and therefore they have been satisfied with their living environment since resettlement.

In summary, the rehabilitated roads and irrigation facilities have been improved, and their functions have recovered to the same or a higher level than that prior to the disaster. Furthermore, some positive impacts that were related to the security of residents in the disaster-affected areas were observed. Driving safety on some roads has improved, the capacity of reservoirs has been enhanced and capacity for flood control improved for some irrigation schemes. Some impacts that were related to the prompt recovery of economic and social activities in the disaster-affected areas were also observed, such as decreased costs for the transportation of agricultural products, fewer times when roads were impassable during floods, reduced risks of water shortage as a result of the improvement in reservoir capacity, the recovery of business activities, recovered livelihoods, restored health and educational services. On the other hand, there was no impact related to disaster prevention in cooperation with the DPME Technical Cooperation Project. There was no negative impact on the natural environment through the

⁹ According to the Irrigation Department, MIWRM, because the location near the diversion channel has a high risk of flood and it is dangerous, it was not allowed to live in the area. However, the 26 households to be resettled did not own the land and they were farmers who had been living there illegally.

project. There was the resettlement of 26 households for the irrigation schemes in the North Central Province. The resettlement procedure was carried out appropriately based on Sri Lankan domestic laws.

From the above, it can be seen that there were positive impacts of implementation of this project as planned, and therefore its effects and impacts are high.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

<National Roads>

The Road Development Authority (RDA) is responsible for the operation and maintenance of the national roads which consist of trunk and artery roads as well as expressway throughout Sri Lanka. As of 2016, the total length of the national roads was 12,340 km. In the RDA headquarters, the Maintenance,

Table 9: Number of RDA District Office Staff responsible for the O&M of Target National Roads

District Office	Province	Number (person)
Ampara Office	Easter	88
Anuradhapura Office	North Central	33
Kandy Office	Central	34

Source: RDA

Management and Construction Department (National Roads) is responsible for the operation and maintenance of the national roads. There are provincial offices in 9 provinces across the country, under which there are 21 district offices. The project target roads were under the Ampara District Office, the Anuradhapura District Office and the Kandy District Office. The number of staff in each of the district offices is shown in Table 9. According to RDA, there is no issue in the allocation of a workforce at each district office. The RDA conducts daily maintenance directly, but some periodic maintenance is outsourced, the outsourcing companies being selected among those which have been registered and approved by the Construction Industry Development Authority (CIDA). No major issues were observed in terms of the institutional aspect of the RDA.

<Provincial Roads>

The Provincial Road Development Authority (PRDA) in each province is responsible for the operation and maintenance of provincial roads. The number of Provincial Road Development Authority staff in each province is shown in Table 10. While in the Eastern Province and the Central Province no major issues were observed in terms of the institutional aspect of the PRDA, a shortage of labor was observed in the PRDA of the North Central Province. However, although there are some restrictions in terms of staffing in the PRDA of the North Central Province, maintenance and operation is accomplished to some extent.

For the daily maintenance and periodic maintenance of the provincial roads, the Eastern Province outsources most and the North Central Province outsources some of the operations including to Community-based Organizations (CBOs). When outsourcing to CBOs, the PRDA is responsible for the supervision and quality control of the outsourced works. Meanwhile, most of the maintenance (more than 75%) is directly implemented by the PRDA in the Central Province, although some operations are outsourced as needed. Each PRDA is given project information and documents by the PMU. Therefore, no major issues have been observed in terms of the institutional aspects of the three target PRDAs.

Table 10: Number of Provincial Road Development Authority Staff in the Three Target Provinces

Province	Dept.	Total length of provincial roads (km) ^(Note)	Number (persons)
Easter	PRDA	1,089	Permanent staff: 139
North Central	PRDA	1,947	Permanent staff: 175 Temporary staff: 130
Central	PRDA	2,244	Permanent staff: 235

Source: PRDA/Eastern Province, PRDA/North Central Province, PRDA/Central Province

Note: The data for the total length of provincial roads for each province are as of 2015.

<Rural Roads>

Local council governments¹⁰ are responsible for the maintenance of the rural roads and the divisional council governments¹¹ (Pradeshiya Sabha) are in charge of the target rural roads in this project. Pradeshiya Sabha is responsible for the operation and maintenance of the target rural roads of this project in 30 locations (18 in the Eastern Province, 6 in the North Central Province and the 6 in Central Province).

In the four Pradeshiya Sabha¹² (one in the Eastern Province, two in the North Central Province and one in the Central Province) which were interviewed, although each one is different in size, there are a dozen or few dozen staff from the technical departments who were responsible for road, water and garbage collecting services, and also one or two assigned technicians. Meanwhile, there are rural roads that average a few hundred kilometers

¹⁰ The local government administrative system of Sri Lanka is made up of a parallel system of two different lines: (i) an administrative system under central control based on Districts (the country is divided into 25 districts), and (ii) an administrative system under the Provincial Council and the other local councils. The local administrative system based on Districts has remained from the British colonial era, while the Provincial Council system was introduced to solve ethnic problems in 1987. There are 9 Provincial Councils in Sri Lanka and other local councils underneath them as local municipalities. The local councils are mainly responsible for the provision of environmental and social services such as public health, sanitation, water supply, garbage disposal, sewage, etc.

¹¹ Each of the municipal Councils, Urban Councils and Pradeshiya Sabha are responsible for the operation and maintenance of the rural roads when they are located in municipal areas, urban areas and rural areas, respectively. The Local Councils are under the supervision of the Commissioner of Local Government (CLG). The organizational structure of the Local Councils in each municipality is almost the same, and there are about 80 staff members in the Municipal Councils and 20 staff members in Pradeshiya Sabha.

¹² Damama Pradeshiya Sabha (Eastern Province, Ampara District), Thamankaduwa Pradeshiya Sabha (North Central District, Polonnaruwa District), Anuradhapura East Pradeshiya Sabha (North Central Province, Anuradhapura District), and Poojapitiya Pradeshiya Sabha (Central Province, Kandy District).

in length in each divisional boundary under Pradeshiya Sabha, of which 80-90% are gravel or unsurfaced. It is thought that there is not enough staff to implement sufficient maintenance (periodic maintenance) of the rural roads due to the limited staffing of each Pradeshiya Sabha.

Project information and documents such as design drawings of the rural roads had not been handed over from the PMU or provincial governments to the four Pradeshiya Sabhas which were interviewed and it is assumed that this was also the case for Pradeshiya Sabhas where interviews hearings did not take place. However, the PRDAs are responsible to take care of larger scale maintenance and repair, and therefore the maintenance of the concrete pavement roads rehabilitated and improved by the project is necessary only for surface treatment (sand sealing) or weeding of road shoulders. For this reason, it is thought that there are no major problems for periodic maintenance to take place without project information such as design drawings.

Therefore, there are some issues observed in terms of the institutional aspects of the four Pradeshiya Sabhas which were interviewed.

<Large and Medium-scale Irrigation Schemes>

The Irrigation Department, MIWRM is responsible for the operation and maintenance of large and medium-scale irrigation schemes. The Irrigation Department has 14 regional offices and 5 zone offices throughout the country. Five of the regional offices, the Trincomalee Office, the Batticaloa Office, the Ampara Office, the Anuradhapura Office and the

Polonnaruwa Office, are responsible for the operation and maintenance of the target large and medium-scale irrigation schemes. The number of staff at each regional office is shown in Table 11. According to the Irrigation Department, there is an insufficient number of staff at the Anuradhapura, Batticaloa and Ampara offices with a particular lack of lower level technicians. However, although the number of staff is somewhat limited, the operation and maintenance work for the large and medium-scale irrigation schemes is implemented to a certain level by the Irrigation Department. Therefore, it is considered that there is almost no issue in terms of the institutional aspects of the Irrigation Department, MIWRM.

Table 11: Number of Regional Office Staff of Irrigation Department, MIWRM responsible for the O&M of Target Large and Medium-scale Irrigation Schemes

Regional Office	Province	Number (persons)
Trincomalee Office	Eastern	206
Batticaloa Office	Eastern	80
Ampara Office	Eastern	365
Anuradhapura Office	North Central	415
Polonnaruwa Office	North Central	261

Source: Irrigation Department, MIWRM

<Small-Scale Irrigation Schemes>

The Provincial Irrigation Departments (PIDs) of the two target provinces are responsible for the operation and maintenance of the small-scale irrigation schemes. The number of staff at each PID is shown in Table 12. The Eastern Province PID implements most of the

Table 12: Number of Provincial Irrigation Department Staff in Target Two Provinces

Province	Dept.	Number (persons)
Eastern	PID	348 (including 120 workers)
North Central	PID	71

Source: PID, Eastern Province, PID, North Central Province

operation and maintenance work by themselves and has field workers as staff members; therefore, the number of staff is larger than that in the Northern Province Irrigation Department. On the other hand, there is a relatively small number of staff at the Northern Province PID, as much of the maintenance work is outsourced to farmers' organizations and CBOs. However, the maintenance of field canals in the small-scale irrigation schemes is the responsibility of the farmers who own the fields. According to the PID of the Eastern Province and the North Central Province, there is no major issue in terms of the institutional aspects. Therefore, there are no issues seen in the institutional aspects of the two target provincial PIDs.

3.5.2 Technical Aspects of Operation and Maintenance

<National Roads>

The engineers (chief engineers and senior engineers) who belong to the above three district offices of RDA are qualified as "chartered engineers" by the Institution of Engineers Sri Lanka (IESL). In addition, other technical staff such as technicians and site supervisors, possess the technical capacity to implement normal maintenance work. There is a training department in the RDA headquarters, and all members of technical staff are expected to take annual in-house training programs such as "Road Operation and Maintenance Training" and "Computer Training". There are also overseas training programs for the acquisition of the latest road and bridge technology.

Maintenance work has been implemented based on the RDA standard regulations, *Standard Specifications for Construction and Maintenance for Roads and Bridges – November 2008*. The Disaster Impact Assessment Checklist created through the JICA' DiMCEP Technical Cooperation Project described earlier, has been introduced by RDA, and it is used for road and bridge designing. Therefore, there is no issue in terms of the technical aspect of RDA.

<Provincial Roads>

The engineers (chief engineers and senior engineers) at PRDAs in the three target

provinces are also qualified as “chartered engineers” by IESL. At the PRDAs in the three target provinces, the Road Maintenance Management System (RMMS¹³) has been introduced by donors; but it is only the Central Province PRDA¹⁴, which actually utilizes this system to implement the maintenance of the provincial roads. However, it is possible to implement the maintenance of the provincial roads without the use of RMMS. Each PRDA conducts periodic training programs for staff in order to maintain and improve their technical capacity¹⁵. The three target provinces implement maintenance work based on the RDA maintenance standard specifications. Therefore, there is no issue in terms of the technical aspects of the PRDA in the three target provinces.

<Rural Roads>

Usually, one or two road managers / engineers and a dozen skilled road workers are allocated to Pradeshiya Sahba. However, the engineers’ qualifications and ability are inferior to those of the RDA and PRDA. The four Pradeshiya Sahbas where interviews took place own heavy machinery (roller trucks, concrete mixer trucks, loading shovels, etc.) for road maintenance. The engineers at Pradeshiya Sahba receive technical training on a regular basis, and they get technical support from the engineers of provincial government as needed. Through this, the staff of the technical divisions of Pradeshiya Sahba is considered to possess the sufficient knowledge and technical skills required for maintaining concrete paving roads. Therefore, there is no issue in terms of the technical aspects of the four Pradeshiya Sahbas interviewed.

<Large and Medium-Scale Irrigation Schemes>

The engineers at each regional office under the Irrigation Department, MIWRM are also qualified as “chartered engineers” by IESL. MIWRM has two training institutions in the country, the Irrigation Training Institute (ITI) and the Kothmale International Training Institute (KITI), which provide training for staff from the Irrigation Department on the subjects of operation and management, water management, and flood control every year. Furthermore, the Irrigation Department has a resident office in each irrigation scheme they

¹³ RMMS is a system that sets priorities in maintenance from the perspective of economic efficiency, based on road surface condition data or traffic volume data.

¹⁴ RMMS was introduced to the Central Province and Sabaragamuwa Province by the technical transfer made under the Japanese ODA loan projects “Rural Road Improvement Project” (Loan agreement signed on March 2003) and “Provincial/Rural Road Development Project (Central Province & Sabaragamuwa Province)” (Loan agreement signed on March 2010).

¹⁵ PRDA, the Eastern Province conducts training programs for engineers and technical offices on the quality control of road construction and on procurement 1-2 times a year. PRDA, the North Central Province dispatches several selected engineers to overseas training programs in Malaysia, Vietnam and India every year so they can study up-to-date technical knowledge and skills for road maintenance and road project management including road engineering, contract management, supervision, and quality control. PRDA, the Central Province conducts outbound training programs (one a year), technical training (twice a year), and supervisor training (three times a year) for technical staff and management assistants.

manage, and the resident engineers provide capacity development and technical support for the farmers' organizations. The Irrigation Department implements operation and maintenance according to the operation and management manual and guidelines of the irrigation facilities. Therefore, there is no issue in terms of the technical aspects of the Irrigation Department, MIWRM.

<Small-Scale Irrigation Schemes>

The engineers at PID in the Eastern Province and the North Central Province are also qualified as "chartered engineers" by IESL. Each PID provides training for their staff on a regular basis in order to maintain and improve their technical skills¹⁶. In addition, each PID provides capacity development and technical support for the farmers' organizations, in cooperation with divisional staff from the Department of Agrarian Services, Ministry of Agriculture. The PIDs mainly provide technical guidance and support for maintenance of the irrigation facilities, and the Department of Agrarian Services provides support related to management aspects such as support for agricultural techniques, the distribution of fertilizers and seeds, and the operation and management of farmers' organizations. The PID in Eastern and North Central Provinces implement operation and maintenance according to the operation and management manual and guideline from the Irrigation Department, MIWRM. Therefore, there is no issue in terms of the technical aspects of PIDs from the two target Provinces.

3.5.3 Financial Aspects of Operation and Maintenance

<National Roads>

The maintenance budgets of three RDA district offices and the entire RDA for the past three years are shown in Table 13 and Table 14. A part of the maintenance budget for national roads was distributed from the Road Maintenance Trust Fund¹⁷. However, the fund itself has not been functioning properly in recent years, so instead, 4,000 million rupees of maintenance fees have been distributed annually by the Ministry of Finance and Planning. According to RDA, a comparable amount of annual maintenance fees will be distributed by the Ministry of Finance and Planning for the time being. There is no issue in terms of the maintenance budget.

¹⁶ PID, the Eastern Province conducts training programs for PID staff every year on the methodology for the operation and maintenance of irrigation structures, on the quality control aspects and on the design aspects of irrigation schemes. Meanwhile, PID, the North Central Province provides training programs for PID staff, including technical officers and engineers, every year on subjects such as leadership training, GPS/GIS training, and design training.

¹⁷ The Road Maintenance Trust Fund was established by the government of Sri Lanka in December 2005 to secure finance for road maintenance. The financial source for this was based on a levy of 1 rupee per 1L for gasoline sales and 0.5 rupee per 1L for diesel sales.

Table 13: Maintenance Budget of Three RDA District Offices

Unit: Million Rupees

	2014		2015		2016	
	Plan	Actual	Plan	Actual	Plan	Actual
Ampara Office (Eastern Province)	20.0	24.0	20.0	27.0	25.0	31.5
Anuradhapura Office (North Central Province)	360.0	306.0	215.0	147.1	240.0	179.8
Kandy Office (Central Province)	630.7	487.2	238.0	158.0	202.5	167.5

Source: RDA

Note: The maintenance budget for RDA district offices is a total maintenance budget for all national roads located in each district, including the target national roads of the project.

Table 14: Maintenance Budget of the Entire RDA

Unit: Million Rupees

		2014		2015		2016	
		Plan	Actual	Plan	Actual	Plan	Actual
Total Annual Budget of RDA	Current	5,500	5,500	6,000	6,000	6,000	6,000
	Development	25,700	24,278	38,872	35,203	37,380	N.A.
	Total	31,200	29,778	44,872	41,203	43,380	N.A.
Total maintenance budget of RDA for all national roads		8,000	7,262	5,000	3,554	4,000	N.A.

Source: RDA

<Provincial Roads>

The maintenance budgets of PRDAs of the three target provinces for the past three years are shown in Table 15. Each PRDA does not have its own financial source and the budget distributed by the provincial government is the main financial source of the maintenance budget of PRDAs. Unlike the maintenance budget for the national roads, there is no distribution from the Road Maintenance Trust Fund for the maintenance of the provincial roads. For this reason, there is a budget shortage for the provincial road maintenance in all provinces. There are different demands for the maintenance cost of the provincial roads for each of the three target PRDAs as the roads all differ in distance, and geographical conditions. However, according to the PRDAs, the required annual maintenance budgets for each province in order to implement proper maintenance in all provincial roads according to the rules has been 150 million rupees in the Eastern Province, 500 million rupees in the North Central Province and 1,200 rupees in the Central Province. There is a big difference when comparing these figures to the actual maintenance budget distributed to each PRDA. Therefore, there is an issue in terms of the financial aspects of the three target PRDAs.

Table 15: Maintenance Budget for PRDAs of Target Three Provinces

Unit: Million Rupees

	2014		2015		2016	
	Plan	Actual	Plan	Actual	Plan	Actual
PRDA, Eastern Province	86.0	52.0	114.0	103.0	63.7	55.0
PRDA, North Central Province	75.0	74.8	100.0	92.8	120.0	114.0
PRDA, Central Province	400.0	374.0	400.0	302.0	400.0	190.0

Source: PRDA, Eastern Province, PRDA, North Central Province, PRDA, Central Province

<Rural Roads>

The financial resources for Pradeshiya Sahba consist of budget distribution from the provincial government and their own tax revenue (property tax, etc.) and the maintenance budget for the rural roads is derived from this. According to the four Pradeshiya Sahbas interviewed, financial shortages are being experienced as the maintenance budget currently distributed is only 30-40% of what is necessary. In addition, the maintenance budget of Pradeshiya Sahbas is used for the maintenance of gravel and unsurfaced roads on a priority basis, and spending on paved roads, including concrete pavements, is extremely limited. Therefore, some minor problems have been observed in terms of the financial aspects of the four Pradeshiya Sahbas which were interviewed.

<Large and Medium-Scale Irrigation Schemes>

The maintenance budgets of the regional offices in the two target provinces under the Irrigation Department, MIWRM as well as those for the entire Irrigation Department for the past three years are shown in Table 16 and 17. The maintenance budget of the Irrigation Department is distributed by the central government. Although the Irrigation Department estimates an annual budget of 1,000 million rupees to maintain its irrigation facilities nationwide, its actual maintenance budget for 2016 remained at 800 million rupees. This is still considered by the Irrigation Department to be insufficient even though the actual maintenance budget for 2016 had a significant increase compared to the previous year as there was an additional budget for flood prevention. Therefore, some minor problems have been observed in terms of the financial aspects of the Irrigation Department, MIWRM.

Table 16: Maintenance Budget of Regional Offices under the Irrigation Department, MIWRM

Unit: Million Rupees

		2014		2015		2016	
		Plan	Actual	Plan	Actual	Plan	Actual
Trincomalle Office (Eastern Province)	Maintenance budget	37.9	36.3	39.6	39.0	45.3	44.3
	Annual budget	308.1	278.3	402.7	300.0	331.3	327.3
Batticaloa Office (Eastern Province)	Maintenance budget	8.6	N.A.	9.7	N.A.	24.5	N.A.
	Annual budget	212.5	N.A.	245.9	N.A.	202.4	N.A.
Ampara Office (Eastern Province)	Maintenance budget	67.5	57.6	65.2	68.4	76.1	76.2
	Annual budget	314.5	311.2	432.9	394.8	528.8	491.2

		2014		2015		2016	
		Plan	Actual	Plan	Actual	Plan	Actual
Anuradhapura Office (North Central Province)	Maintenance budget	N.A.	61.3	N.A.	62.0	N.A.	69.4
	Annual budget	N.A.	801.2	N.A.	673.2	N.A.	697.7
Polonnaruwa Office (North Central Province)	Maintenance budget	59.8	58.7	58.7	57.9	67.5	66.6
	Annual budget	173.5	157.3	350.9	344.8	315.5	284.4

Source: Irrigation Department, MIWRM

Note 1: The maintenance cost covers the maintenance cost for all irrigation schemes under the management of each regional office including the maintenance cost for the target irrigation schemes of the project.

Note 2: The maintenance cost does not include the personnel cost for the staff of each regional office.

Table 17: Maintenance Budget of the Irrigation Department, MIWRM

Unit: Million Rupees

	2014		2015		2016	
	Plan	Actual	Plan	Actual	Plan	Actual
Maintenance budget	559.7	559.7	450.0	431.0	800.0	753.7
Annual budget	12,863.3	12,847.0	13,397.2	13,198.2	16,585.3	13,224.1

Source: Irrigation Department, MIWRM

Note: The maintenance cost does not include the personnel cost of Irrigation Department staff.

<Small-Scale Irrigation Scheme>

The maintenance budgets of PID of the Eastern Province and the North Central Province for the past three years are shown in Table 18. Budget distribution from the provincial government is the main financial resource of the maintenance budget for the irrigation facilities under PID in both provinces, as it is for the PRDA, and PID does not have its own financial resources. Maintenance outsourced to farmers' organizations and CBOs is also paid out of the budget of PID. However, the maintenance of the field channels in each field is paid by the farmer who owns the land. Each PID is currently experiencing budget shortages for maintenance. According to PID in the Eastern Province and the North Central Province, to maintain its irrigation schemes appropriately according to the rules requires 90-100 million rupees for the Eastern Province, and 322.4 million rupees for the North Central Province. There is a large gap when these are compared to the actual maintenance budgets that are distributed to each PID. Therefore, there are some issues observed in terms of the financial aspect of PIDs in two target provinces.

Table 18: Maintenance Budget of the Provincial Irrigation Departments of Two Target Provinces

Unit: Million Rupees

	2014		2015		2016	
	Plan	Actual	Plan	Actual	Plan	Actual
PID, Eastern Province,	50.0	48.0	50.0	47.8	40.0	38.8
PID, North Central Province	181.5	148.4	531.0	247.7	261.0	156.0

Source: PID, Eastern Province, PID, North Central Province

Note: The maintenance cost does not include the personnel cost of PID staff.

3.5.4 Current Status of Operation and Maintenance

<National Roads>

The RDA maintenance activities for national roads are shown in Table 19. The target national roads are maintained in good condition.

Table 19: Contents of RDA Maintenance Activities for National Roads

Type of Maintenance	Contents
Routine Maintenance	Jungle cleaning of road shoulders, cleaning and desilting of drains, crack repair and pot hole patching
Periodic Maintenance	Sealing and patching of road surface, repair of road shoulders, painting of guardrails, repair, color and white washing of road signs, repair of structures damaged by accidents

Source: RDA

<Provincial Roads>

At the PRDA in the three target provinces, the maintenance budget is used for repair and urgent repair of decrepit provincial roads on a priority basis. The maintenance budget distributed for the new and repaired provincial roads is extremely limited after 5-6 years since completion. However, at the time of the ex-post evaluation, the target provincial roads were kept in a good condition.

<Rural Roads>

In Pradeshiya Sahba, almost no maintenance is implemented for the concrete paving roads as their life-span is approximately 20 years, and also there is only a limited budget. However, at the time of the ex-post evaluation, the target rural roads of the Pradeshiya Sahbas who were interviewed were kept in a good condition.

<Large and Medium-Scale Irrigation Schemes>

The contents of the routine and periodic maintenance for the large and medium-scale irrigation schemes by the Irrigation Department, MIWRM are shown in Table 20. The target irrigation facilities under the management of the Irrigation Department in the Eastern Province and the North Central Province are kept in a good condition.

Table 20: Contents of the Maintenance Activities for Irrigation Facilities
by the Irrigation Department, MIWRM

Type of Maintenance	Contents
Routine Maintenance	Checking cracks in bunds, slopes and drainages, checking of water leakage in gates and canal structures, weeding and cleaning of canals and tank bunds
Periodic Maintenance	Repair of irrigation structures, desilting of canals

Source: Irrigation Department, MIWRM

<Small-Scale Irrigation Schemes>

The contents of routine and periodic maintenance for the small-scale irrigation schemes by the PID are shown in Table 21. The target irrigation facilities under the management of PID of the Eastern Province and the North Central Province are kept in a good condition.

However, although it is not a target scope of the project, it is not sufficiently implemented the maintenance of field channels in each field by farmers' organizations which are responsible for the maintenance, working on a volunteer basis..

Table 21: Contents of Maintenance Activities for Irrigation Facilities by the Provincial Irrigation Department of the Two Target Provinces

Type of Maintenance	Contents
Routine Maintenance	Weeding and cleaning of canals and tank bunds, desilting of canals
Periodic Maintenance	Major repair of gates and tank bunds, major works for desilting of canals

Source: PID, Eastern Province, PID, North Central Province

In the light of the above, there are some problems observed in terms of the institutional and financial aspects, as well as current status of the maintenance and operation of the project, therefore the sustainability of the project is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of this project was to recover its previous level of function for the road and irrigation infrastructure in disaster-affected areas in the Central, North Central and Eastern Provinces of Sri Lanka by the rehabilitation of flood damaged roads and irrigation facilities, thereby contributing to the prompt recovery of economic and social activities, the improvement in the safety of residents, and the prevention of further damage and loss. The relevance of the project is high, as the objective was consistent with Sri Lanka's development policies and development needs as well as with Japan's ODA policies. Each function has been recovered. The annual average daily traffic on the rehabilitated national and provincial roads by the project, benefited areas, cultivated areas and the volume of rice production where there were irrigation schemes have all reached, or overtaken the pre-disaster level. The safety level in the surrounding areas has improved due to improvements in road safety and decrease in traffic accidents. Meanwhile, there has been an enhancement in the capacity of reservoirs as well as improvements in flood control since implementation of this project; therefore, the project has contributed to the safety assurance of the residents in the disaster-affected areas to some extent. Decreased transportation costs for agricultural products, decreased time for road closure during floods, reduced risks of water shortage as the result of the improvement in reservoir capacity, recovery of business activities, recovered livelihoods, restored health and educational services

were all observed. Therefore, it is considered that the project has contributed to the prompt recovery of the economic and social activities of the disaster-affected areas. No negative impact on the natural environment was observed, and no land acquisition was executed. However, 26 households were resettled for the irrigation component of the project, and the resettlement was executed according to related Sri Lankan domestic laws. Therefore, the effectiveness and impacts of the project were high. The efficiency of the project was high as the project cost and project period were both within the plan. On the other hand, a minor problem was observed in the institutional and financial aspects of the operation and maintenance system. Therefore, the sustainability of the project effects is evaluated to be fair.

In the light of the above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Recommendation to Pradeshiya Sahba

Each Pradeshiya Sahba is responsible for maintaining rural roads that are hundreds of kilometers in distance. Furthermore, 80-90% of the rural roads are gravel or unsurfaced roads, and the burden of maintenance is great as damaged gravel or unsurfaced roads need to be maintained during the monsoon season. Meanwhile, the institutional setup and budget for maintenance of each Pradeshiya Sahba are limited, and, in the current situation, almost no maintenance is implemented for concrete roads. In order to secure the minimum level of surfaced road maintenance with such limited staff numbers and budget, it is recommended that a participatory maintenance system by local residents to be introduced. In this way, residents living along the rural roads would take part in some of the work such as weeding on the road shoulders or cleaning the drainage facilities.

(2) Recommendation to the Provincial Council

Although RMMS was introduced to the PRDAs of the three target provinces with the support of donors, the Central PRDA was the only place where RMMS was actually utilized to implement maintenance of the provincial roads. The advantage of RMMS is the ability to prioritize roads that require maintenance from the point of view of economic efficiency based on objective data such as road conditions and traffic volume. All three target PRDAs are experiencing maintenance budget shortages as a common problem, and it is important that maintenance is implemented utilizing RMMS in order to conduct road maintenance rationally and efficiently within limited budgets. For this reason, the PRDAs need to work together, sharing information on RMMS or providing opportunities for mutual learning of knowledge and skills in order to improve their RMMS operational capability.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

(1) Project implementation scheme to secure smooth operation when multiple implementing agencies are involved

In this project, there were multiple implementing agencies involved at both the central government and provincial government levels, such as RDA (in charge of national roads), provincial governments (in charge of provincial roads, rural roads and small-scale irrigation schemes) and the MIWRM (in charge of large and medium-scale irrigation schemes). The Department of National Planning, the Ministry of National Policies and Economic Affairs represented the implementing agencies in order to coordinate the overall project and play the role of project management role. Did it not only set up PMU within the Department of National Planning, but also set up PIU within RDA and MIWRM at the central level, and in each of the provincial governments at the provincial level. This implementation scheme functioned promptly and well and agile project implementation was conducted as expected. In Sri Lanka, it is not uncommon that development projects are implemented with a scheme such as that described above, and the success of this project can be referenced in the future.

(2) Project framework for accelerating disaster rehabilitation

For the purpose of implementing prompt disaster rehabilitation, the project approved subprojects as eligible for the loan where contractor bidding was completed retroactively by the pledge date (August 22, 2011) before the signing of the loan agreement (September 29, 2011). Furthermore, because the subprojects were scattered in the target provinces and there were many of them, and because each payment amount was small and it was very likely that many payments would be made, the Special Account Procedure with the SOE method was employed in order to simplify the process of voucher submission and verification. Thus, it became possible to implement a minimum amount of urgent construction (reinforcement where landslides had occurred, repair of anicuts, etc.) by the start of the monsoon season in October. As its result, it was possible to resume irrigation agriculture (rice cultivation) during 2012 Yala¹⁸ (mid-April to mid-August) in many irrigation schemes, and it was confirmed the economic loss of farmers was kept at a minimum level. As for the rehabilitation of the large and medium-scale irrigation schemes under the Irrigation Department, the Department of National Planning, Ministry of National Policies and Economic Affairs acted with flexibility, approving the introduction of a direct management method and changes in procurement rules as exceptions,

¹⁸ Rice cultivation in Sri Lanka is made in two cropping seasons: the Yala season (from mid-April to mid-August) during the south-west monsoon and the Maha season (from October to January) in the north-east monsoon.

and this contributed to the prompt implementation of the project. The retroactive financing, the Special Account Procedure with the SOE method (i.e. the lending procedure of initial payment without evidenced documents), and flexible measures for the procurement rules promoted prompt disaster rehabilitation and contributed to the achievement of the objectives as emergency support. The success of this project can be referenced for similar projects in the future.

<End>

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs		
(1) Rehabilitation of National Roads	Total length: 71.7km (breakdown) • Central Province: 22.2km • North Central Province: 22.5km • Eastern Province: 27.0km	Total length: 92.0km (breakdown) • Central Province: 24.7km • North Central Province: 30.3km • Eastern Province: 37.0km
(2) Rehabilitation of Provincial Roads	Total length: 216.1km (breakdown) • Central Province: 47.1km • North Central Province: 73.7km • Eastern Province: 95.3km	Total length: 253.6km (breakdown) • Central Province: 72.3km • North Central Province: 97.5km • Eastern Province: 83.8km
(3) Rehabilitation of Rural Roads	Total length: 42.7km (breakdown) • Central Province: 10.3km • North Central Province: 7.4km • Eastern Province: 25.0km	Total length: 44.9km (breakdown) • Central Province: 22.0km • North Central Province: 7.3km • Eastern Province: 15.6km
(4) Rehabilitation of Large and Medium-scale Irrigation Schemes	No. of subprojects: 167	Same as planned
(5) Rehabilitation of Small -scale Irrigation Schemes	No. of subprojects: 77 (breakdown) • North Central Province: 38 • Eastern Province: 39	No. of subprojects: 81 (breakdown) • North Central Province: 34 • Eastern Province: 47
2. Project Period	Sep. 2011 – Sep. 2014 (37 months)	Sep. 2011 – July 2014 (35 months)
3. Project Cost		
Amount Paid in Foreign Currency	37 million yen	158 million yen
Amount Paid in Local Currency	8,217 million yen (10,454 million rupees)	7,927 million yen (10,879 million rupees)
Total	8,254 million yen	8,085 million yen
ODA Loan Portion	7,000 million yen	6,987 million yen
Exchange Rate	1 rupee = 0.786 yen (As of May 2011)	1 rupee = 0.729 yen (Average between 2011 and 2014)
4. Final Disbursement	October 2014	

Democratic Socialist Republic of Sri Lanka

FY2016 Ex-Post Evaluation of Japanese Grant Aid Project

“The Project for Reconstruction of 5 Bridges in Eastern Province”

External Evaluator: Koichi Akimoto, OPMAC Corporation

0. Summary

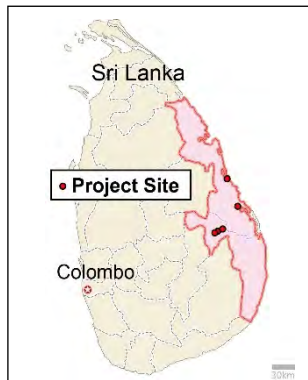
The objective of this project is to increase transportation capacity and safety for the targeted 5 bridges in the Eastern Province affected by civil war, by improving the condition for 4 deteriorated small and medium sized bridges on A005 national highway and Panichchankeni causeway¹ and a bridge on A015 national highway, thereby contributing to improve living environment of local communities and to improve access and logistics between Eastern Province and neighboring Provinces.

The project was consistent with the development plan and development needs of Sri Lanka, both at the time of planning and ex-post evaluation, as well as with Japan’s ODA policy at the time of planning. Therefore, the project relevance is high. As for the project effects, it is confirmed that the project brought positive effects for increase in transportation capacity and safety for the targeted bridges and neighboring roads such as an increase in average daily traffic volume, an increase in the passable weight (tons) of heavy trucks and an increase in the average driving speed of vehicles in the project areas. In addition, improvement in traffic accessibility and the safety of pedestrians in the project bridges has also been confirmed. Through these positive effects, it is considered that there has been an improvement in the lives and economic activities of locals along with an improvement in service accessibility to schools, hospitals, and markets. The project is found to have contributed to these improvements, and thus, its effectiveness and impacts are high. However, the effectiveness and impacts are considered not only to have been achieved by reconstruction of the targeted 5 bridges, but also through various other road improvement projects. Projects by the Road Development Authority (hereinafter called the RDA), and other donors such as the World Bank, the Asian Development Bank and the Agence Française de Développement contributed to the results around the project areas in Eastern Province as external factors. Meanwhile, even though the project cost was in accordance with the plan, the project period slightly exceeded the plan. Therefore, the efficiency of the project is fair. The sustainability of project effects is high since no major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance system for the Executing Agency.

In light of the above, this project is evaluated to be highly satisfactory.

¹ A causeway is a road or railway on top of an embankment which is built in a water area or wetland.

1. Project Description



Project Location
(the Eastern Province is marked in red)



Vehicles passing over the Chenkalady Bridge
(Bridge No.4) after reconstruction.

1.1 Background

The Eastern Province of Sri Lanka was affected by civil war for more than 20 years with fighting between the government and an antigovernment force, the Liberation Tigers of Tamil Eelam (herein after called LTTE). Even though the province was freed from the control of LTTE by government forces in July 2007, infrastructure such as roads and bridges had suffered serious damage from the civil war, which lasted for many years, and from the Indian Ocean Tsunami which occurred in December 2004. In particular, bridges were scattered which posed a problem for smooth transport in the province since some of the bridges had been constructed more than 60 years ago during the British colonial period, and there had been no sufficient implementation of operation and maintenance of the bridges during the civil war. In addition, deterioration/corrosion of bridge girders, damaged bridge abutments and piers, collapsed revetments, and damaged bridge railings were observed in the targeted 5 bridges of project, which were in a dangerous situation.

In response to this situation, the Japan International Cooperation Agency (herein after called JICA) implemented a technical cooperation project “Recovery, Rehabilitation and Development Project for Tsunami Affected Trunk Road” (2005-2006), and implemented a Japanese yen loan project, the “Pro-Poor Eastern Infrastructure Development Project” (2006-2013) for an improved transport system in the Eastern Province. Under these circumstances, the government of Sri Lanka requested that the government of Japan provide grant aid cooperation for reconstruction of 4 small and medium sized bridges on the A005 national highway which connects the central areas of Sri Lanka and the Eastern Province, and the Panichchankeni causeway and a bridge on A015 national highway, thereby contributing to improved access to the Eastern Province.

1.2 Project Outline

To increase transportation capacity and safety for the targeted bridges in the Eastern Province, by improving the condition for 4 deteriorated small and medium sized bridges on A005 and causeways and a bridge on A015 national highway, thereby contributing to improve living environment of local communities and to improve access and logistics between the Eastern Province and neighboring provinces² affected by civil war.

E/N Grant Limit / Actual Grant Amount	(Detailed Design): 29 million yen / 28 million yen (Main Works): 1,217 million yen / 1,052 million yen
Exchange of Notes Date /Grant Agreement Date	(Detailed Design): January 2010/ January 2010 (Main Works): November 2010/ November 2010
Executing Agency	Road Development Authority (RDA)
Project Completion Date	June 2013
Main Contractor	Daiho Corporation
Main Consultants	Joint Venture (Oriental Consultants Co., Ltd. Japan Bridge & Structure Institute, Inc.)
Basic Design	February 2009 - October 2009
Related Projects	<p><u>Technical Cooperation</u></p> <ul style="list-style-type: none"> • Recovery, Rehabilitation and Development Project for Tsunami Affected Trunk Road (2005 - 2006) • The Project for Capacity Development on Bridges (2015 - 2018) <p><u>ODA Loan</u></p> <ul style="list-style-type: none"> • Pro-Poor Eastern Infrastructure Development Project (2006 - 2013) • Provincial/Rural Road Development Project (Eastern Province) (2010 - 2013) <p><u>Other International Agencies and Donors</u></p> <ul style="list-style-type: none"> • Asian Development Bank (herein after called ADB): Eastern and North Central Provincial Road Project (2009 - 2016)

² The project objectives at the planning stage were “To improve the condition of small and medium sized bridges on the A005 and causeways and a bridge on A015 national highways, and to provide smooth transport to the Eastern Province, thereby contributing to establishment of peace for those people who were affected by conflict”. However, at the ex-post evaluation, the evaluator reviewed the project background and necessity, the implication of the target bridges in the Eastern Province, the scope/scale of the project, and the relevance (logic) of direct/indirect effects as the result of project implementation. Consequently, the evaluator rearranged/interpreted the direct effects as “Increase in transportation capacity” and “Improvement in safety”, and the indirect effects as “Improvement in the access/logistics in the Eastern Province and with neighboring provinces” and “Improvement in the living environment of locals around the project site areas”, then summarized the project objective.

2. Outline of the Evaluation Study

2.1 External Evaluator

Koichi Akimoto, OPMAC Corporation

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: September 2016 – October 2017

Duration of the Field Study: January 5 – 18, 2017 – May 1– 6, 2017

2.3 Constraints during the Evaluation Study

While the project was implemented for the reconstruction of bridges, other donors also implemented road improvement/reconstruction projects for national roads and outer roads which are connected to the bridges targeted by the project. It is considered that these projects also made a contribution that was reflected in the effectiveness and impact of this project, but when evaluating, it was difficult to separate the direct effects of the project and the contributions (external factors) of the other donor projects. Therefore, although there is no specific indication later in this report, the effectiveness/impact confirmed at the ex-post evaluation was achieved both by the project and by the road improvement/reconstruction projects of other donors.

3. Results of the Evaluation (Overall Rating: A³)

3.1 Relevance (Rating: ③⁴)

3.1.1 Consistency with the Development Plan of Sri Lanka

The *10 Years' National Development Plan (Mahinda Chintana)* (2006-2016) that was the basic policy of Sri Lanka at the time of planning, stated the need for restoring income gaps and the regional balance. In addition, the development plan included the “Northern/Eastern Tsunami Reconstruction Continuous Implementation Program” especially for the Eastern region, which was targeted for regional development and poverty reduction by the improvement of basic infrastructure including access roads. In addition, the *National Road Master Plan (2007-2017)* was formulated in December 2007, the aim of which was the improvement of road sector for promoting economic development within Sri Lanka and the restoration of regional balance.

At the time of ex-post evaluation, in addition to the *10 Years National Development Plan (Mahinda Chintana)* (2006-2016) and the *National Road Master Plan (2007-2017)* previously mentioned, the Prime Minister also introduced the “Economic Policy Statement” (an outline of mid-term policy under the new administration) (November 5th, 2015) after a regime changed

³ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁴ ③: High, ②: Fair, ①: Low

in 2015 which referred to the improvement of transport and accommodation facilities for the promotion of tourism from both home and abroad. Finally, in the *Public Investment Plan (2017-2020)* introduced in February 2017, investment for the road sector accounted for the largest ratio which was approximately 20% of the whole budget. Thus, improvement of the road sector has been continuously of high priority out of all 28 sectors.

3.1.2 Consistency with the Development Needs of Sri Lanka

At the time of planning, as indicated in “1.1 Background”, bridges in the Eastern Province had suffered serious damage and posed a problem for the smooth transport of vehicles and locals; in addition to negatively affecting people’s lives and economic activities, there was also a safety concern.

At the time of the ex-post evaluation, road transport was one of the main methods of transportation in Sri Lanka, and a high priority has continuously been placed on the development of road infrastructure as previously mentioned in the *Public Investment Plan*. The bridges reconstructed by the project were the Mahaoya Athuganga Bridge (No.1 Bridge), the Mundeni Bridge (No.2 Bridge), the Pulavady Bridge (No.3 Bridge), and the Chenkalady Bridge (No.4 Bridge), located on the A005 national highway, which runs east and west for 276 km from Peradniya city in the internal region of Sri Lanka to Chenkalady city in the eastern coast region. On the other hand, the Panichchankeni Bridge (No.5 Bridge) is located on the A015 national highway, it runs south and north for 199 km from Batticaloa city, which is the one of the main cities in the eastern coast region, to Trincomalee city, which is the capital city of the Eastern Province. Thus, the targeted 5 bridges reconstructed by the project are located on A005 and A015 national highways which are major highways connecting the Eastern Province and neighboring provinces in Sri Lanka, and they play a crucial role in the movement of people and logistics within the Eastern Province and neighboring provinces.

As shown in Table 1 below, the population of the Eastern Province increased from 1,561,000 to 1,615,000 in the 3 years from 2012 to 2015, with a yearly average increase rate of 1.2%. One of the reasons for this increase is thought to be that the evacuees temporarily moved outside of the province during the civil war gradually returned to the Eastern Province after the war ended in 2009. GDP per capita in the Eastern Province increased from 306 thousand LKR (2012) to 415 thousand LKR (2015), and showed a consistent economic growth of a 12% yearly average increase rate for these 3 years. The number of motor vehicle registrations in the Eastern Province increased from 215,088 (2012) to 286,234 (2015), showing an 11% yearly average increase rate. Meanwhile, the number of vessel entries was 161 in 2012. This number temporarily decreased between 2013 to 2014, then recovered to 164 in 2015. These examples show that logistics were continuously active in the Eastern Province. Economic activities in the Eastern Province were therefore active after the reconstruction

period, and the major roads, including the project bridges in the Eastern Province, have continuously played an important role from the perspective of promoting economic activities in the Eastern Province, which is a less developed area, as well as restoring the regional balance within Sri Lanka.

Table 1: Eastern Province 2012-2015 Yearly Statistical Information

Item	2012	2013 (Project Completion)	2014	2015
Population	1,561,000	1,575,000	1,593,000	1,615,000
GDP per capita (LKR)	306,471	344,701	379,471	415,331
Number of motor vehicle registrations	215,088	227,109	239,238	286,234
Number of vessel entries at Trincomalee Port	161	134	127	164

Source: Central Bank of Sri Lanka

3.1.3 Consistency with Japan's ODA Policy

At the time of planning, *Japan's Country Assistance Plan for Sri Lanka* (formulated in April 2004) specified two pillars which are "Assistance for the consolidation of peace and reconstruction process" and "Assistance that in line with the country's long term development vision", as the direction of assistance programs for Sri Lanka in the next 5 years. One of the focus areas for the "Consolidation of peace and reconstruction process" was the "Development of economic infrastructure (improvement in the power industry, development of the transport infrastructure network, improvement in the urban environment)". As the aim of the project was to strengthen the traffic infrastructures in the Eastern Province, which had been affected by civil war, therefore, the project fell under the focus of the above mentioned "Development of economic infrastructure".

In light of the above, this project has been highly relevant to the country's development plan and development needs, as well as to Japan's ODA policy. Therefore its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The outputs of the project for the Japan side and the Sri Lanka side were the planned reconstruction of 5 project bridges, land acquisition, the relocation of public facilities etc. These were mostly implemented according to the plan. The outputs of the project for Japan side and Sri Lanka side are shown in Table 2 below.

In fact, the actual project outputs changed slightly and some additional works were carried out. Specifically, the height of the abutment of Pulavady Bridge (No.3 Bridge) was extended by 1.8m, countermeasure work for soft ground was added for Chenkalady Bridge (No.4 Bridge), the height of the abutment of Panichchankeni Causeway and Bridge (No.5 Bridge) was shortened by 1.5m, the construction of No.5 Bridge causeway was changed to the rubble

mound method, and railings were extended for all bridges in consideration of transit safety etc. Also, even though it was planned that the demolition of the existing Pulavady Bridge (No.3 Bridge) would be implemented by the Sri Lanka side, it was conducted by the Japan side as the Sri Lanka demolition work was delayed and it was necessary to complete the project within the construction period. These changes and additional outputs were implemented in consideration of the construction and budget situation of the time, and were relevant to the objective of the project.

As for the civil works of the Sri Lanka side, the demolition of the existing Chenkalady Bridge (No.4 Bridge) was not carried out. According to the Executing Agency, the existing bridge remains as a historic structure since it was built in the British colonial era and has preservation value. The existing bridge continues to be used as a pedestrian bridge by the locals.

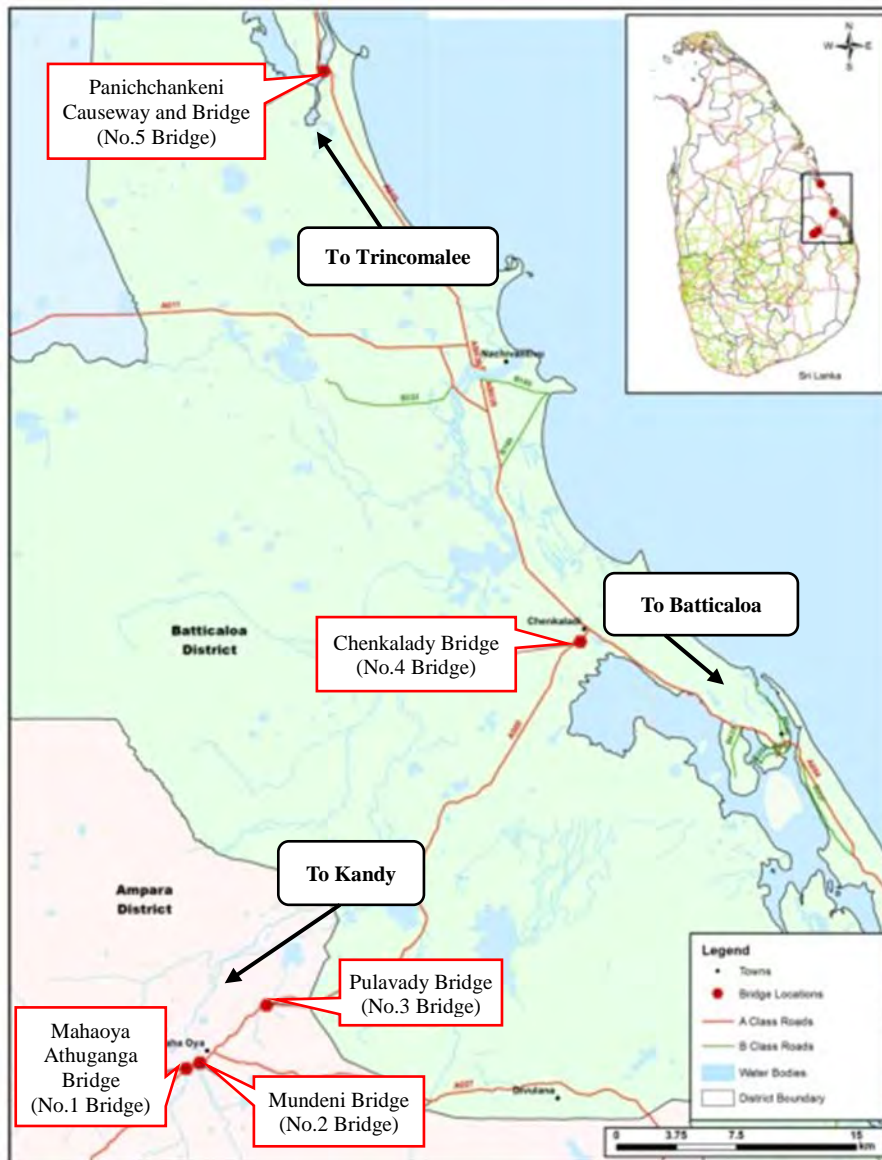
Table 2: Planned and Actual Project Outputs

Item	Plan	Actual
[Japan side] Civil Works	<ul style="list-style-type: none"> • Reconstruction of Mahaoya Athuganga Bridge (No.1 Bridge, Length of bridge: 26m) on the A005 national highway • Reconstruction of Mundeni Bridge (No.2 Bridge, Length of bridge: 85m and Box culvert 7m) on the A005 national highway • Reconstruction of Pulavady Bridge (No.3 Bridge, Length of bridge: 16m) on the A005 national highway • Chenkalady Bridge (No.4 Bridge, Length of bridge: 36m) on the A005 national highway • Panichchankeni Causeway and Bridge (No.5 Bridge, Length of bridge: 133m, Length of causeway on the left bank: 82m, Length of causeway on the right bank: 82m) on A015 national highway 	<ul style="list-style-type: none"> • As planned • As planned • Mostly as planned (height of abutment changed) • Mostly as planned (countermeasure work for soft ground added) • Mostly as planned (height of abutment changed) <p>*Cross Section (All bridges in common) 10.4m=1.5m (Sidewalk) +3.7m² (Roadway) +1.5m (Traffic segregation:Mount up type⁵) <Additional works></p> <ul style="list-style-type: none"> • Traffic safety facility added for all 5 bridges (extended railing) • Demolition of existing No.3 bridge
[Sri Lanka side] Civil Works	<ul style="list-style-type: none"> • Relocation of public facilities (buried telephone wires, telephone poles) • Demolition of existing 2 bridges (No.3 bridge, No.4 bridge) 	<ul style="list-style-type: none"> • As planned • Demolition of No.3 bridge was conducted by the Japan side • Demolition of No.4 bridge was not carried out
Construction of facilities and procurement for Operation & Maintenance	<ul style="list-style-type: none"> • Acquisition of construction sites for 5 bridges • Acquisition of temporary yard camp site • Lending and transporting of construction material for Bailey bridge 	<ul style="list-style-type: none"> • As planned • As planned • As planned

Source: JICA internal documents and response to interviews with RDA

⁵ Sidewalks are located higher than the roadway, and the gateways of each sidewalk are rounded down for easier access by pedestrians.

Please refer to Figure 1 for the site and bridge location of the project in Eastern Province.



Source: RDA

Figure 1: Map of Project Site

3.2.2 Project Inputs

3.2.2.1 Project Cost

The actual project cost was 1,269.4 million yen, which was within the planned project budget of 1,456.0 million yen (87.2% against the plan). Please refer to the breakdown of each expense for the Japan side and the Sri Lanka side in Table 3 below.

Table 3: Planned and actual project costs

Item	Plan	Actual	Compared to the plan
Japan side (Detailed Design)	29.0 million yen	28.5 million yen	98.3%
Japan side (Main works)	1,217.0 million yen	1,052.9 million yen	86.5%
Japan side (Total)	1,246.0 million yen	1,081.4 million yen	86.8%
Sri Lanka side	210.0 million yen ^(Note 1)	188.0 million yen ^(Note 2)	89.5%
Total	1,456.0 million yen	1,269.4 million yen	87.2%

Source: JICA internal documents, RDA internal documents

Note 1: The exchange rate used: USD 1 = JPY 95.94, USD 1 = LKR 111.31 (April, 2009)

Note 2: The exchange rate used: JPY 1 = LKR 1.41 (Based on the response to the ex-post evaluation from RDA, date of exchange rate unknown)

The main reason for the actual project cost being 13% lower than the planned cost was that, the construction cost of the main works was lower than the estimated price due to competitive bidding, and the demolition of the existing No.3 bridge and No.4 bridge as initially planned were not implemented by the Sri Lanka side (at the time of planning: the demobilization cost was calculated as LKR 14.5 million). The actual project cost of the Sri Lanka side was consequently 10% lower than the planned project cost.

3.2.2.2 Project Period

The planned project period was identified as 38 months from February 2010 to March 2013, including the period for the exchange of notes/detailed design/bid tender/construction. In fact, the actual project period was identified as 42 months, which was slightly longer than planned (a ratio against the plan of 110.5%)

The main reasons for the 4 months prolongation of the project were, the delay in mobilization for the construction of No.1, No.2, No.4, and No.5 bridges due to a large-scale flood which occurred in December 2012 (delayed for a total 60 days), and the delay in the start of tendering for the main contractor due to the Great East Japan Earthquake (March 11, 2011).

Table 4: Planned and Actual Project Period

Plan	Actual
February 2010 (E/N) – March 2013: Total 38 months (Detailed Design: 6 months, Bid tender/Construction: 24 months) *No indication for the remaining 8 months in the Ex- ante evaluation report and Feasibility report)	E/N and G/A date for Detailed Design: January 2010
	Detailed Design: February 2010 – October 2010
	E/N and G/A date for Main Works: November 2010
	Contract agreement date for Consultant: January 2011
	Contract agreement date for Contractor: April 2011
	Completion date (project period): June 2013 (42 months)

Source: JICA internal documents

In the light of above, the project cost of both the Japan side and the Sri Lanka side was as planned, while the project period slightly exceeded the plan. The output of the Japan side was

implemented mostly as planned, including slight changes and additional works based on the site situation. The output of Sri Lanka side was conducted as planned except the demolition of the existing Bridge No.4. Therefore, the efficiency of the project is fair.

3.3 Effectiveness⁶ (Rating: ③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

The Operation and Effect Indicators of the projects were, the annual average daily traffic volume (number/day), the passable weight (tons) of heavy vehicles, and the average driving speed of vehicles (Km/h). The results are shown in Tables 5, 6, and 7 below.

(1) Annual Average Daily Traffic Volume

The baseline value and target value of the average daily traffic volume were not provided at the time of planning. Looking at the transition of traffic volume at each bridge between the years 2013 - 2017 for 4 years after project completion, the traffic volume of Pulavady Bridge (No.3 Bridge) remained mostly unchanged but the volume for the other bridges increased between 30% - 70% (Table 5). The reason for this increase was the reconstruction of the targeted bridges and the improvement in the neighboring roads which became more convenient, with increase of driving speeds for each vehicle, increase in the passable weight of vehicles, and a decrease in the number of road closures due to flooding etc.

Table 5: Average Daily Traffic Volume for the 5 Bridges

Unit: number/day

Name of Bridge	Baseline	Target	Actual		
	2009	2016	2013	2016	2017
	Planned Year	3 Years After Completion	Completion Year	3 Years After Completion	4 Years After Completion
Mahaoya Athuganga Bridge (No.1 Bridge)	N/A	N/A	2,952	N/A	4,909
Mundeni Bridge (No.2 Bridge)	N/A	N/A	2,952	N/A	4,909
Pulavady Bridge (No.3 Bridge)	N/A	N/A	963	N/A	976
Chenkalady Bridge (No.4 Bridge)	N/A	N/A	1,388	N/A	1,867
Panichchankeni Causeway and Bridge (No.5 Bridge)	N/A	N/A	1,313	1350	1,972

Source: JICA internal documents, RDA internal documents

Note 1: The above traffic data was collected on the road 50m - 100m distant from each bridge. It is considered that the traffic volume of the targeted bridges should match the above data, since there were no major branch roads around the bridges.

Note 2: The measuring time was for 16 hours, between 6am - 10pm.

Note 3: According to RDA who provided the traffic data, it is currently collected once every 2 - 3 years. As for the above traffic data for 2017, RDA specifically collected it for ex-post evaluation purposes.

In association with the project, other donors also implemented projects for the improvement of roads/bridges in the Eastern Province. An existing 370km of provincial roads in the Eastern

⁶ The sub-rating for Effectiveness is also evaluated with consideration of Impact.

Province and the North Central Province was reconstructed and improved by the ADB “Eastern and North Central Provincial Road Project” (2009 - 2016). One of the targeted provincial roads of this ADB project was Henseman Road, which is located between Pulavady Bridge (No.3 Bridge) and Chenkalady Bridge (No.4 Bridge) and connects with the A005 national highway. Thus, it is considered that the ADB project also contributed to the increase in traffic volume for the 2 bridges. In addition, ADB implemented the “Peradeniya – Badulla – Chenkaladi Road Improvement Project” which improved 4km of road around the Chenkalady Bridge (No.4 Bridge) on the A005 national highway. This certainly contributed to the increase of traffic volume around the bridge.

Meanwhile, the Agence Française de Developpement (herein after called AFD) implemented the “Thirikkadndiyamadu – Traincomalee Road Improvement Project” which improved 99km of road around Panichchankeni Causeway and Bridge (No.5 Bridge) on the A015 national highway. The World Bank (herein after called WB) implemented the “Jayanthipura – Tirikkandiyamadu Road Improvement Project” which was for improvement of 19km of road on the A011 national highway, located on the near side of the Panichchankeni Causeway and Bridge (No.5 Bridge) on the A015 national highway. It is considered that these AFD and WB projects also contributed to the increase in traffic volume for each project bridge.

(2) Passable Weight (Tons) of Heavy Vehicles

The passable weight of vehicles for the targeted 5 bridges increased to more than 25 tons and 3 axle vehicles after project completion, which means that the target value was achieved (Table 6). The designed load of each bridge provided for an HB Load of 30 units (maximum axle weight: 30.6 tons) by the British Standard, so after project completion, it was possible for vehicles of more than 25 tons to cross the bridges without problems.

Table 6: Passable Weight (Tons) of Vehicles for the 5 Bridges

Unit: tons

Name of Bridge	Baseline	Target	Actual		
	2009	2016	2013	2016	2017
	Planned Year	3 Years After Completion	Completion Year	3 years After Completion	4 years After Completion
Mahaoya Athuganga Bridge (No.1 Bridge)	10 (less than 2 axle)	25 (more than 3 axle)	25 (more than 3 axle)		
Mundeni Bridge (No.2 Bridge)	10 (less than 2 axle)	25 (more than 3 axle)	25 (more than 3 axle)		
Pulavady Bridge (No.3 Bridge)	10 (less than 2 axle)	25 (more than 3 axle)	25 (more than 3 axle)		
Chenkalady Bridge (No.4 Bridge)	10 (less than 2 axle)	25 (more than 3 axle)	25 (more than 3 axle)		
Panichchankeni Causeway and Bridge (No.5 Bridge)	10 (less than 2 axle)	25 (more than 3 axle)	25 (more than 3 axle)		

Source: JICA internal documents, RDA internal documents

(3) Average Driving Speed of Vehicles

Since the average driving speed of vehicles for the 5 project bridges has not been measured by the Executing Agency (RDA), it was not possible to collect quantitative data (Table 7). However, RDA recognized a remarkable increase in the driving speed of each vehicle, and vehicles were able to cross the bridges smoothly as a result of the lanes of the project bridges increasing from 1 lane to 2 lanes after the project completion. Also based on their experiences, RDA recognized vehicles were able to pass across the targeted bridges at 40 – 70 km/h same as general road after the project completion. According to the Focus Group Discussions⁷ (herein after called FGD) and Key Informant Interviews, the neighbors of each bridge and frequent bridge users saw vehicles regularly cross the bridges at 40 - 70 km/h. The evaluator crossed each project bridge by vehicle and confirmed that the driving speed was around 60 km/h. Taking into consideration the factors mentioned above, it can be said that the target value for the average driving speed 40 – 70 km/h for vehicles on the targeted 5 bridges was achieved.

Table 7: Increase in Average Driving Speed of Vehicles for the 5 Bridges

Unit: km/h

Name of Bridge	Baseline	Target	Actual		
	2009	2016	2013	2016	2017
	Planned Year	3 Years After Completion	Completion year	3 years After Completion	4 years After Completion
Mahaoya Athuganga Bridge (No.1 Bridge)	40	40-70	N.A.		
Mundeni Bridge (No.2 Bridge)	40	40-70	N.A.		
Pulavady Bridge (No.3 Bridge)	40	40-70	N.A.		
Chenkalady Bridge (No.4 Bridge)	40	40-70	N.A.		
Panichchankeni Causeway and Bridge (No.5 Bridge)	40	40-70	N.A.		

Source: JICA internal documents, RDA internal documents

Note: As RDA did not measure the driving speed of vehicles for each bridge, it was not possible to collect quantitative data.

3.3.2 Qualitative Effects (Other Effects)

(1) Increase in transportation capacity

The ex-post evaluation conducted a beneficiary survey with local residents and businesses located near the project bridges. According to the FGD conducted with 57 local residents near the bridges, increase in traffic volume and passable weight of vehicles was recognized for the

⁷ For the targeted 5 bridges of the project, FGD was conducted three times with local residents in the villages near 2 bridges on the A005 national highway (Mahaoya Athuganga Bridge: No.1 Bridge & Chenkalady Bridge: No.4 Bridge) and 1 bridge on the A015 national highway (Panichchankeni Causeway and Bridge: No.5 Bridge). These included 31 people (No.1 Bridge), 12 people (No.4 Bridge), and 14 people (No.5 Bridge) (total: 28 Male, 29 Female), in order to confirm the effectiveness of the project. Participants in the discussion were chosen from an residents assembly in the public offices close to No. 1 Bridge. As for No. 4 Bridge and No. 5 Bridge, participants agreed to take part in FGD were chosen from villages located near these bridges with the assistance of the local leader in each area. Even though it was a non-random selection, attention was paid so as to be unbiased in gender ratio and age composition.

roads located near the project bridges from the viewpoint of one who lives in the vicinity and based on their actual observations.

Also based on interviews with RDA, the Executing Agency for the project, as well as key informant interviews with 2 rice-mill companies, 1 dairy production company, 1 CBO⁸ (PALM Foundation⁹), 2 owners of bus companies, 3 bus drivers, all of whom regularly use Mahaoya Athuganga Bridge (No.1 Bridge), Mundeni Bridge (No.2 Bridge), Pulavady Bridge (No.3 Bridge) and Chenkalady Bridge (No.4 Bridge), it was confirmed that the project had had a positive effect on the increase in transportation capacity on the bridges and neighboring roads. Additionally, since the bridges only had 1 lane and a vehicle load limit for less than 10 tons before the project it used to take a lot of time to cross the bridges as it was necessary to stop before the bridge in order to wait for oncoming cars. However, through the project the bridges were enlarged to 2 lanes and the passable weight of vehicles increased to 25 tons and therefore it is no longer necessary to wait for oncoming cars anymore and 2 vehicles are able to cross the bridge at the same time.

According to the interview with the rice-mill companies, the capacity of their delivery vehicles has risen to 12 tons - 15 tons from 7 tons as the bridges reconstructed by the project allow large-sized vehicles to cross. Similarly, according to the interview with the dairy production company, as large-sized vehicles are able to cross the bridges after the project completion, the transportation volume of the company has increased with the amount of milk they are able to collect from farmers per day increasing to 1,500 liters from 450 liters. The project has clearly contributed to increase in transportation capacity.

(2) Improvement in Safety

Based on the key informant interviews mentioned above, RDA recognized that the safety of pedestrians on the bridge has improved since the number of minor collisions between vehicles and pedestrians decreased thanks to the installation of a mount up type sidewalk on both side of the carriage way by the project. Traffic signs on the targeted bridges were also installed by the project, and RDA confirmed that these had also contributed to the reduction in accidents as they are especially helpful for night driving. All of the local residents who participated in FGD agreed that the safety of pedestrians on the bridge has improved thanks to the mount up type sidewalks installed by the project.

In addition to this, it was found through the key informant interview that, even though before the project, the project bridges used to be frequently closed for floods in the rainy season, following project completion, vehicles have been able to cross the bridge throughout the year

⁸ CBO: Community Based Organization

⁹ A local non-governmental organization in the Ampara district, Eastern Province which focuses on community development.

with no closures in the rainy season dependent on the weather. Also before the project started, there were accidents on the project bridges between oncoming cars and with vehicles crashing to the bridge etc. due to the fact that there was only a one lane road which was not wide enough to have passing traffic. Through the interview with RDA, it was confirmed that such accidents did not happen after the bridge became two lanes through the project.

Meanwhile, vehicles drive at greater speed as a result of reconstruction of the bridges and the improvement of neighboring roads. Thus, the drivers of vehicles or buses need to be careful about their driving speed, and the local residents need to walk carefully paying attention to passing vehicles when they cross the bridge.



Mahaoya Athuganga Bridge (No.1 Bridge) after reconstruction



Mundeni Bridge (No.2 Bridge) after reconstruction



Pulavady Bridge (No.3 Bridge) after reconstruction



Chenkalady Bridge (No.4 Bridge) after reconstruction



Panichchankeni Causeway and Bridge (No.5 Bridge) after reconstruction



Large-sized vehicle passing across Panichchankeni Bridge

3.4 Impacts

3.4.1 Intended Impacts

(1) Impact on the improvement of access/logistics in the Eastern Province and with neighboring provinces:

According to the key informant interview with 2 rice-mill companies, before the project started the project bridges used to frequently close because of floods in the rainy season which made it difficult for them to make deliveries for several days until the bridges were re-opened. In those cases, they had to reject delivery orders in far distance. However, the above problems have been solved since the reconstruction of the bridges by the project and the improvement of neighboring roads. In addition, the delivery time for the rice-mill companies has shortened. For example, the transportation time between Mangalagama (Eastern Province) and Kandy

(Central Province) (approximately 150km) shortened to 6 hours from 7 hours, and the transportation time between Rajagalathenna (Eastern Province) and Kandy (Central Province) (approximately 170 km) shortened to 5 hours from 6 hours. The companies feel that a part of the time saving comes from the impact of the reconstruction of the bridges by the project. As already mentioned, it became possible for large-sized vehicles to cross the bridges, and the delivered quantity of rice-mill at one time has increased to 12 - 15 tons from 7 tons. Moreover, intermediary agents from distant places such as Colombo and Kandy have begun to travel over to purchase their rice-mill, and these new customers have contributed to the sales growth of the rice-mill companies.

From the key informant interview with 2 owners of bus companies and 3 bus drivers, it was found that the transportation time of regular bus routes shortened thanks to the reconstruction of the bridges and improvement of neighboring roads. For example, the route between Kandy (Central Province) and Ampara (Eastern Province) (approximately 200km) shortened to 4 hours 15 minutes from 4 hours 45 minutes, and the route between Batticaloa (Eastern Province) and Pullumalai (Eastern Province) (approximately 43km) shortened to 1 hour from 1 hour 30 minutes. Accordingly, as the number of bus services and the passengers per day increased, the sales of the bus company also increased. In addition, because of the reconstruction of the bridges and improvement of neighboring roads, the frequency of repairs to rice-mill delivery trucks and buses also decreased and those interviewed recognized that the project had had a certain impact on the reduction in maintenance costs of vehicles.

To summarize, as the result of key informant interviews, it was confirmed that the project has contributed to the improvement of access/logistics in the Eastern Province and with neighboring provinces.

(2) Impact on the improvement of the living environment of local residents around the project site:

Through the FGD of 57 local residents in three different areas of the project bridges, the following impacts on the improvement of the living environment of local residents around the project site were confirmed.

(i) Improvement in traffic accessibility

Before the year 2013 (completion year of the project), as the bridges had only one lane, it took a long time to cross since it was necessary to wait for oncoming cars and thus there was traffic congestion around the bridge areas. Also, there was inefficiency in using the bridges at the time of floods as the bridges were closed at those times. However,



Focus Group Discussion with local residents.

after the project was implemented, vehicle transportation became remarkably more efficient as there was no traffic congestion thanks to the bridges having two lanes and not being closed anymore by floods.

(ii) Improvement of service accessibility

After project implementation, service accessibility to hospitals, markets and education improved thanks to reconstruction of the bridges, and, importantly, it became possible to go to city areas at any time to purchase food and daily necessities. Moreover, it became easier to access hospitals in the case of an emergency, and students were able to commute to distant private schools in the search for a better education.

(iii) Increase of service facilities

The number of retail stores increased around the project bridges, and various service facilities such as banks, hotels, private hospitals were built.

(iv) Other Impacts

Some local residents have been employed at a garment factory built near a project bridge since project completion. Even though most local residents at the project sites used to use only bicycles, recently the number of residents who possess at least a motorcycle or small car has increased.

According to the local residents near the project bridges mentioned above, there have been improvements in traffic accessibility, service accessibility such as to hospitals, markets, educational services, as well as an increase in various services facilities such as retail stores, banks, hotels, and hospitals since project completion. It has also been confirmed that employment opportunities have been created at factories around the project site, and there has been an increased ownership ratio for motorcycles and small cars among local residents. There have thus been various positive impacts on the improvement in the living environment of local residents around the project site. It is considered that these positive impacts have arisen from activation of the movement for people and logistic thanks to the reconstruction of the bridges and the improvement of neighboring roads.

3.4.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

This project was the reconstruction of existing bridges, and was given a Category B based on the *JICA Guidelines for Environmental and Social Considerations (2004)* as there were minor unfavorable impacts during the construction such as water pollution, waste generation

and noise. The Environment Impact Assessment (EIA) was conducted in September 2008, although environmental approval and license for the project was not required according to the domestic law of Sri Lanka.

Through the interviews and beneficiary surveys with the Executing Agency (RDA) and consultants in this ex-post evaluation, it was confirmed that during the construction large-sized sandbags were piled at foot of slopes in construction yards for water pollution control, and that the slopes were protected with blue-sheets to prevent sediment discharge and diffusion. Laying-leveling was conducted around the project sites for No.1 Bridge to No.4 Bridge since a small amount of surplus soil remained. Laying-leveling for the surplus soil of No. 5 Bridge was conducted after it had been carried out at the lower level of ground at the request of local residents. The waste provided by this project was delivered to designated areas of RDA.

The monitoring of air quality, water quality, and noise was conducted by RDA during construction, but RDA has not continued this monitoring since project completion. According to the interviews with RDA and FGD with local residents, no issues have been observed for air quality, water quality, and noise since project completion.

To summarize, no negative impacts on the natural environment were observed.

(2) Land Acquisition and Resettlement

There was neither land acquisition nor resettlement by the project since it was a project for the reconstruction of the project bridges.

As stated above, the expected effects of this project have been mostly realized as planned. Therefore, effectiveness and impact of the project are high.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

The Road Development Authority (RDA) which belongs to the Ministry of Higher Education and Highways is responsible for the operation and maintenance (herein after called O&M) of the project. The RDA Ampara District Office (in charge of Bridge No. 1, Bridge No. 2, Bridge No.3) and the RDA Batticaloa District Office (in charge of Bridge No. 4, Bridge No. 5) are directly responsible for the O&M of the project bridges. Tables 8 and 9 below indicate each department and staff allocation for O&M of the RDA Ampara and Batticaloa District Offices as of May 2017. Since Ampara District has a larger area and has to take care of longer distance roads compared to Batticaloa District, there are more staff in the RDA Ampara District Office. According to RDA, the number of staff in each RDA District Office is enough for O&M purposes and no issues have been observed in terms of the institutional aspect of O&M.

Table 8: Organizational structure for O&M in the RDA Ampara District Office

Person / Department in charge	Responsibility	Numbers
Provincial Director	In charge of overall operation maintenance and management, construction of road networks in Ampara District.	1
Chief Engineers	In charge of operation maintenance and management, construction of road networks in the Ampara Region (280 km) and the Akkaraipattu Region (316 km).	2
Executive Engineers	In charge of operation maintenance and management, construction of road networks in the Ampara Region (280 km), the Kalmunai Region (312 km), and the Akkaraipattu Region (184 km).	3
Engineers	In charge of assisting the Provincial Director, Chief Engineers and Executive Engineers for maintenance, management and construction of road networks.	15
Technical Officers	In charge of the management, maintenance, and construction of road networks at work sites.	18
Technical Assistants	In charge of assisting Technical Officers at work sites.	24
Labor Supervisors	In charge of supervising road maintenance work at work sites.	8
Road Maintenance Labor	In charge of road maintenance work at work sites.	137
Total		208

Source: RDA internal documents

Table 9: Organizational structure for O&M in the RDA Batticaloa District Office

Person / Department in charge	Responsibility	Numbers
Provincial Director	In charge of overall operation maintenance and management, construction of road networks in Batticaloa District and Trincomalee District.	1
Chief Engineer	In charge of operation maintenance and management, construction of road networks for A class roads (A004, A005, A015) and B class roads.	1
Executive Engineer	Same as Chief Engineer.	1
Engineers	In charge of assisting the Provincial Director, Chief Engineers and Executive Engineers for maintenance, management and construction of road networks.	6
Technical Officers	In charge of management, maintenance, and construction of road networks at work sites.	6
Technical Assistants	In charge of assisting Technical Officers at work sites.	19
Labor Supervisors	In charge of supervising road maintenance work at work sites.	4
Road Maintenance Labor	In charge of road maintenance work at work sites.	128
Total		166

Source: RDA internal documents

3.5.2 Technical Aspects of Operation and Maintenance

The engineers (Chief Engineers, Executive Engineers) of the RDA Ampara and Batticaloa District Offices have a higher level of academic background than university level, and also are qualified as "Official Engineers", which is certified by the Sri Lanka Engineers Association. Other technical staff such as Technical Officers and Labor Supervisors, have the technical capability to accomplish basic O&M works without any problems, as instructed by the Chief Engineers or Executive Engineers. Moreover, the O&M works are implemented according to the *Road/Bridge Standard Specifications for Construction, Operation and Maintenance* –

November 2008, which are RDA standard provisions.

Even though training in relation to O&M has not been conducted recently, it is expected that the organizational ability for O&M capacity for bridges in RDA will improve through the JICA Technical Cooperation Project, The Project for the Capacity Development of Bridge Management (2015 – 2018)¹⁰ which was in progress at the time of ex-post evaluation and *Bridge O&M Policy* will be developed and Bridge Management Systems etc. created through the project. The model Provinces of this project are the Central Province, the Western Province, and the Southern Province. However, other Provinces, such as the Eastern Province, are planning to utilize the Bridge O&M program including O&M training by the second half of 2018.

3.5.3 Financial Aspects of Operation and Maintenance

The O&M budgets of the RDA, Ampara District Office and Batticaloa District Office for the past 3 years (2014 - 2016) are shown in Tables 10, 11 and 12. In government organization in Sri Lanka, it is common to allocate an actual budget less than the planned budget. A part of the O&M budget for RDA which included the project bridges had been allocated from the “Road Maintenance Trust Fund¹¹”. However, the fund recently has not functioned and instead the Treasury Department annually allocates LKR 4,000 million for the RDA O&M budget and this is expected to continue at the same amount for the time being. According to RDA, no major issues have been observed in terms of the financial aspect of O&M.

Table 10: Annual Budget and the Budget for O&M in RDA (2014 – 2016)

Unit: LKR Million

	2014		2015		2016	
	Planned	Actual	Planned	Actual	Planned	Actual
Annual Budget of RDA	31,478.2	30,991.1	44,871.9	42,963.1	43,482.0	40,549.2
The Budget for O&M in RDA	6,047.0	4,772.0	6,303.0	5,477.0	4,320.0	2,736.0

Source: RDA internal documents

¹⁰ The expected outcomes of “The Project for the Capacity Development of Bridge Management” are follows: (i) Development of Bridge O&M Policy; (ii) Reconstruction of the organizational structure of the RDA headquarters and local offices; (iii) A revised Bridge Inspection and Diagnosis Manual; (iv) The creation of a Bridge Management System; and (v) Deepened basic technical knowledge on the part of the staff of the RDA headquarters and in model provinces through seminars and on the job training (OJT).

¹¹ The “Road Maintenance Trust Fund” was established in December 2005 by the Government of Sri Lanka, for collecting the revenue for the O&M of the road sector. The revenue is collected from LKR 1 for 1 liter of gasoline, and LKR 0.5 for 1 liter of diesel at the selling price.

Table 11: Annual Budget and the Budget for O&M in the RDA Ampara District Office
(2014 – 2016)

Unit: LKR Million

	2014		2015		2016	
	Planned	Actual	Planned	Actual	Planned	Actual
Annual Budget of the Ampara District Office	1,360.64	972.87	779.79	725.52	614.13	398.10
The Budget for O&M in the Ampara District Office	555.96	394.22	404.25	394.22	494.13	234.10

Source: RDA internal documents

Table 12: Annual budget and the Budget for O&M in the RDA Batticaloa District Office
(2014 – 2016)

Unit: LKR Million

	2014		2015		2016	
	Planned	Actual	Planned	Actual	Planned	Actual
Annual Budget of the Batticaloa District Office	288.37	146.06	151.64	193.40	231.26	104.93
The Budget for O&M in the Batticaloa District Office	88.37	109.06	51.64	36.40	131.26	48.93

Source: RDA internal documents

3.5.4 Current Status of Operation and Maintenance

The daily maintenance and regular maintenance have been conducted by the inspection item accordingly, as mentioned in Table 13, by RDA Ampara and Batticaloa District Office. After the project completion, the 5 project bridges have been kept in good condition and no issues have been observed in terms of the current status upon the visual site inspection at the ex-post evaluation.

Table 13: Maintenance Program of O&M for the 5 bridges

	Inspection item	Frequency
Daily Maintenance	<ul style="list-style-type: none"> • Carriageways • Shoulders & road sides • Drainage systems • Surface dressing & surfacing • Clearing vegetation 	Everyday
Regular Maintenance	<ul style="list-style-type: none"> • Traffic signs, road marking & painting • Bridges • Down pipes 	Every 3 months
Others	<ul style="list-style-type: none"> • Painting uprights & confirming handrails 	Once a year

Source: RDA internal documents

In the light of above, no major problems have been observed in the institutional, technical and financial aspects and current status of the operation and maintenance system. Therefore sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of this project is to increase in transportation capacity and safety for the targeted bridges in the Eastern Province where is affected by civil war, by improving the condition for deteriorated small and medium sized 4 bridges on A005 national highway and Panichchankeni causeway and a bridge on A015 national highway, thereby contributing to improve living environment of local communities and to improve access and logistics between Eastern Province and neighboring provinces.

The project was consistent with the development plan and development needs of Sri Lanka, both at the time of planning and ex-post evaluations, as well as with Japan's ODA policy at the time of planning. Therefore, the project relevance is high. In addition, it is confirmed that there have been improvements in transportation capacity and the safety of the project bridges and neighboring roads, along with positive effects in the lives and economic activities of local residents together with an improvement in service accessibility to schools, hospitals, and markets.

Thus, the effectiveness and impacts of the project are high. The effectiveness and impacts are considered not only to have been achieved by the project, but also through the various road improvement projects of RDA, and of other donors such as WB, ADB, AFD which have also contributed to the results as external factors around the project areas in the Eastern Province. The project cost was in accordance with the plan, although the project period slightly exceeded that planned. Therefore, the efficiency of the project is fair. The sustainability of project effects is high since no major problems were observed in the institutional, technical and financial aspects of the operation and maintenance system for the project.

In light of the above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

None

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

The Importance of Coordination/Demarcation with Other Donors

The project was to reconstruct deteriorated bridges which had been the traffic bottlenecks. It contributed to improvements in transportation capacity and safety of the target bridges. Also the impacts such as the improvement in accessibility and logistics between the Eastern Province and neighboring provinces, the improvement in the living environment of locals, etc. were confirmed.

Therefore, the effectiveness of the project was realized as originally expected. The Eastern Province was significantly affected by the civil war, as was the Northern Province. There had been a delay in the rehabilitation and development of economic and social infrastructure including the road sector, and it was the area where reconstruction assistance was fully launched only after the end of the civil war in 2009. It had been difficult to maintain and repair the bridges for a long time during war which led to deterioration, and the creation of transport bottlenecks around the project areas. The project was consistent with the development needs of the project areas as it dealt with solving the issues. Additionally, there was sufficient coordination/demarcation with other donors for in the implementation of the project, such as the improvement of one of the road networks in the Eastern Province by improving the project bridges and connected roads. The impact of the project was seen extensively not only in the local communities around the project bridges, but also it spread to outside of the Eastern Province. As the result, the project is considered to have been successful in understanding the appropriate development needs and having coordination with the projects of other donors, such as ADB, at the planning stage. It is expected that the same kind of coordination will take place in similar projects in the future. Specifically, it is recommended that there is demarcation with other donors before a project starts in the case where other donors also plan to implement a project. Information about the project site (roads, bridges) including road networks should be shared with an awareness of the synergy effect between each project.

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