Ex-Post Project Evaluation 2017
Package Ⅳ-1 (Sri Lanka)

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Democratic Socialist Republic of Sri Lanka

FY2017 Ex-Post Evaluation of Japanese ODA Loan

"Poverty Alleviation Micro Finance Project II"

External Evaluator: Yumiko Onishi, IC Net Limited

0. Summary

Microfinance was considered an important tool for attaining Sri Lanka's poverty alleviation policy goal. The project's objective was to increase the income of people living in poverty by providing credit, targeting the north-eastern region, where there were long years of civil war, as well as adjacent poor areas, and by improving the capacity of Participating Finance Institutions (PFIs) and beneficiaries, thereby contributing to the poverty alleviation. At the time of the ex-post evaluation, the poverty ratio of Sri Lanka had achieved its policy target, which was set during the project appraisal. In the northeast, however, the poverty rate continues to be higher than the national average, and microfinance remains important. Development policy, development needs, and Japan's ODA policy at the time of the appraisal are consistent with the project, and the relevance of the project is high. Considering the high demand for funds, the credit component was increased by 1.8 times the planned amount through fund reallocation. Nevertheless, the total project cost was more or less the expected amount. On the other hand, because the credit component was increased and the loan scheme was operated beyond the planned duration, the project period was prolonged. As a result, the efficiency of the project is fair. The operation and effect indicators set to measure effectiveness have mostly indicated that the target was achieved and that several positive impacts have been seen for people living in poverty. Therefore, effectiveness and impacts are high. The operation of the project's revolving fund was completed in June 2018. No issues have been observed with regard to the institutional, technical, or financial aspects of the operation and maintenance of the executing agency and PFIs, and no delays have occurred in the debt recovery of the revolving fund. Therefore, the project's sustainability is also high.

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

1. Project Description

Project Locations

A Business Activity Funded by Microfinance

1.1 Background

In 2006, Sri Lanka's human development indexes for items such as literacy rate and access to basic health and basic education were better than those of countries in a similar economic situation and significantly above the South Asian average. While this indicated that Sri Lanka had a potential capacity for development, development was delayed in the country as a whole because of severe poverty in such areas as the north-eastern region, which was politically unstable, plantation (tea estate) areas, and arid rural areas.

One of the factors that was considered to be hampering efforts to tackle poverty in Sri Lanka was the severely worsening economic environment in the northern and eastern regions due to 20 years of civil conflict. Of the 119 high-poverty villages listed by the Government of Sri Lanka in 2006, the top 20 were concentrated in Puttalam District, bordering the Northern Province; Badulla and Monaragala Districts, bordering the Eastern Province; and Ratnapura District, next to Monaragala. Although the list did not include the Northern and Eastern Provinces because statistics were not available, the poorest area has spread across the Northern and Eastern regions and surrounding areas.

The Government of Sri Lanka has long considered microfinance an important tool for poverty alleviation and has been practicing it through a number of institutions[1]. However, there were several issues in the microfinance sector:

- Although outreach had been made to people living in poverty, financial sustainability had not been sufficiently secured.
- A policy environment that strengthens the sector as a whole had not been sufficiently developed.
- Capacity development among institutions and beneficiaries was needed.

[1] In addition to the Central Bank of Sri Lanka and Samurdhi Bank implementing government schemes, commercial banks in both the public and private sectors, semi-governmental regional development banks, and cooperatives provided microfinance. (Source: materials provided by JICA)

- Monitoring of microfinance projects needed to be strengthened
- Fund supply and access to financial services were insufficient in the northern and eastern regions, and there were no medium-term credit programs.

The history of microfinance in Sri Lanka is long, and various kinds of institutions have been implementing it. However, the microfinance market at the time of the appraisal lacked legal regulations and competition and was still at an immature stage. Particularly in the northern and eastern regions, insufficient fund supply and access to financial services were issues. Alleviating poverty by providing credit to the poor in the northeast and surrounding areas required support for microfinance that struck a balance between responding to the above issues and providing social welfare, while ensuring the long-term sustainability of the microfinance project.

1.2 Project Outline

The objective of the project is to increase the income of people living in poverty by providing credit to the poor in the northeast and surrounding regions, where the poverty rate is high, and carrying out training for participating financial organizations, microfinance organizations, and beneficiaries, thereby contributing to both poverty alleviation and social and economic stabilization in the regions.

Loan Approved Amount/ Disbursed Amount	2,575 million yen / 2,561 million yen	
Exchange of Notes Date/ Loan Agreement Signing Date	June 2008 / July 2008	
Terms and Conditions	Interest Rate	0.65% (0.01% for consulting services)
	Repayment Period (Grace Period	40 years 10 years)
	Conditions for Procurement	General Untied
Borrower / Executing Agency	The Government of Democratic Socialist Republic of Sri Lanka / Central Bank of Sri Lanka	
Project Completion	November 2015	
Main Contractor(s) (Over 1 billion yen)	None	
Main Consultant(s) (Over 100 million yen)	-	
Related Studies (Feasibility Studies, etc.)	Project formulation study for the Poverty Alleviation Micro Finance Project II (JICA, September 2007)	
Related Projects	<Japanese ODA Loan> Poverty Alleviation Micro Finance Project (August	

	1999), Pro-Poor Economic Advancement and Community Enhancement Project (March 2003) <Asian Development Bank> Rural Finance Sector Development (2001), LOLC Finance and LOLC Micro Credit (2015) <World Bank> Financial Sector Modernization Project (2017)

2. Outline of the Evaluation Study

2.1 External Evaluator

Yumiko Onishi, IC Net Limited

2.2 Duration of Evaluation Study

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

Duration of the Study: October 2017 – January 2019

Duration of the Field Study: March 7–28, 2018 and May 29–June 8, 2018

3. Results of the Evaluation (Overall Rating: A[2])

3.1 Relevance (Rating: ③[3])

3.1.1 Consistency with the Development Plan of Sri Lanka

At the time of the project appraisal, the *Mahinda Chintana Ten-Year Plan* (2006), the Sri Lankan policy document at that time, aimed to reduce poverty to 12% by 2015, at a time when 23% (as of 2002) of the Sri Lankan population was living in poverty. As it envisaged alleviating poverty and reducing regional disparities through regional and rural development, the Sri Lankan government was implementing and expanding a number of projects that targeted poverty alleviation and regional development. About the north and east, it said "if a peaceful environment where people are guaranteed of rights to a decent living is created, realization of rapid social and economic development of Sri Lanka can be expected," and regarded economic and social stability in the north and east as important for the development of the entire country. Furthermore, the *Mahinda Chintana Ten-Year Plan* recognized that economic development would not automatically benefit people living in poverty and outlined a new strategy focused on providing opportunities for the poor to participate in the process of economic growth. In this strategy, from the perspective of promoting micro and small industries which increase income for the poor, the microfinance was positioned as an effective tool for increasing income, and alleviating poverty.

As explained in section 3.1.2 Consistency with the Development Needs of Sri Lanka, poverty alleviation was still part of Sri Lanka's policy at the time of the ex-post evaluation. *Vision 2025*,

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

[3] ③: High, ②: Fair, ①: Low

prepared in 2017, points out that there is a significant regional inequality in the nation's economic development. Poverty rate in the Northern and Eastern Provinces, Monaragala District adjacent to the Eastern Province, and plantation areas is still high. To make a breakthrough, the Sri Lankan government aims to continue to improve access to finance and strengthen financial literacy in an effort to improve access to finance for small and medium enterprises. It plans to establish a development bank using existing financial institutions. As can be seen in the enactment of the Microfinance Act in 2016, microfinance is considered important in Sri Lanka.

As can be seen from the development policy at the time of the appraisal and ex-post evaluation, poverty alleviation and microfinance are both in line with the project.

3.1.2 Consistency with the Development Needs of Sri Lanka

At the time of the appraisal (2007), 15% of the Sri Lankan population was considered to be in poverty as of 2006. The Gini coefficient[4] at that time was 0.49. Although the poverty rate and the disparity between urban and rural areas in the country have slowly reduced in the past 20 years, poverty continued to be an issue for development of Sri Lanka. This was particularly true for the north and east, which have been affected by long years of civil conflict. Under such circumstances, microfinance was considered an effective tool for increasing income for people living in poverty and for poverty alleviation. According to a 2002 report[5] of the Asian Development Bank (ADB), demand for microfinance funds across Sri Lanka was estimated to be SLR 20 billion annually, and the supply–demand gap was SLR 10 billion. Particularly in the north and east the issues were a) an insufficient supply of funds; b) lack of access to financial services; and c) an absence of medium-term credit programs. To provide credit to the poor in insecure areas like the north, east, and surrounding areas and alleviate poverty, support was needed which balanced tackling various issues and considering social welfare issues, while promoting competition and introducing market principles in the microfinance sector.

Table 1 shows changes in poverty rates in the project's target areas as confirmed at the time of the ex-post evaluation. The share of people living in poverty has been slowly declining in the country since 2002. However, as seen in the poverty rate of the target areas in 2016, out of the 14 target districts, eight are above the national average of 4.1%, indicating that poverty remains an issue.

[4] Indicates disparity of incomes. A figure closer to 0 indicates a society with less income disparity while one closer to 1 means there is inequality.

[5] Charitonenk, Stephanie and Dulan deSilva (2002). *Commercialization of Microfinance: Sri Lanka*. Asian Development Bank.

Table 1: Poverty Rate in the Target Districts

Unit: %

District	FY 2006	FY 2009	FY 2012	2016
Jaffna	N/A	16.1	8.3	7.7
Kilinochchi	N/A	N/A	12.7	18.2
Mullaitivu	N/A	N/A	28.8	12.7
Mannar	N/A	N/A	20.1	1.0
Vavuniya	N/A	2.3	3.4	2.0
Trincomalee	N/A	11.7	9.0	10.0
Batticaloa	10.7	20.3	19.4	11.3
Ampara	10.9	11.8	5.4	2.6
Puttalam	13.1	10.5	5.1	2.1
Anuradhapura	14.9	5.7	7.6	3.8
Polonnaruwa	12.7	5.8	6.7	2.2
Badulla	23.7	13.3	12.3	6.8
Monaragala	33.2	14.5	20.8	5.8
Ratnapura	26.6	10.4	10.4	6.5
National	15.2	8.9	6.7	4.1

Source: Household Income and Expenditure Survey (HIES)

To find out the improvements in financial access attained by the project in the north and east, a banking density index[6] was obtained. Table 2 indicates changes in the index.

Table 2: Banking Density Index in the Target Districts

Unit: %

District	2005	2010	2016
Jaffna	17	15	24
Kilinochchi	7	4	15
Mullaitivu	6	3	20
Mannar	14	13	19
Vavuniya	11	12	20
Trincomalee	14	10	14
Batticaloa	10	12	17
Ampara	11	14	17
National	20	14	17

Source: CBSL

As can be seen in the changes in the banking density index, many financial institutions have entered the area since 2009, while others have increased their branch networks. This has resulted in a significant improvement in access to financial services. This was triggered by a

[6] Banking density index indicates penetration of banks against the population. Higher the number, it means there are better penetration of financial institutions. Here, it is calculated as (number of financial institution branches in the district) ÷ (total population of the district).

large demand for funds in the north and east for reconstruction and recovery of livelihood when the civil war ended in 2009. Some financial institutions popped up that provided loans without using microfinance practices such as forming beneficiary groups or saving for several months to serve people who preferred to obtain credit without using such procedures. These financial institutions are lending at high interest rates, and many are using malicious means to recover the loans. Because it is easy to obtain credit, some people have ended up taking multiple loans, and some have been driven to suicide. Interviews with PFIs and beneficiaries in the area revealed that malpractice in the microfinance sector is now a social problem. It appears that, even today, it is difficult to obtain credit for micro and small business activities in rural areas and among the poor in urban areas and that the demand for microfinance is high.

3.1.3 Consistency with Japan's ODA Policy

In the *Country Assistance Program for the Democratic Socialist Republic of Sri Lanka* (April 2004), Japan's official development assistance policy at the time of the appraisal, "assistance for poverty alleviation" was included as a direction for the next five years of assistance. In the JICA's *Medium-Term Strategy for Overseas Economic Cooperation Operations* (2005–end of September 2008), "foundation for sustainable growth" was a priority area, while "assistance for economic growth for poverty alleviation" and "reducing disparity among ethnic groups and regions for peace building" were the priority areas for Sri Lanka, making them consistent with the project.

This project has been highly relevant to Sri Lanka's development plan and 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) Credit to People Living in Poverty

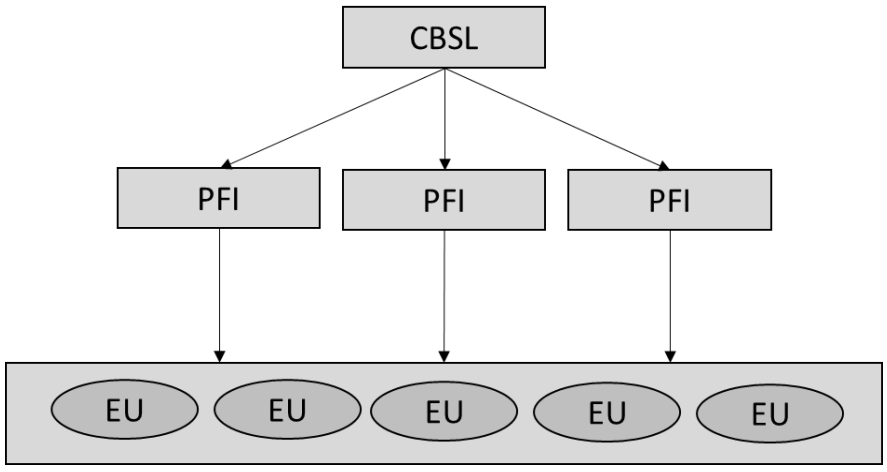
The target areas for the project are the 14 districts listed in Table 3. Of the credit component, at least 50% was supposed to be given to the Northern and Eastern Provinces, and 65% was actually provided to these areas. The higher share of credit to the Northern and Eastern Provinces is assumed to be due to the acceleration of reconstruction work in the area after the civil war ended in 2009 and because the project began with credit from Batticaloa district in the Eastern Province and was expanded to adjoining areas.

Table 3: Loans from the Project (at the time of final disbursement)

Province	District	No. of Loans	Loan Amount (SLR million)	%
Northern	Jaffna	7,553	466	15
	Kilinochchi	1,443	85	3
	Mullaitivu	1,470	103	3
	Mannar	1,417	80	2
	Vavuniya	595	39	1
Eastern	Trincomalee	6,772	360	11
	Batticaloa	11,600	585	18
	Ampara	7,497	386	12
Others	Puttalam	6,391	345	11
	Anuradhapura	4,218	230	7
	Polonnaruwa	1,993	90	3
	Badulla	2,207	124	4
	Monaragala	2,223	126	4
	Ratnapura	3,836	194	6
Total		59,215	3,213	100

Source: CBSL (questionnaire survey for the ex-post evaluation)
Note: The percentage refers to each district's share of loan amount.

The lending scheme, as seen in Figure 1, was designed so that PFIs were selected from those fulfilling the selection criteria set beforehand by the Central Bank of Sri Lanka (CBSL), the executing agency, and signed administrative agreement. Then the loan would be provided to the beneficiaries through PFIs.



Source: Prepared by the external evaluator.
Note: EU refers to end users, the beneficiaries of the project.

Figure 1: Lending Scheme

The PFIs were selected using criteria such as a) an annual recovery ratio of a minimum of 75%; b) a return on asset ratio of a minimum of 1%; c) a return on capital ratio of a minimum of

10%; d) a current asset ratio of a minimum of 20%; e) an on-time loan recovery ratio of a minimum of 70%; and f) a loan infection ratio of below 30%. Of the 12 PFIs that expressed interest, 11 participated in the project. Table 4 is a list of PFIs and portfolios.

Table 4: PFIs and Their Portfolios

PFI	No. of Loans	Amount of Loan (SLR million)
Bank of Ceylon (BOC)	24,987	1,368
People's Bank	13,259	734
Regional Development Bank (RDB)	11,830	673
Sanasa Development Bank (SDB)	5,342	265
LOLC	2,370	78
Hatton National Bank (HND)	787	58
Lankaputhra Development Bank	294	20
Sampath Bank	132	8
Union Bank	129	7
People's Leasing Company	73	1
Commercial Bank	12	1
Total	59,215	3,213

Source: CBSL

Originally, loans to the beneficiaries were considered through two channels: one is directly from PFIs to the beneficiaries and the other is from PFIs through Participating Agencies (PAs), which are microfinance institutions such as NGOs, to the beneficiaries. It was considered that using PAs would enable better outreach to and better care for the beneficiaries. However, reasons such as the higher risk of irrecoverable debt (because the PFIs would not recover the loans directly from the beneficiaries), the difficulty of monitoring PAs, and the smaller interest margin when PAs are used, would have made the project less attractive to the PFIs, none of the PFIs used PAs.

In the lending scheme, two modes were planned: a) lending to individuals who belonged to a group of about five beneficiaries and b) lending to individuals who were not in a group because they lived in remote areas where group formation was difficult. Nevertheless, groups were formed even in remote areas, and all of the credit was provided to individuals belonging to a group. Beneficiaries were required to meet the following conditions to obtain credit:

- Monthly household income of SLR 15,000 or less[7]
- At least three months of saving after group formation (the amount of saving to be decided among the members)
- Household was not a beneficiary of other microfinance schemes simultaneously

[7] Since November 2015, based on the revision of poverty line used in the project, the amount was increased to SLR 16,500.

- Household was not a defaulter of other financial institutions

Loans to the beneficiaries were provided at low interest as planned at the time of the appraisal. The interest rate was initially 12% and was reduced to 10% after it was revised in August 2015 by the Steering Committee set up for the project. Although there were slight differences among the geographical areas and the PFIs, the first loans with a maximum amount of SLR 50,000 and second and third loans up to SLR 100,000 and 150,000 were given after the group formation and regular saving for three months had occurred.

The target business activities included trade and services, livestock, agriculture, and small-scale industry, as was planned in the appraisal. Trade and services accounted for 39% of the total, and livestock and agriculture accounted for 20% each.

Photo 1: Dairy Husbandry

Photo 2: Brick Production

The project kept in mind the structure required to continue providing microfinance after the project was completed and thus established development societies by amalgamating several beneficiary groups. The activities of the development societies, their benefits, and their future prospects are summarized at the end of the report.

b) Procurement of Equipment for Project Management and Monitoring

Motorbikes and office equipment required for project monitoring were procured. Originally, the procurement of office furniture was also planned, but the furniture used in the previous Poverty Alleviation Micro Finance Project was used, and new furniture was not necessary.

c) Consulting Services and Capacity Development

Originally, the project planned to make use of staff from PFIs on deputation to fill the posts required to operate and manage the project. However, the required human resources were not secured, and individuals were recruited from the open market. A total of 93 people, including those in the Central Project Office at the CBSL headquarters; credit, training, and marketing experts at Project Regional Offices; and field officers for the PFIs were posted.

Training for field officers was conducted quarterly by the CBSL starting in 2010 when their recruitment commenced. Training for the beneficiaries was conducted by the CBSL, PFIs, and Sarvodaya Economic Enterprise Development Services[8] (SEEDS), an NGO hired for one year in 2014. Aside from group formation, entrepreneurship, and bookkeeping, the Project Regional Offices and PFIs assessed the needs of the beneficiaries, and technical training such as for agriculture and food processing was conducted. Table 5 provides a summary of the training conducted by SEEDS[9]. A total of 432 beneficiary training courses were conducted by the Central Project Office and Project Regional Offices of the CBSL, in which 14,135 beneficiaries participated.

Table 5: Capacity Development Training for the Beneficiaries Conducted by SEEDS

Training Course		No. of Programs	No. of Participants
Vocational Training	Agriculture	96	4,693
	Fisheries	21	1,146
	Livestock	71	3,802
	Small industries	50	2,613
Entrepreneurship Development		151	7,087
Society Development	Leadership	83	3,147
	Bookkeeping	80	2,922
	Exposure visit	20	588
Marketing Workshop	Value addition	14	675
	Value chain	14	664
	Market and new technologies	14	727
Information Technologies		5	106
Total		619	28,170

Source: SEEDS

3.2.2 Project Inputs

3.2.2.1 Project Cost

In the appraisal plan, the total project cost was JPY 2,759 million (the foreign currency portion was JPY 79 million, and the local currency portion was SLR 2,552 million), of which JPY 2,575 million was from a Japanese ODA loan. The actual total project cost was JPY 2,680 million (the foreign currency portion was JPY 71 million, and the local currency portion was SLR 3,858 million). The disbursement of the Japanese ODA loan was JPY 2,561 million. Table 6 shows that, as there was a high demand from the beneficiaries and there were unused funds in other components, the credit component amount was enhanced using the balance amount by reallocating the fund twice.

[8] Established as an NGO in 1986. The organization is registered as a private company now. It runs capacity development training mainly for micro enterprises.

[9] Table 5 does not include beneficiary training and workshops conducted separately by the CBSL and PFI.

Table 6: Planned and Actual Project Cost

Unit: JPY million

	Plan	Actual
a) Credit component	2,100	2,381
b) Procurement of equipment	25	35
c) Consulting service	368	75
d) Others	266	189
Total	2,759	2,680

Source: CBSL

Although there were increases and decreases in the costs for each component, the project was implemented without any issues. There was no problem with the funds provided by the Government of Sri Lanka, and the project cost was within the plan.

3.2.2.2 Project Period

At the time of the appraisal, the planned project period was 72 months beginning in May 2008, when the selection of consultants and the preparation of the operation manual were to start, and to be completed by April 2014, when the consulting services were to end. The project indeed started in May 2008. However, because the credit component was enhanced by fund reallocation, the lending scheme was operated beyond the original project period. The service of personnel was extended beyond the final disbursement date of June 2018 using the Sri Lankan government's own funds to operate a revolving fund. Therefore, the completion of the project has been designated as the final disbursement date of November 2015, when the project's consulting service was completed. As a result, the project period was 91 months and exceeded the planned period.

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

The internal rate of return for the project was not calculated at the time of the appraisal. Therefore, it was not recalculated at the time of the ex-post evaluation.

The project cost was within the plan, but the project period exceeded it. Therefore, the efficiency of the project is fair.

3.3 Effectiveness and Impacts[10] (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

Table 7 shows the target and actual figures for the project's operation and effect indicators.

[10] Sub-rating for Effectiveness is to be put with consideration of Impacts.

Table 7: Operation and Effect Indicators

	Target	Actual	
	2015	2017	Remarks
	2 Years After Completion	2 Years After Completion	
a) Number of loans	75,000	150,535	Inclusive of loans given from the revolving fund of the project for the target and the actual.
b) Total amount of approved loans	SLR 2,000 million	SLR 3,213 million	Exclude revolving fund for the target and the actual.
c) Ratio of beneficiaries who apply for loans more than twice	90%	10%	Inclusive of loans given from the revolving fund for the actual.
d) Repayment rate by beneficiaries on time	90%	93%	—
e) Ratio of beneficiaries who have cross passed above the poverty line	50%	98%	Result obtained from the quantitative survey conducted in the ex-post evaluation for the actual.

Source: CBSL

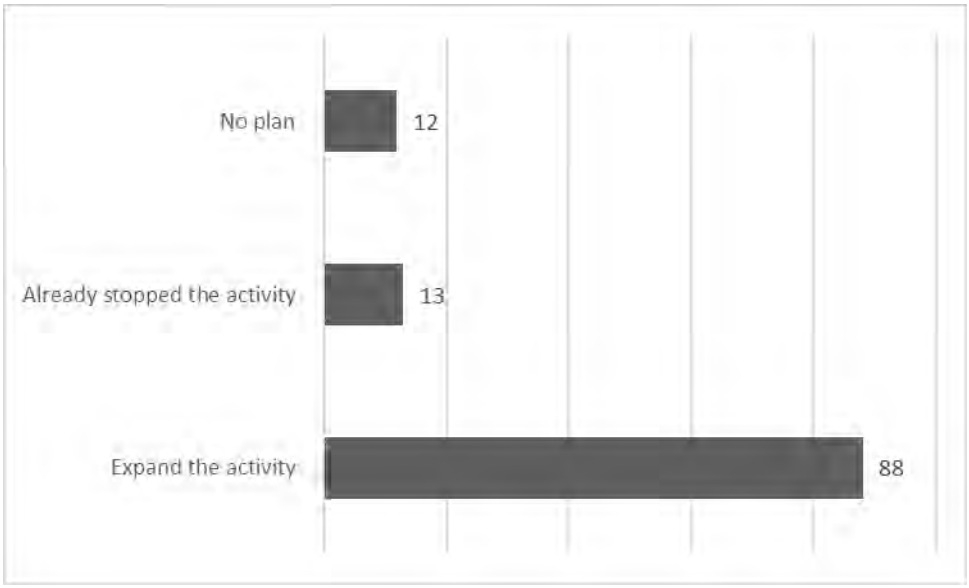
As seen in a) the number of loans and b) the total amount of approved loans, the demand for microfinance funds from the beneficiaries was high, the actual figures significantly exceeded the target figures because the unused balance of the Japanese ODA loan was allocated to the credit component. The total number of people who have taken loans, excluding those from the revolving fund, was 141,799. There are no comprehensive gender-wise data on the beneficiaries, but, according to the mid-term evaluation and quantitative survey[11]conducted in the ex-post evaluation, the share of male beneficiaries was 12 to 16% while the female share was 84 to 88%.

The figure on c) the ratio of beneficiaries who apply for loans more than twice includes those from the project and the revolving fund. It appears that the target was set based on the actual

[11] A quantitative survey was conducted to supplement the data on the effectiveness and impact of the project. Using multistage sampling, it covered 113 beneficiary households in six districts of the project target districts. The six districts were selected by ranking the target districts in the order of most number of loans. The top three districts were selected from the Northern and Eastern Provinces, and three more districts were chosen from other districts: Ampara, Jaffna, Batticaloa, Anuradhapura, Ratnapura, and Puttalam were selected. Only the beneficiaries from the top four lending PFIs were covered because of the way the databases on beneficiaries are organized by the PFIs and because many beneficiaries live in places where it is difficult to identify their addresses. In each district, one PFI branch was randomly selected from each of the BOC, People's Bank, RDB, and SDB branches with at least 20 loans from the project. From the beneficiary list of each PFI branch, six beneficiary households were selected from both the BOC and People's Bank, the PFI with larger number of loan cases, while four were selected from both the RDB and SDB using a randomized list. Using this method, a survey of 120 households was planned. However, some of the beneficiaries could not be traced, and others were absent. Ultimately, 113 households were surveyed.

ratio of the beneficiaries who applied for a loan more than twice in the earlier Poverty Alleviation Microfinance Project[12]. The project's achievement rate is much lower, and the target figure of 90% may have been ambitious. Moreover, the actual figure of 10% includes the beneficiaries who borrowed a second or more times only from the project fund. Some of the beneficiaries took subsequent loans from other credit schemes. According to the quantitative survey conducted at the time of the ex-post evaluation, the share of beneficiaries who took subsequent loans from the project was 12%, and the share of those who took subsequent loans from other schemes was 19%. Some of those (12 out of 22 respondents) who took loans from other schemes said that they did so because they needed loans above the project's credit limit. Similarly, according to the survey at the time of the ex-post evaluation, most of the respondents were continuing with the businesses for which they had taken credit. Eighty-eight respondents (78%) were planning to expand or thinking about expanding their businesses in the near future (see Figure 2).

Unit: People



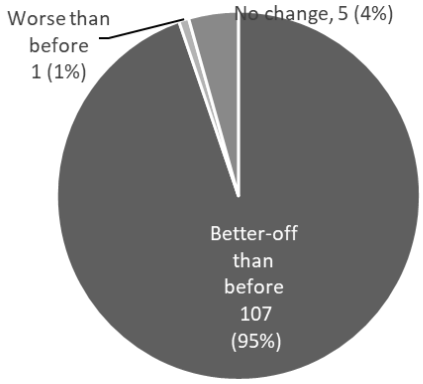
Source: Quantitative Survey

Figure 2: Future Plan for the Business for Which the Loan Was Taken

The actual figure of d) repayment rate by beneficiaries on time is almost the expected rate. And e) the ratio of beneficiaries who have cross passed above the poverty line exceeded the target. According to the survey conducted by CBSL in 2016, the figure was 91%. In the quantitative survey of the ex-post evaluation, when the monthly income of the 112 households who responded was compared with the poverty line determined by the Government of Sri Lanka

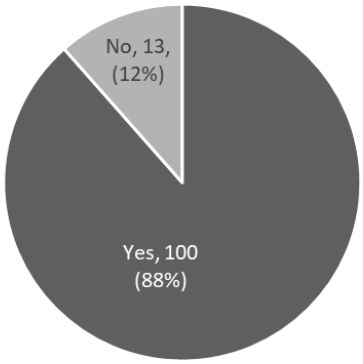
[12] Microfinance project implemented by Japanese ODA loan from 1999 in six districts of Kurunegala, Matale, Nuwara Eliya, Badulla, Kalutara and Hambantota.

in December 2017 (SLR 4,584 per capita), the average monthly income per person was SLR 11,753; 110 households (98%) had surpassed the poverty line. Similarly, in the quantitative survey, 107 out of 113 households (95%) felt economically better off, and 100 households (88%) felt financially better prepared for an emergency than they were 10 years before.



Source: Quantitative Survey

Figure 3: Current Economic Status Compared to 10 Years Ago



Source: Quantitative Survey

Figure 4: Whether Financially Prepared Now Compared to 10 Years Ago

3.3.1.2 Qualitative Effects (Other Effects)

The expected qualitative effect at the time of the appraisal was the capacity development of the PFIs. However, each PFI has its own human resource development and training programs, and no systematic PFI capacity development effort in the microfinance sector was made during the project. Training was limited to the field officers recruited for project implementation. On the other hand, a significant number of PFIs, which had no or limited experience in operating microfinance schemes before the project, gained experience and knowledge of microfinance by participating in the project. This was confirmed in interviews with PFIs in the ex-post evaluation. Moreover, some of the PFIs, taking advantage of the project experience, developed and are operating their own microfinance projects (see the column at the end of the report for more details).

3.3.2 Impacts

3.3.2.1 Intended Impacts

Poverty Alleviation and Other Impacts

The expected impacts of the project were poverty alleviation in the target areas and a contribution toward social and economic stabilization in the northeast. With regard to poverty alleviation, the impacts were as indicated in the effectiveness indicators. In addition, several positive impacts from the activities of beneficiary groups and development societies are observed. For example, group savings, a prerequisite for obtaining credit, gave beneficiaries a

regular saving habit. When inquired about regular saving habit 10 years ago and now, as part of the quantitative survey, the saving habit has improved as seen below.

Table 8: Saving Habit of the Beneficiaries

	No.	%
10 years ago		
Was saving	50	44%
Was not saving	63	56%
Now		
Saving	81	72%
Not Saving	32	28%

Source: Quantitative Survey

Most of the beneficiaries are women, and many of them have taken executive positions in beneficiary groups or development societies. More women have been able to gain leadership skills through the activities of the beneficiary groups and development societies. In interviews with the beneficiaries, some women said that, earlier they had no skills to generate income or even they had the skills, they were unable to use them to contribute to the household income. Many said that, since participating in the project, they were able to contribute to the household budget by earning on their own and the group and development society activities gave them skills, such as in negotiation, that are useful in the society and that have given them confidence.

The site visits and interviews with beneficiaries and PFIs indicated that the continuity[13] and activity of the beneficiary groups and the formation of development societies are proportionate to the degree of involvement of the PFIs' ground-level staff such as field officers. In places where field officers or similar staff were posted after the project ended and where the officers are regularly visiting and supporting the activities of the beneficiary groups and development societies, internal lending and other social and welfare activities seemed to be actively taking place. The members clearly identified the objective of the development societies and charted out a path to future development.

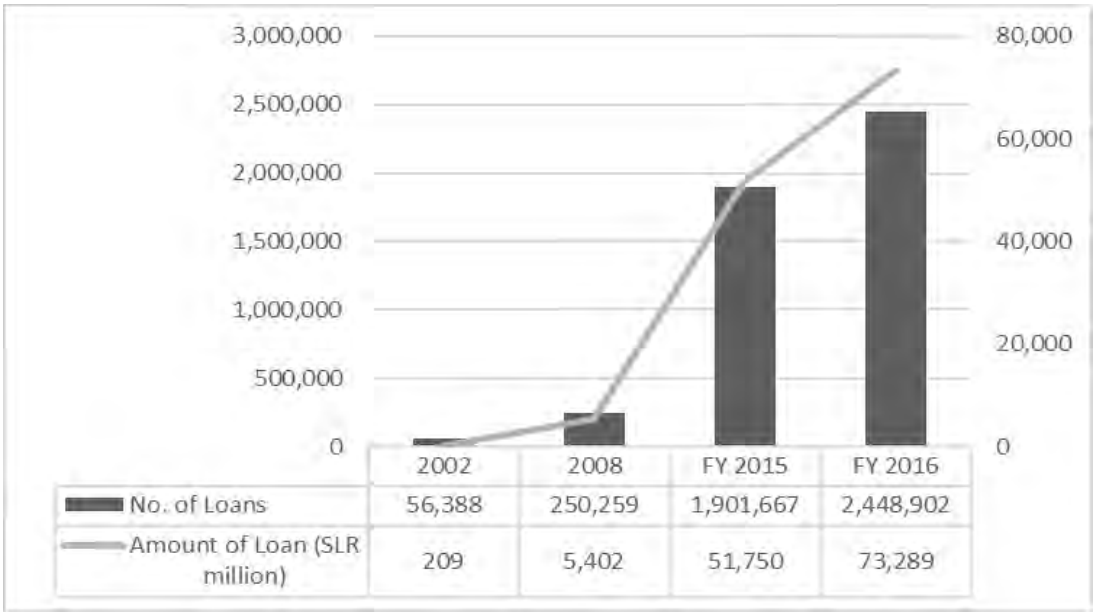
Growth of Microfinance Market

At the time of the appraisal, the microfinance market in Sri Lanka was in a stage of infancy. Therefore, the project was expected to lead to the capacity development of institutions that would operate microfinance and thereby promote competition and the introduction of market principles. Moreover, considering that there was a high demand to improve financial access in the northeast at that time, the contribution of the project to the development of the sector was

[13] Reference is made here to the beneficiaries who have demand for microfinance even after the project and who recognize the need to continue belonging to beneficiary groups and development societies. Some of the beneficiaries graduated to small enterprises using the credit from the project, and some no longer needed to be part of a beneficiary group or development society because they ceased their business.

considered as an impact.

Although Sri Lanka has a long history of microfinance, no comprehensive statistical data on the sector in the country have been gathered. In its backdrop was the existence of various types of institutions which operated microfinance, and there was no microfinance act until 2016. The Lanka Microfinance Practitioners' Association (LMPA)[14], an association of microfinance practitioners, is developing data based on annual surveys; however, the target is its membership and will not comprehensively cover the microfinance schemes operated by the commercial banks. Changes in the loan portfolios in Sri Lanka's microfinance sector are presented below based on the available documents and information collected from the LMPA.



	2002	2008	FY 2015	FY 2016
No. of Loans	56,388	250,259	1,901,667	2,448,902
Amount of Loan (SLR million)	209	5,402	51,750	73,289

Figure 5: Changes in Performance of Microfinance[15]

The microfinance institutions shown in the above figure are selected using different methodologies and thus cannot be simply compared. However, the sector has grown dramatically, mostly over the last 10 years. Financial institutions and branch networks are expanding in several regions, and financial access has significantly improved. In addition, as regard to the fund demand and supply in microfinance sector, there is a sufficient number of players and the supply is ample. On the other hand, malpractice is becoming an issue in rural

[14] Non-profit organization established in 2007. Members are NGOs and various financial institutions that implement mainly microfinance. When it was established, networking of practitioners was the objective, but it now advocates for microfinance and became a coordinating body for microfinance in the country.

[15] Source for 2002 data: Gant, Richard et al. *National Microfinance Study of Sri Lanka: Practice and Policies* (2002). Co-sponsored by AusAID and GTZ. Source for 2008 data: Atapattu, Anura. *State of Microfinance in Sri Lanka* (2009). Prepared for Institute of Microfinance. Source for FY 2015 and FY 2016 data: Lanka Microfinance Practitioners' Association. Microfinance Review Sri Lanka: Performance and Analysis Report 2016 (2017).

areas and among the urban poor. As approximately 2,000 microfinance institutions are estimated to be operating, the LMPA is considering developing a code of conduct for the membership. From such point of view, the project employed fair practices in providing and collecting loans based on the operation manual while conducting awareness programs on financial literacy for the borrowers. The project prevented malpractice in the microfinance sector. As indicated in the interviews with PFIs, they improved their capacity to operate microfinance in a changing environment by participating in the project. However, because PAs were not involved, the project has not contributed to capacity development for organizations such as NGOs operating microfinance. In addition, the PFIs include public commercial banks, such as the BOC and People's Bank, that had strong branch networks in the country to start with, and the involvement of institutions such as the RDB and SDB, whose main clientele is in rural areas, was noteworthy. Therefore, it is fair to say that the benefit to private commercial banks was limited.

In the interviews, microfinance experts and practitioners in the country, said that the design of the project distorted the market because public commercial banks such as the BOC and People's Bank had a competitive edge over private institutions to start with, and the contribution of the project to promoting competition in the microfinance sector is thus considered to be limited.

3.3.2.2 Other Positive and Negative Impacts

Regarding impacts on the natural environment, the main targets of the project were services, agriculture, and livestock on micro and small scales. The surveys on the executing agency and PFIs and field visits did not reveal any activities that would cause negative impacts on the natural environment.

Livelihood-related activities to which the project provided credit were conducted in the homes and on the agricultural land of the beneficiaries and in rented place, and no resettlement took place. No land acquisition that could cause negative impacts was observed.

All the above indicates that the project has largely achieved its objectives. Therefore, the effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ③)

3.4.1 Institutional/Organizational Aspect of Operation and Maintenance

As was originally planned, the Regional Development Department (RDD) of the CBSL was in charge of the project and the operation and maintenance of the revolving fund. For project implementation, a Central Project Office was established at the CBSL headquarters, and five Project Regional Offices were established in 2011 in Jaffna, Kilinochchi, Anuradhapura, Batticaloa, and Monaragala. Debt recovery and re-lending of the project were implemented through the revolving fund. Details of the revolving fund are provided in 3.4.4 Current Status of

Revolving Fund. The field officers recruited for the project and PFI staff attended to debt recovery and the operation of the revolving fund. Some of the PFIs such as the BOC absorbed field officers as permanent employees, who were originally recruited for the project. Other PFIs allocated their own staff to perform debt recovery, and no manpower shortage occurred. Therefore, there is no issues with the institutional aspects of operation and maintenance.

3.4.2 Technical Aspect of Operation and Maintenance

The CBSL, the executing agency, was established in 1950 and has been playing a central role in stabilizing Sri Lanka's economy, price, and financial systems. From the time of the appraisal, the CBSL has had rich experience as a financial institution, and the RDD was implementing microfinance and two-step loans supported by donors such as ADB, the International Fund for Agriculture Development (IFAD), and the Canadian International Development Agency (CIDA).

For the project, consultants assigned to the RDD were recruited, mainly from among those who had experience of working in financial institutions and had knowledge of and experience in the finance sector. Financial institutions in Sri Lanka, including the PFIs, appear to have a strong technical capacity. Some of the PFIs had limited know-how and experience related to microfinance, but a certain amount of knowledge and experience were gained through the project. When the project started, an operation manual outlining the principles of loan appraisal and debt recovery was prepared. A format for loan appraisal was prepared, and the beneficiaries were appraised on its basis. In addition, PFIs have their own manuals related to loan appraisal and debt recovery, which are being used at the time of the ex-post evaluation. Although their technical capacity is not specific to microfinance, both the CBSL and PFIs offer regular training programs for their staff. Thus, the technical aspects of the operation and maintenance of the project are adequate.

3.4.3 Financial Aspect of Operation and Maintenance

Budget allocation such as the administrative costs required for project implementation was properly arranged by the Government of Sri Lanka, and there were no issues with regard to finance. Financial status of the CBSL and the PFIs for the last three years were checked and, budgetary allocation to the RDD of the CBSL had no issues. The PFIs' statuses varied, but most of the major financial indicators such as return on assets and return on equity are close to the average of the banking sector[16] in the country. Therefore, it is fair to say that the financial statuses of the RDD of the CBSL and the PFIs are not problematic at the time of the ex-post evaluation.

[16] The average in 2016 for return on assets is 1.9%, return on equity 17.3 % and capital adequacy ratio 15.6%.

Table 9: Financial Indicators of PFI (partial)

	BOC			People's Bank			RDB		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
Total asset (SLR million)	1,329	1,568	1,669	1,026,769	1,176,595	1,302,048	92	106	130
Total equity (SLR million)	74	81	92	43,470	49,495	59,649	92	106	130
Return on assets (%)	1.6	1.7	1.9	1.8	1.8	1.7	1.3	1.5	1.8
Return on equity (%)	20.5	22.2	28.4	35.5	27. 1	27.5	9.5	9.8	11
Capital adequacy ratio (%)	13.6	13.1	12.3	14.3	12.6	12.1	6.9	7.6	6.5
Debt-equity ratio (%)	293.1	228.2	124.5	34.6	30.4	21	—	83.8	82.3
	SDB			HND			Lankaputhra Development Bank		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
Total asset (SLR million)	40,572	60,289	66,032	576	752	858	7,914	8,426	8,671
Total equity (SLR million)	4,695	5,297	5,519	60	65	77	4,661	4,818	4,942
Return on assets (%)	2.1	2.2	1	2.2	2.3	2.5	2.4	2.9	3
Return on equity (%)	12.5	14.4	7.5	16	16.8	20.2	4	4.2	5.4
Capital adequacy ratio (%)	15.3	12.5	12.3	14.8	12.7	15.3	74.3	69.3	75.5
Debt-equity ratio (%)	7.4	10.1	10.8	54.6	100.6	119.8	69.8	74.9	75.4

Source: PFI

3.4.4 Current Status of Revolving Fund

At the time of the appraisal, the option of operating the project's revolving fund together with the revolving fund of the earlier Poverty Alleviation Micro Finance Project was considered; however, because the target areas are different, they were operated separately. At the time of the ex-post evaluation, a few of the consultants recruited for the project by the RDD were engaged in the operation of the revolving fund and recovering debts.

The status of the revolving fund as of end of December 2017 is shown below. Operation of the revolving fund which had been managed by the CBSL and PFIs ended in June 2018 following a decision of the Sri Lankan government.

Table 10: Operation Status of the Revolving Fund

No. of loans from the revolving fund	91,320
Amount of loans from the revolving fund	SLR 6,680 million

Source: CBSL

Debt recovery from the beneficiaries by PFIs was continued by field officers and PFI staff after the project ended, in line with each PFI's rules. As described earlier in 3.3.1 Effectiveness, on-time repayment from the beneficiaries of the project is high (93%), largely because the repayment schedules did not constrain the beneficiaries and because of the diligent services

provided by the field officers and PFI staff. No problems such as delayed repayments from PFIs to the CBSL have occurred.

No major problems have been observed in the project's institutional, technical, or financial aspects; in the operation and maintenance system; or in the current status of the revolving fund. Therefore, the sustainability of the project's effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

Sri Lanka considered microfinance as an important tool for poverty alleviation, one of the nation's policy goals. The project was implemented to increase the income of people living in poverty by providing credit, targeting the northeast, where there were long years of civil war, and adjacent poor areas, and by improving the capacity of PFIs and beneficiaries, thereby contributing to the poverty alleviation. At the time of the ex-post evaluation, the poverty rate of Sri Lanka had been reduced to the policy target set at the time of the project appraisal. In the northeast, however, the poverty rate continues to be higher than the national average, and microfinance is still important. The development policy, development needs, and Japan's ODA policy at the time of the appraisal are consistent with the project, and the relevance of the project is high. Considering the high demand for funds, the credit component was increased by 1.8 times the planned amount through fund reallocation. Nevertheless, the total project cost was more or less the expected amount. On the other hand, because the credit component was increased and the loan scheme was operated beyond the planned duration, the project period was prolonged. As a result, the efficiency of the project is fair. The operation and effect indicators set to measure effectiveness have mostly indicated that the target was achieved and that several positive impacts have been seen for people living in poverty. Therefore, effectiveness and impacts are high. The operation of the project's revolving fund was completed in June 2018. No issues have been observed in terms of the institutional, technical, or financial aspects of the operation or the maintenance of the executing agency and PFI, and no delays have occurred in the debt recovery of the revolving fund. Therefore, the project's sustainability is also high.

In light of the above, the 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

Implementing the Scheme Applying Credit Plus Concept and Assistance at the Field Level

The project has contributed to improving the skills of the beneficiaries through technical training, bookkeeping and entrepreneurship training, as well as the formation of beneficiary groups and development societies. In addition, through the activities of the groups and development societies, many women have acquired leadership skills, resulting in women's empowerment. This was largely a result of implementing a credit scheme with the value addition called "Credit Plus" instead of simply providing low-interest credit to the poor. Beneficiaries have been able to improve not only their technical skills but also their life skills through the training and activities of the groups and development societies. The involvement of PFI staff at the field level such as the field officers recruited for the project played a key role. In the places that saw greater involvement of field officers, the beneficiary groups and development societies continued to be active even after the project ended. Some societies have introduced social welfare activities for their members and envision the development society playing a larger role.

When operating credit schemes, as in the case of this project targeting the poor, incorporating programs designed to improve the beneficiaries' technical and life skills is recommended. Maximizing the effect of such programs requires the assistance for allocating human resources and establishing systems backed by the strong commitment of the institutions operating the scheme.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	a) Credit for people living in poverty b) Procurement of equipment for project management and monitoring Vehicles for monitoring (motor bikes), office equipment, office furniture c) Consulting services Assistance for project implementation, capacity development and assistance at field level	As planned Vehicles for monitoring (motor bikes), office equipment As planned
2. Project Period	May 2008–April 2014 (72 months)	May 2008 –November 2015 (91 months)
3. Project Cost Amount Paid in Foreign Currency Amount Paid in Local Currency Total ODA Loan Portion Exchange Rate	 79 million yen 2,680 million yen (2,552 million Sri Lankan rupees) 2,759 million yen 2,575 million yen 1 Sri Lankan rupee = 1.05 yen (As of September 2007)	 71 million yen 2,609 million yen (3,858 million Sri Lankan rupees) 2,680 million yen 2,561 million yen 1 Sri Lankan rupee = 0.79 yen (Average between January 2008 and November 2015)
4. Final Disbursement	November 2015	

Ripple Effect: Future Path for the Development Societies and BOC's Mithuru Scheme

Two things that can be called byproducts of the project are described here. The first concerns the development societies, comprised of multiple beneficiary groups, and their future prospects. The second concerns the Bank of Ceylon's (BOC) microfinance product, the Mithuru scheme, which was developed based on the experience of the project.

Development Societies

In the project, development societies were established to continue offering microfinance after the project ended by amalgamating several beneficiary groups. One development society is made up of five to eight beneficiary groups, and the membership varies from small ones (e.g., 20–30 members) to ones with more than 100 members. Development societies are based on the beneficiary groups formed by each PFI; therefore, the members are the customers (beneficiary groups) of the same PFI. They are registered in accordance with the Societies Ordinance of Sri Lanka, and the members all hold shares. By the end of December 2017, 1,062 development societies had been formed.

The activities of the development societies established in the project vary. What is common among them is saving and internal lending within the society. As happened in the beneficiary groups, the development societies collect a certain amount of money from the members regularly, and, using the saving as capital, they lend to the members (and sometimes to non-members), setting interest rates, repayment periods, and ceiling amounts for the credit. For one particular development society, the ceiling amount for the first loan is SLR 5,000/month with a 4% monthly interest rate. For successive loans, the amount is gradually increased. Several development societies that have built a track record on saving and other activities have taken bulk loans, leveraging products such as the Mithuru scheme as described in subsequent section. A bulk loan is a form of credit financial institutions provide to organizations, like development societies, that have multiple customers, and on-lending to the customer is entrusted to the organization.

In the operation of bulk loans, development societies are serving as small development banks in the villages. In Sri Lanka, this type of village banking formation and success have a long history. The most famous model is perhaps the Women's Development Federation (WDF) in Hambantota. The WDF has amalgamated women's groups, which were formed by a poverty-eradication program (Janasaviya) implemented in the past, at the village level and established a bank outlet, the Janashakthi Bank Society, in each target village. Each bank society has a dozen to hundreds of customers as members. In the WDF model, as in the development societies of the project, the members hold shares in the WDF. Moreover, the

WDF provides not only financial services but also occupational training, awareness programs, and social welfare.

The maturity levels of the development societies vary, and they were established at different times. Thus, not all the development societies follow the WDF model. Some of the development societies of the project were established simultaneously with the beneficiary groups. Because the formation of the societies took place hurriedly, not all the members necessarily recognize their objectives, and some of the societies' activities have dwindled. On the other hand, the societies whose members understand their objectives and importance and have a strong track record have a clear vision to develop into village-level financial institutions, as the WDF did.

In addition, some of the development societies are providing services such as funeral funds and financial assistance for emergencies as social welfare to their members. To strengthen the members' cohesiveness and attract new membership, some of them are organizing cultural events in the village. Others are marketing agricultural produce. Members of a development society in Jaffna have taken up food processing and are using the interest income from internal lending to build a processing center.

The development societies are beneficial to not only the beneficiary members but also the PFIs. By providing bulk loans through the societies, PFIs can reduce the administrative procedures which would otherwise be required when they directly lend to a large number of individuals. They can also introduce new products through the development societies.

Mithuru Scheme

By participating in the project, the BOC (a PFI) saw great potential in microfinance. Considering that the project will end one day, the BOC has been operating a microfinance product called the Mithuru scheme since 2013 using its own funds. Mithuru has been lending to both the individual members of the Mithuru development society and the societies, basically using the same conditions as those of the project. As of March 2018, credit had been provided under the following conditions:

- Interest rate: 10%/annum
- Credit Limit

	Society members	Society
First loan	SLR 100,000	SLR 500,000
Second loan	SLR 200,000	SLR 750,000
Third loan	SLR 300,000	SLR 1,000,000
Fourth loan	SLR 500,000	-

- Repayment period: Up to 36 months for society members with loan amount less than

SLR 200,000. Up to 60 months for society members with loan amount SLR 200,000 and above and for the societies.

The project targeted 14 poor districts in the country, but the Mithuru scheme is targeting across the whole country. From the beginning of the scheme's operation to December 2017, 444 development societies were formed[1]. In 2017, credit of SLR 237 million was provided. Bulk loans to the development societies are given based on a performance assessment of the society. The assessment is based on the frequency of society meetings, saving amounts, the record keeping of various books, and an audit.

The Mithuru scheme is the BOC's corporate social responsibility. To provide low-interest credit, as was done in the project, when all the capital comes from the bank's own funds, a strong commitment from the institution is required. People who had worked as BOC field officers and at BOC branches and headquarters were interviewed. The interviews indicated that BOC management understood the potential of microfinance and had a strong commitment from the beginning of the project. The BOC had experience of microfinance before the project began, but, by taking part in the project and assisting in beneficiaries' capacity development and responding carefully to their needs, the importance of the "Credit Plus" concept has infiltrated in BOC. Therefore, like the project, Mithuru scheme provides occupational training and other leadership-related training.

As described in the main text of the evaluation report, the demand for microfinance in Sri Lanka remains high, and many of the project beneficiaries still require a similar scheme. The Mithuru scheme, an unexpected ripple effect of the project, is a good response to such demand.

[1] Includes the development societies established as BOC customers in the project.

Democratic Socialist Republic of Sri Lanka

FY2017 Ex-Post Evaluation of Japanese ODA Loan

"Water Sector Development Project and Water Sector Development Project (II)"

External Evaluator: Tsuyoshi Ito, IC Net Limited

0. Summary

As the population of Sri Lanka increases, the Water Sector Development Project and Water Sector Development Project (II) were implemented in Greater Colombo and Greater Kandy in order to accommodate the ever-rising demand for water. The objectives of these two projects are to provide water for domestic use in a safe and stable manner by installing and expanding water supply equipment, thereby contributing to improving the residential environment in the target regions. There were no changes to Sri Lanka's national plans related to water supply and sewage both at the time of the appraisal and the ex-post evaluation; thus, these were acknowledged as being consistent with development policies and priority issues. From the perspective of consistency with development needs, at the time of the appraisal it was acknowledged that it was necessary to accommodate the increasing demand for water, while at the time of the ex-post evaluation it was acknowledged that it was necessary to reduce the non-revenue water rate in Colombo, as well as needs for expanding distribution networks, reducing the non-revenue water rate, and improving the sewage system in Kandy. The projects are also consistent with Japan's assistance policy and their relevance is high. Moreover, the projects added outputs by using the surplus with the project costs generated from fluctuations in the exchange rate. The project costs were lower than planned, but there were considerable overruns in the project period attributable to problems with implementation management. Therefore, the efficiency of the projects is fair. The majority of the indicators for operational effectiveness that denote project effectiveness were achieved. While the extent to which impacts such as improvements to the residential environment and sanitation and health were achieved is not necessarily clear, other positive impacts were observed. Therefore, the effectiveness and impacts of the projects are high. While there were no major problems with the institutional and technical aspects of operation and maintenance, or the status of operation and maintenance, there have been delays in setting the rate structure designed to improve the financial aspects. Therefore, the sustainability of the projects is fair.

In light of the above, these projects are evaluated to be satisfactory.

1. Project Description

Project locations

Kadana water treatment plant

1.1 Background

In 2005, 78% of Sri Lanka's total population had access to safe drinking water through wells, surface water, and similar sources. However, the water supply coverage rate remained at the low level of 30%. In addition, as the country's population has risen year by year the demand for water has rapidly increased, as evidenced by the fact that the water consumption of 148 million m^3 throughout Sri Lanka as a whole in 1995 had risen to 247 million m^3 by 2005. In Greater Colombo in particular, the coverage rate had reached 58%, a high level compared with that in other regions. However, at the time 1.6 million people of the region's population of 3.7 million people were unable to access this water supply. In Greater Kandy, only 300,000 people were able to access the water supply in 2001, but by 2006 this had risen to 600,000 people, with the coverage rate improving from 27% to 56%. However, the population of Greater Kandy was 1.1 million people in 2006, 1.3 million people in 2010, and is expected to rise to 1.6 million people by 2020. The region's existing facilities for supplying water was unable to keep pace with this growth, and there was an urgent need to close the gap between supply and demand.

Even in those regions that had water supply coverage, it was not considered that an adequate amount of water was being supplied. For example, there were a number of regions that only had one to two hours of water supply per day due to reasons such as a lack of capacity with the water treatment plant facilities, shortage of water pumps, and the deterioration of the facilities.

Given such conditions, the Water Sector Development Project (hereafter referred to as "Project I") and the Water Sector Development Project (II) (hereafter referred to as "Project II") were implemented and managed with their own respective objectives. Thus, they were evaluated individually with regard to their efficiency and effectiveness. With regard to the rating results, they were assessed by combining the two projects together.

1.2 Project Outline

The objective of Project I is to provide safe water for domestic use in a stable manner in Greater Colombo and Greater Kandy by installing and expanding water supply equipment, thereby contributing to improving the residential environment in these regions. The objective of Project II is to provide water for domestic use in a safe and stable manner in Grater Colombo by improving and expanding a water supply system along the Kalu Ganga River water system as well as reducing non-revenue water within the city of Colombo, including in tenement gardens (low-income localities), thereby contributing to improving the residential environment within said region.

Loan Approved Amount / Disbursed Amount	Project I: 13,231 million yen / 13,217 million yen Project II: 8,388 million yen / 8,269 million yen	
Exchange of Notes Date / Loan Agreement Signing Date	Project I: March 23, 2007 / March 28, 2007 Project II: June 24, 2008 / July 29, 2008	
Terms and Conditions	Interest Rate	Project I: 1.5% Project II: 1.4% Consulting service: 0.01%
	Repayment Period (Grace Period)	30 years (10 years)
	Conditions for Procurement	General Untied
Borrower/Executing Agency	Government of the Democratic Socialist Republic of Sri Lanka / National Water Supply and Drainage Board (NWSDB)	
Project Completion	Project I: December 2015 Project II: August 2016	
Main Contractors (Over 1 billion yen)	Project I: NCC Ltd. (India) / Sierra Construction Limited (Sri Lanka) (JV), Maga Engineering (PVT) Ltd. (Sri Lanka), China Geo Engineering Corporation (China) Project II: NCC Ltd. (India), Salcon Engineering BHD (Malaysia)	
Main Consultants (Over 1 billion yen)	Project I: Nihon Suido Consultants Co., Ltd. (Japan), NJS Consultants Co., Ltd. (Japan), Nihon Suido Consultants Co., Ltd.(Japan) / NJS Consultants Co., Ltd.(Japan) / Ceywater Consultants (PVT) Ltd. (Sri Lanka) / Nippon Koei UK Co. Ltd. (UK) (JV) Project II: Nihon Suido Consultants Co., Ltd. (Japan) / NJS Consultants Co., Ltd. (Japan) / Ceywater Consultants (PVT) Ltd. (Sri Lanka) (JV)	
Related Studies (Feasibility Studies, etc.)	Project I: Project Formation Study (April 2006) Project II: Project Formation Study (October 1996)	
Related Projects	Japanese ODA Loans	

	Towns East of Colombo Water Supply Project (1990), Greater Colombo Water Supply System Extension Project (Coverage of the Southern Urban Areas) (1993), Towns North of Colombo Water Supply Project (1996), Kalu Ganga Water Supply Project for Greater Colombo (1997), Project for Reduction of Non-Revenue Water (1999), Greater Kandy Water Supply Project (2001)

2. Outline of the Evaluation Study

2.1 External Evaluator

Tsuyoshi Ito, IC Net Limited

2.2 Duration of Evaluation Study

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

Duration of the Study: October 2017–January 2019

Duration of the Field Studies: February 19–March 15, 2018 / May 21–June 6, 2018

3. Results of the Evaluation (Overall Rating: B[1])

3.1 Relevance (Rating: ③[2])

3.1.1 Consistency with the Development Plan of Sri Lanka

In 2002, the Government of Sri Lanka formulated its National Policy of Water Supply and Sanitation as part of its initiatives to reduce poverty, in which it set forth the objectives of ensuring access to safe water for the entire population and installing adequate sewage treatment facilities. Based on the Millennium Development Goals, Sri Lanka set a target of "ensuring access to safe water for 85% of the population by 2010, and for 100% of the population by 2025." It also aimed to set in place water supply for 100% of its urban areas and 75% of its rural areas by 2010. What is more, the Corporate Plan (2007–2011) enacted by the National Water Supply and Drainage Board (NWSDB), which is the executing agency, in 2007 made it a goal to reduce the non-revenue water rate within the city of Colombo, which had been 34% at the time, down to 1% per year. With respect to sewage development, it set forth a plan to connect 70% of Sri Lanka's total population to sewage (including onsite treatment) by 2010, and achieving 100% coverage by 2025.

The National Policy of Water Supply and Sanitation (2016–2020) confirmed at the time of the ex-post evaluation set forth a number of targets. These include the following: (1) 100% access to safe water, (2) 60% water supply via water distribution pipes, (3) reducing non-revenue water in Colombo to 20%, and (4) 7% sewage treatment rate via sewage development in urban areas.

[1] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[2] (3): High, (2): Fair, (1): Low

Furthermore, the latest version of the NWSDB's Corporate Plan (2016–2020) set forth the targets of expanding water coverage (including achieving a water supply coverage rate of 60% by 2020), reducing the non-revenue water rate, and improving project efficiency through the introduction of ICT based on the National Policy of Water Supply and Sanitation.

In this manner, the orientation of Sri Lanka's national plans related to water supply and sewage and the NWSDB's Corporate Plans have remained unchanged from the time of the appraisal through to the time of the ex-post evaluation. Thus, the projects are consistent with development policies and priority issues.

3.1.2 Consistency with the Development Needs of Sri Lanka

Whereas the coverage rate in Greater Colombo had been down at 58% as of 2005, the demand for water has been trending upward since that time as a result of the increase in the population. However, some districts had only six hours of water supply per day. In Greater Kandy, the coverage rate as of 2001 was low at 27%, with the sewage coverage rate not even reaching 3% (2005). Just like with Greater Colombo, the demand for water continued to rise in Greater Kandy as a result of the increasing population, and along with the increase of sewage volume, the degradation of living environments and the contamination of rivers proceeded apace.

Inquiries to the NWSDB at the time of the ex-post evaluation revealed that the coverage rate for Colombo had already reached 92% by 2013 and 97% by 2017. However, it had not brought the non-revenue water rate down to its target of 20%, as this was still 38% in 2013 and 34% in 2017. In Colombo, there is a greater need to reduce the non-revenue water rate through rehabilitation and the like, more so than there is for extending the distribution network. Similarly, according to the NWSDB the coverage rate in Kandy was 46% in 2013 and 59% in 2017, while its non-revenue water rate was 39% in 2013 and 26% in 2017. Thus, it is necessary to both extend the distribution network and decrease the non-revenue water rate. The sewage coverage rate in Kandy is currently sitting at 0%, indicating an ongoing need for sewage development.

As indicated above, at the time of the appraisal it was necessary for the country to accommodate its increasing demand for water. At the time of the ex-post evaluation, there was ongoing recognition of the need to reduce the rate of people without access to water in Colombo, and the need to extend distribution networks, reduce the non-revenue water rate, and improve the sewage system in Kandy. Therefore, these projects are consistent with these sorts of development needs.

3.1.3 Consistency with Japan's ODA Policy

Japan's Country Assistance Policy for Sri Lanka (2004) set forth "institutional reform and

assistance for improving the country's economic foundations" as the direction for its assistance. As part of this, developing water supply and sewage for major metropolitan regions were not specified as priority areas. However, the FY 2006 Medium-Term Strategy for Overseas Economic Cooperation for Japanese ODA loans designated "improving the urban environment sector (improving water supply and sewage)" under "improving the investment environment by improving basic infrastructure" as one of its priorities for support for Sri Lanka. From this, it can be seen that these projects were consistent with Japan's ODA policy at the time of the appraisal.

3.1.4 Appropriateness of the Project Plan and Approach

These projects significantly overran their project periods. The details for this will be described later in the section on efficiency. The delays in project implementation were attributable to problems with implementation management and additions to the project scope, not to deficiencies in the project plans.

With Project II, revisions to the master plan related to supplying water in Western Province were carried out, so Project I was implemented ahead of this. Project I was planned based on the master plan before the plan underwent these revisions, but it was acknowledged that it was necessary to revise the master plan during the implementation of Project I. No particular inconsistencies were acknowledged with this.

These projects are consistent with Sri Lanka's development plans and development needs, as well as with Japan's ODA policy. It cannot be claimed that the delays with the project implementation were due to deficiencies with the plan. Rather, water supply improvements for Greater Colombo situated in Western Province were included in Project I; thus, ideally, the revisions to the master plan should have been carried out through Project I. The need to do so was acknowledged in the middle of Project I, meaning there were no problems with relevance of the plan and the approach. Therefore, the relevance of implementing these projects is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

These projects consisted of a number of elements. For Project I, these include the following: (1) Greater Kandy Water Supply Project (GKWSP), (2) Greater Colombo Water System Rehabilitation Project (GCWRP), (3) Towns North of Colombo Water Supply Project (TNCWSP), (4) Greater Kandy Waste Water Disposal Project, and (5) strengthening organizations, while Project II consisted of: (1) Kalu Ganga Water Supply Project (KGWSP), (2) countermeasures against non-revenue water, and (3) consulting services. Table 1 shows both the planned and actual outputs from these projects.

Table 1: Output Comparison Table

Plan	Actual
<u>Greater Kandy Water Supply Project (GKWSP)</u> - Newly install 15 reservoirs - Newly install 6 pump stations - Install 11 pump sets - 26.4 km of water distribution pipes - 105.1 km of water supply pipes - Construction work to prevent non-revenue water: 200 km - Consulting services (detailed design, bid tendering assistance, construction supervision assistance)	<u>Greater Kandy Water Supply Project (GKWSP)</u> - Newly installed 8 reservoirs - Newly installed 5 pump stations - Installed 11 pump sets - 27.7 km of water distribution pipes - 73.9 km water supply pipes - Consulting services (detailed design, bid tendering assistance, construction supervision assistance) - Additional outputs from the surplus (1 sedimentation tank, 2 water tanks, 1 pump shed, 3 pumps, 10.85 km of water distribution pipes, 21.7 km of water supply pipes)
<u>Greater Colombo Water System Rehabilitation Project (GCWRP)</u> - New installation of and repairs to reservoirs in Central Greater Colombo (newly install 1 reservoir, repair 1 reservoir, 1 management office) - Repair and extend the water supply system in Kotikawatta – Mulleriyawa (newly install 1 pump station, 4.4 km of water distribution pipes, 40 km of water supply pipes, 1 reservoir, 1 water tower, 1 pump shed) - Improve the living environment in the tenement gardens (connect 900 households to water supply) - Consulting services (bid tendering assistance, construction supervision assistance)	<u>Greater Colombo Water System Rehabilitation Project (GCWRP)</u> - New installation of and repairs to reservoirs in Central Greater Colombo (newly installed 2 reservoirs and built 1 management office) - Repaired and extended the water supply system in Kotikawatta – Mulleriyawa (46.1 km of water supply pipes, 1 water tower) - Consulting services (bid tendering assistance, construction supervision assistance)
<u>Towns North of Colombo Water Supply Project (TNCWSP)</u> - 2 reservoirs - Repair 1 reservoir - 2 pump sheds - 8 pump operating rooms - Pump station electrical equipment (for 6 pump stations) - Water supply pipes: 571 km - 1 management office - Consulting services (bid tendering assistance, construction supervision assistance)	<u>Towns North of Colombo Water Supply Project (TNCWSP)</u> - 2 reservoirs - Repaired 1 reservoir - 2 pump sheds - 6 pump operating rooms - Pump station electrical equipment (for 6 pump stations) - Water supply pipes: 1,700 km - Built 5 management office - Consulting services (bid tendering assistance, construction supervision assistance) - Additional outputs from the surplus (1 RSC office building, 4 district engineer office buildings, 1 water tank, 22.3 km of water

	supply pipes, replaced connecting pipes, spare water supply pipes, and office and vehicle equipment)
Greater Kandy Waste Water Disposal Project - Consulting services for the basic design, bid tendering assistance, and improving capacity	Greater Kandy Waste Water Disposal Project - Consulting services for the basic design, bid tendering assistance, and improving capacity
Strengthening organizations - Consulting services for capacity building	Strengthening organizations - Consulting services for capacity building
Kalu Ganga Water Supply Project (KGWSP) - Build 1 water treatment plant in Kadana (treatment capacity of 60,000 m^3/day, chemical clarification / rapid filtration method) - 14.5 km of water distribution pipes between Bandaragama and Piliyandala - 1 reservoir and 1 pump shed in Piliyandala - 1 reservoir and 1pump shed in Moratuwa - 320.65 km of water supply pipes (Kesbewa, Boralesgamuwa, Gonapoloa, Polgasowita, Ingiriya, Handapangoda, Diyagama, Piliyandala, Panadura East, and Magammana) - Consulting services (bid tendering assistance, construction supervision assistance)	Kalu Ganga Water Supply Project (KGWSP) - Built 1 water treatment plant in Kadana (treatment capacity of 60,000 m^3/day, chemical clarification / rapid filtration method) - 21.0 km of water distribution pipes between Bandaragama and Piliyandala - 3 water towers in Kesbewa, Jumburaliya, and Kumbuka - 250 km of water supply pipes (Kesbewa, Jumburaliya, Piliyandala, Miriswatta, Koralaima, Gonapoloa, Kumbuka, Panadura East) - Consulting services (bid tendering assistance, construction supervision assistance)
Countermeasures against non-revenue water - Replace 120 km of water supply pipes in CBI District and Colombo 02 District - Improve pipes in order to connect to water supply pipe networks and water supply pipe mains in CBI District and Colombo 02 District (private connections for 2,000 households[3])	Countermeasures against non-revenue water - Replaced 56.5 km of water supply pipes in CBI District - Improved pipes in order to connect to water supply pipe networks and water supply pipe mains in CBI District and Colombo 02 District (private connections for 2,000 households) - Additional outputs from the surplus (1 water supply tower, laid 212 km of water distribution pipes, rehabilitated 25 km of water supply pipes, 1 RSC office building, 1 district engineer office)
Consulting services - Bid tendering assistance, construction	Consulting services - Bid tendering assistance, construction

[3] The NWSDB's past actual performance for this was 2,000 households a year (its target was 3,000 households). With these projects, which added on to this, the plan was to connect 1,000 households a year via Japanese ODA loans and have the NWSDB bear the burden for connecting another 500 households, for a planned number of households connected of about 3,500 per year.

supervision assistance - Revise master plan targeting Western Province, which includes Greater Colombo, and prepare F/S report based on revised master plan - Assist in improving the capacity of the NWSDB concerning O&M (assist in improving capacity related to preventive O&M and reducing non-revenue water, procurement of equipment for repairing water meters and leak detection equipment, etc.)	supervision assistance - Revised master plan targeting Western Province, which includes Greater Colombo, and prepared F/S report based on revised master plan - Assisted in improving the capacity of the NWSDB concerning O&M (assisted in improving capacity related to preventive O&M and reducing non-revenue water, procurement of equipment for repairing water meters and leak detection equipment, etc.)

Sources: Documents provided by JICA, Project Completion Report (PCR)

After the projects began, the rate of inflation was higher than had been anticipated at the time of the appraisal. As a result, from early on in the implementation stage the plans for the GKWSP and GCWRP were curtailed. However, the rate of inflation returned to normal later on which, together with fluctuations in the exchange rate, resulted in a surplus arising in the project costs. Therefore, in the latter half of the implementation stage this surplus was used to add additional outputs for the GKWSP and TNCWSP. These were examined in line with the objectives of both of these projects, and instituted within the scope of the initial budget with the consent of both the executing agency and JICA. As will be discussed later on, because the envisioned project results were achieved, it can be judged that there were no problems with the changes in outputs.

For Project II, the plan at the time of the appraisal was to use Japanese ODA loans for the task of installing private connections for 1,000 households a year. The NWSDB had planned to provide connections for 2,500 households per year in addition to this. Thus, it was anticipated that the total number of households that would be connected each year would come to 3,500. This target of 3,500 households exceeded the 3,000 households found in the annual plans of the NWSDB to that point. As the actual work of installing these private connections was carried out without any problems, it is fair to say that there were no problems with the setting of this project target.

In addition, at the time of the appraisal, the supplier of the water supply pipes and the contractor for pipe laying works were different, so it had been pointed out that coordination for the procurement package was a point that should be kept in mind for the implementation to ensure that this was performed smoothly. This difference between the water supply pipe supplier and laying contractor did not cause any problems such as implementation delays or the like.

3.2.2 Project Inputs

3.2.2.1 Project Costs

In the plan for Project I, the total project costs were to be 17,644 million yen, of which 13,231

million yen was to be covered by Japanese ODA loans. In actuality, this came to 14,228 million yen, with the total disbursement amount from Japanese ODA loans coming to 13,217 million yen. In the plan for Project II, the total project costs were to be 10,846 million yen, of which 8,388 million yen was to be covered by Japanese ODA loans. In actuality, this came to 9,784 million yen, of which the total loan disbursement amount came to 8,269 million yen. A comparison of the planned and actual project costs is shown in the table below. The project costs were lower than planned.

Table 2: Project Costs

		Plan	Actual
Project I	Total project costs	17,644 million yen	14,228 million yen
	Japanese ODA loan	13,231 million yen	13,217 million yen
Project II	Total project costs	10,846 million yen	9,784 million yen
	Japanese ODA loan	8,388 million yen	8,269 million yen

Sources: Documents provided by JICA, NWSDB

The Japanese ODA loan portion of the project costs were largely as planned at 99% for both Projects I and II. The total project costs for both Project I and Project II were lower than planned at 81% and 90% of the plan, respectively.

3.2.2.2 Project Period

The planned and actual project periods for both Projects I and II are shown in Table 3. The defined completion point for Project I was the expiration of the warranty period for the public works, while that for Project II was the end of the construction work. Compared with the plan, the project periods suffered substantial overruns of 154% over for Project I and 233% over for Project II.

Table 3: Project Period

	Plan	Actual
Project I	March 2007–September 2012 (5 years and 7 months, or 67 months)	June 2007–December 2015 (8 years and 7 months, or 103 months)
Project II	July 2008–December 2011 (3 years and 6 months, or 42 months)	July 2008–August 2016 (8 years and 2 months, or 98 months)

Source: Documents provided by JICA, PCR

The overruns in the project implementation can be summarized as follows for each of the components.

(1) Towns North of Colombo Water Supply Project (TNCWSP): The project proceeded largely as planned up through the selection of contractors and procurement, but delays of approximately one year arose in some of the sub-components during the implementation stage. Major factors behind these delays in construction included the time it took to be issued construction permits from the Road Development Authority (RDA) and the emergence of managerial deficiencies (financing difficulties and worker shortage) on the part of the construction contractors for the additional sub-components through the use of the surplus.

(2) Greater Colombo Water System Rehabilitation Project (GCWRP): The project went largely as planned up through the selection of contractors and procurement, but delays of about one year arose due to the time required to respond once bedrock and soft ground were unexpectedly encountered during the reservoir construction stage. Delays partially arose due to a lack of capacity on the part of the construction contractors (the allocation of funds and human resources as a result of implementing multiple projects proved problematic).

(3) Greater Kandy Water Supply Project (GKWSP): The project went largely as planned up through the selection of contractors and procurement, but substantial delays of four years arose during the implementation stage. This was partially due to managerial deficiencies on the part of the construction contractors, but largely attributable to the implementation of the additional sub-components through the use of the surplus. They seem to be more of extensions of the implementation period rather than delays.

(4) Greater Kandy Waste Water Disposal Project: Delays arose in the procedures for selecting the contractors. Afterwards, following the completion of the basic design in the implementation stage, demands to change the specifications arose and substantial delays occurred before the project was completed on account of the changes made to the design.

(5) Kalu Ganga Water Supply Project (KGWSP): Delays of approximately one year occurred in the design consultant selection stage (on the Japanese side). Because there were no acceptable contractors during the construction contractor advance review stage, the conditions were reassessed and another review was performed, which caused the delays. In addition to delays caused by bad weather during the implementation stage, further delays occurred as a result of a lack of capacity on the part of the construction contractors (input delays).

(6) Countermeasures against non-revenue water: In the implementation stage, substantial delays arose as a result of partial capacity shortfalls on the part of the contractors (depletion of funds) and other such factors.

As this indicates, there is a sense in which the project period grew longer as a result of adding to the scope by using the surplus with the project costs generated from the depreciation of the

yen. However, one major factor in this is owing to the delays caused by problems with implementation management. The project period exceeded the plan, and the time efficiency of the projects has been deemed to be low.

3.2.3 Results of Calculations for Internal Rates of Return (Reference Only)

For internal rate of return, Financial Internal Rate of Return (FIRR) and Economic Internal Rate of Return (EIRR) were calculated at the time of the appraisal for GKWSP and TNCWSP of Project I and for Project II. The internal rate of return and assumptions for each project at the time of the appraisal are as follow.

1) GKWSP

FIRR: 8.1%	EIRR: 19.5%
Cost: Project cost and operation and maintenance cost	Cost: Project cost (exclusive of tax) and operation and maintenance cost
Benefit: Income from water fee	Benefit: Willingness to pay

2) TNCWSP

FIRR: 7.6%	EIRR: 9.5%
Cost: Project cost and operation and maintenance cost	Cost: Project cost (exclusive of tax) and operation and maintenance cost
Benefit: Income from water fee	Benefit: Willingness to pay

3) Project II

FIRR: 5.0%	EIRR: 12.4%
Cost: Project cost and operation and maintenance cost	Cost: Project cost (exclusive of land acquisition cost and tax) and operation and maintenance cost
Benefit: Income from water fee	Benefit: Willingness to pay

While FIRR was recalculated at the time of the ex-post evaluation for GKWSP, as required data were obtained, it was 14.6%. The rate is higher than it was estimated at the time of the appraisal, one of the reasons is because the amount of water supplied, which is used in calculating the income from water fee (the benefit), includes the amount of water supplied by the same water treatment plan even before the project. Therefore, the figure cannot be considered as FIRR of the GKWSP. For TNCWSP and Project II, detail data on benefit could not be confirmed and thus, internal rate of returns were not recalculated.

The project costs were lower than planned, but the project period significantly exceeded the plan. This was primarily due to problems in the implementation stage, including delays in obtaining construction permits, deficiencies in process management due to a lack of managerial capacity on the part of the outsourcing contractors, as well as the changes to the specifications during the latter half of the implementation stage. Therefore, the efficiency of the projects is

fair.

3.3 Effectiveness / Impact[4] (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Qualitative Effects (Operation and Effect Indicators)

The baseline, target, and actual figures at the time of the appraisal for the projects' operation and effect indicators have been summarized in the table below.

Table 4: Operation and Effect Indicators

(1) Greater Kandy Water Supply Project (GKWSP)					
	Baseline	Target	Actual		
	2005	2012	2015	2016	2017
		Time of Completion	Completion Year	1 Year After Completion	2 Years After Completion
Total population served (people)	325,000	511,000	595,000	628,000	664,000
Hours of water supply (hours/day)	0-12	24	24	24	24
Amount of water supply (m^3/day)	36,500	48,000	102,800	107,700	117,500
Water supply coverage rate (%)	46	56	79.3	83.8	88.5
(2) Towns North of Colombo Water Supply Project (TNCWSP)					
	Baseline	Target	Actual		
	2005	2012	2015	2016	2017
		Time of Completion	Completion Year	1 Year After Completion	2 Years After Completion
Total population served (people)	47,800	153,300	681,900	-	732,900
Amount of water supply (m^3/day)	10,100	54,000	151,000	-	163,000
Water supply coverage rate (%)	9	28	69	-	73
(3) Greater Colombo Water System Rehabilitation Project (GCWRP)					
	Baseline	Target	Actual		

[4] The rating for this is performed by factoring the impacts in with the determination of project effectiveness.

	2005	2012	2014	2015	2017[Note 1]
		Time of Completion	Completion Year	1 Year After Completion	2 Years After Completion
Total population served (people)	68,000	124,000	-	-	150,000
Hours of water supply (hours/day)	6-18	20-22	-	-	24
Amount of water supply (m^3/day)	11,600	13,600	-	-	-
Water supply coverage rate (%)	60	100	-	-	100

(4) Water Sector Development Project (II)

	Baseline	Target	Actual		
	2007	2013	2016	2017	2018
		2 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion
Total population served (people)[Note 2]	344,200	490,600	637,200	683,000	
Amount of water supply (m^3/day)	—	48,000	-	94,300	
Number of houses connected (houses)[Note 2]	63,600	110,600	-	169,000	
Non-revenue water rate (%)[Note 3]	52.7	37.9	-	43.0	
Utilization rate of water treatment plant (daily average) (%)	—	80	95	105	
Number of increased connections in tenement gardens (houses)[Note 4]	—	3,000	-	3,000	

Source: Documents provided by JICA and the executing agency, etc.
Note 1: Since there were no actual values for 2016, which was the second year following the completion of the project, the actual values for 2017 were listed instead.
Note 2: The figures include the facilities from the Kalu Ganga Water Supply Project for Greater Colombo (Kalu Ganga River Phase I, Stage I).
Note 3: Figures for the entire city of Colombo.
Note 4: Targets all households that reside in the tenement gardens of the target regions for the component of reducing non-revenue water (the CBI District and Colombo 02 District within Colombo City).

For the confirmations based on the evaluation indicators, some of the data could not be obtained, but for those indicators in which the actuals were confirmed, the targets were achieved for all of them. Although the target year was project completion for the indicators of Project I, the results showed that the targets had been maintained up to the time of the ex-post evaluation.

Furthermore, in Sri Lanka, the necessity to respond to non-revenue water was recognized from the time of the project appraisal. Particularly in Colombo, the needs for reducing the non-revenue water through rehabilitation was higher than expansion of the supply networks; however, rate of non-revenue water was not used as an indicator for GCWRP. Considering that the Corporate Plan of NWSDB at the time of the appraisal had reducing non-revenue water as one of the targets, it would have been desirable to incorporate the rate of non-revenue water as an indicator for the project.

In addition to the operation and effect indicators, the water supplied by the Kalu Ganga River water treatment plant (Kadana water treatment plant) was compared against Sri Lanka's water quality standards to confirm the extent to which these projects have given rise to and maintained their effects. As a result of confirming this with the executing agency at the time of the ex-post evaluation, the water quality of the Kalu Ganga River water treatment plant was in conformance with Sri Lanka's national water quality standards for drinking water. Furthermore, the following items were confirmed regarding the effects of strengthening the capacity of the executing agency that was carried out through the consulting services: (1) Extent to which the basic design for the Greater Kandy sewer system was used, (2) Extent to which NWSDB's management plan was utilized and entrenched, (3) Extent to which the revised master plan was used, and (4) NWSDB's status of operation and maintenance. The confirmation performed at the time of the ex-post evaluation found that (1) had entered the implementation stage as Kandy City Wastewater Management Project under ODA loan at the time of the ex-post evaluation, and that the basic design drafted through these projects was being used. From the NWSDB's management plan (consisting of financial affairs, a management structure, investments, and a rate structure) from (2), the management structure and investments are being used. It was learned that while a request to revise the rate structure was made to the Government of Sri Lanka, this has not been approved and therefore has not led to improving the NWSDB's financial affairs. However, this is seen as a delay in approval due to political ramifications. As for the revised master plan from (3), according to the NWSDB this is being used in a full-scale manner. However, because it took time from the planning until the implementation was carried out, the project did not end up conforming to the demand predictions. Therefore, the project has not necessarily achieved results when it comes to satisfying demand as had been anticipated by the master plan. Conversely, similar to the setting of rates, the time it took from the request for support pursuant to the master plan through to the implementation of the project was a major factor in not satisfying the demand anticipated by the master plan. As for (4), facility operation

and maintenance plans have been prepared for each of the regional support centers.

While there are problems with the extent to which both the NWSDB's management plan and the revised master plan are being used, it can be said external factors have had a significant impact on this. On the other hand, as can be seen from the degree to which the operation and effect indicators have been achieved, the intended effects have largely been achieved and it was confirmed that these effects had been maintained (or improved) as of the time of the ex-post evaluation. Therefore, the effectiveness of the projects is high.

3.3.1.2 Qualitative Effects (Other Effects)

The qualitative effects mentioned at the time of the appraisal seem to be impacts based on their contents. Thus, they will be listed in the section on impacts.

3.3.2 Impacts

3.3.2.1 Intended Impacts

The intended impacts for both Project I and Project II were to: (1) Improve the residential environment for the local residents and (2) Improve sanitary conditions. In addition to these, Project II had another intended impact given as being to: (3) Improve health conditions. For these sorts of impacts, because the projects have many beneficiaries, it is difficult to get a precise grasp of the extent of their contributions. Therefore, in addition to gathering data from local health care centers, attempts were made to interview the relevant officials from health organizations and the local governments in the target regions, as well as the beneficiaries of the projects.[5]

Data on water-borne illnesses retained by the Department of Health Statistics of the Ministry of Health, Nutrition and Indigenous Medicine and the city halls of both Colombo and Kandy were checked. However, no clear results were observed, such as a decline in infection rates as a result of these projects.

For the interviews with beneficiaries, talks were held with 83 people in Colombo and 18 people in Kandy, as well as 10 people in the target region for the KGWSP (93 men and 18 women). Out of the beneficiaries interviewed, 20 of them (14 men and 6 women) were residents of tenement garden in Colombo[6].

The results of this revealed that only a small number of approximately one-third of the users felt any change (improvement) with respect to either the residential environment, sanitary conditions, or health conditions in the project's target regions. However, among those users who

[5] Initially, the plan had been to conduct group interviews aimed at the water users. However, because of difficulties with selecting participants from among the beneficiaries and the fact that interview venues could not be secured, individual interview surveys were adopted through the use of questionnaire forms.

[6] Other beneficiaries were residents of Central Colombo (34) and North Colombo (29).

received support for connecting their homes to the water supply in the tenement gardens, about half of them indicated that they felt an improvement, revealing a higher tendency to feel this way among the users in tenement gardens than among the total beneficiaries as a whole.

Seen solely from the results of the interviews with beneficiaries, the intended impacts were only achieved to a limited extent. However, the fact that no major difference was seen with regard to ensuring safe water before and after the projects seems to be a major factor behind this. The major objective of these projects was to install and rehabilitate distribution networks, and many of the users already had home connections to the water supply prior to the start of the projects. Therefore, the results of these projects included improvements to the water supply status such as the amount of water supply, the water pressure, and the hours of water supply. It is reasonable to conclude that even though these projects clearly improved convenience, they did not have a sizable impact on the environment, sanitation and health. Furthermore, even in those impoverished regions where people gained home connections to the water supply through these projects, they were able to access the safe water needed for daily life to a certain extent from common faucets prior to the project. While the presumption has been that the projects would give rise to impacts when compared with other regions, it is conceivable that people's assumptions that it would bring about across-the-board improvements to the environment as well as health and sanitation were overblown. Therefore, while it could not be adequately confirmed through this ex-post evaluation that the intended impacts from the time of the planning were achieved, it seems premature to determine that there was no impacts.

3.3.2.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

Both Project I and Project II were classified under Category B based on the Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Consideration (2002). The executing agency decided to conduct monitoring of the air quality, water quality, noise, and other factors during the construction to serve as a countermeasure against contamination during the construction work. With respect to the facility design, consideration was given to the operating noise and foul odors from the water treatment plant, pump stations, and other facilities, with the assumption being that the sludge generated at the water treatment plant would be disposed of via landfill disposal or the like.

From the interviews to the NWSDB at the time of the ex-post evaluation, it was learned that environmental monitoring was carried out during the construction work based on Sri Lanka's domestic standards. However, existence and results of environmental monitoring plan and results of monitoring during the construction have not been confirmed. No particular consideration was given to noise from the water treatment plant or the pump stations. However, most of the pumps were installed underground in pump sheds, and it was confirmed during the

onsite field studies that noise would not pose a major problem. As for considerations for foul odors, lime treatment was carried out at the water treatment plant in order to reduce the amount of sludge generated, and this is then disposed of at a disposal site within the plant. Thus, this does not affect the residents in the surrounding area.

It was confirmed that there were no other negative impacts on the natural environment either during the construction work or after the completion of projects.

(2) Resettlement and Land Acquisition

When confirmation was made with the NWSDB at the time of the ex-post evaluation, the organization had acquired 8.9 hectares of land for the GKWSP for Project I, as well as 0.4 hectares of land for Project II. The land acquisition was carried out according to the laws of Sri Lanka. Although it took time to carry out the negotiations with the land owners, no problems arose with this. While it was deemed that there would be no need to resettle residents at the time of the appraisal, in actuality two households had to be resettled for the GKWSP. Resettlement locations and new dwellings were secured for both of the households. The resettlement procedures were carried out by referring to JICA's Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Consideration (2002). The costs for the resettlement were provided by the executing agency, and no problems occurred with this.

(3) Other Positive and Negative Impacts

In the plan for Project II at the time of the appraisal, initial connection costs for the private connections in the tenement gardens were set out of consideration for the income level of the poor people living there. In addition, the expectation was that a roughly three-year installment payment scheme would be adopted in these areas.

At the time of the ex-post evaluation, relaxed water rates were set for low-income households. The water rates were structured so that their price per unit would increase according to the amount used. If an ordinary household were to use between zero and five units in a single month, then it would be charged 12 rupees per unit as the lowest rate for them. Conversely, even if residents of the tenement gardens were to use the same number of units as an ordinary household, their rate would be set at only five rupees. From the interviews with the beneficiaries performed at the time of the ex-post evaluation for the projects, it was learned that relaxed rates had been set in relation to the installation of water distribution pipes and meters related to the initial connection costs. From the results of the qualitative study as well, it was learned that many held the view that it was not difficult to make the payments.

Regarding other positive impacts, many voiced the opinion that the projects improved the living environment for women, particularly in the tenement gardens, such as by reducing the chore of drawing water performed by women and improving privacy protections for them

(doing laundry and using the toilet at home). In addition, a laboratory on water supply-related materials for Kandy that these projects supported the launch carried out quality inspections and training for the water supply pipes, which led to the establishment of quality standards for the materials. This can also be mentioned as a positive impact. In addition, these projects experienced difficulties over and over again with the selection of construction contractors (in that contractors with limited implementation capacity were selected). To address this problem, the method for calculating hypothetical estimated costs on the side of placing the orders were revised in order to make it possible to select contracts on the basis of estimates that were reasonable in a technical sense, rather than simply selecting the cheapest bid tenderer. Based on this, hypothetical estimate guidelines were created.

No problems arose with beneficiaries bearing the initial costs as a result of the setting of the relaxed rates for the tenement gardens (initial costs, water usage rates). At the same time, other outcomes that were affirmed included the gender-related impact in the tenement gardens, the standardization of water supply-related materials, and the impact on improving procurement operations through the lessons learned from the projects.

As for the effectiveness of the projects, while some data could not be obtained, the targets were achieved for most of the indicators and the effects were being maintained or improved upon at the time of the ex-post evaluation. Regarding the impacts, it could not necessarily be clearly confirmed that the intended impacts had been achieved. However, much of the project content served to improve the water supply systems in regions that were already being supplied with water. When this fact is taken into consideration, it would be difficult to logically expect improvements in both an environmental and health sense from the projects (residential environment, sanitary conditions, and health conditions). On the other hand, reasonable, relevant spillover effects from the projects were confirmed, such as the impact on women in the tenement gardens and the standardization of water supply-related materials. These can be duly acknowledged as impacts of these projects. Given the above, the implementation of these projects has been observed as having produced effects largely as planned. Therefore, the effectiveness and impact of the projects are high.

3.4 Sustainability (Rating: ②)

3.4.1 Institutional Aspects of Operation and Maintenance

At the time of the appraisal, it was decided that the NWSDB, as the executing agency, would carry out operation and maintenance for the projects. The NWSDB was established in 1975 on the legal grounds provided by the National Water Supply and Drainage Board Law No. 2 of 1974. It has been charged with installing water supply and sewage systems, as well as their operation and maintenance, in Sri Lanka as a whole (excluding facilities owned by municipal governments). As of 2005, it had approximately 8,000 staff members. The NWSDB has

Regional Support Centers (RSCs) in different areas, and these RSCs were put in charge of operation and maintenance following the completion of the projects. The plan was to have the operation and maintenance authorities of RSC Greater Colombo assume responsibility for the facilities of Greater Colombo, and the operation and maintenance authorities of RSC Central assume responsibility for the Greater Kandy facilities. However, because the city of Kandy owns the reservoirs and water distribution and water supply pipes within Kandy, the Water Works Department of the Kandy Municipal Council (KMC) was to carry out operation and maintenance for these, as well as billing and collection of water fees. Outside the KMC area, the water supply facilities were to be maintained by NWSDB.

When this was confirmed at the time of the ex-post evaluation, there had been no changes from the plan at the time of the appraisal regarding the agency in charge of operation and maintenance. Practical operation and maintenance is carried out by each RSC, with each RSC equipped with a structure for dividing up duties and reporting. Compared with staff quota in each RSC, there is no shortage of personnel. As an example, both RSC Western Central and RSC Western North suffer from vacancies to the point that they are down around 4% of their staff quota. However, as its service area expands, RSC Western Central is considering increasing its current staff of 1,422 people to 1,804 people. As this indicates, the operation and maintenance divisions lack the staff commensurate with the increase in their tasks; thus, they are handling this by outsourcing some of their operation and maintenance tasks. While personnel shortages have arisen at the RSCs, they are handling this by outsourcing their tasks. Therefore, it is fair to say that there are no problems regarding the number of personnel and that an operation and maintenance structure has been set in place.

3.4.2 Technical Aspects of Operation and Maintenance

The NWSDB has previously implemented numerous projects from aid agencies, including Japan's. Thus, it had sufficient experience with project implementation. Because its technical skills would be supplemented by the consulting services through these projects, at the time of the appraisal, it was deemed to be endowed with technical capabilities regarding operation and maintenance for both water supply and sewage.

From the interviews with the NWSDB and on-site studies at the time of the ex-post evaluation, it seemed that operation and maintenance are being properly carried out on the facilities installed via these projects. The manuals on water treatment plant operation and management and the manuals on pump operation and so forth that were prepared via these projects are being put to use. The employees who were the beneficiaries of technology transfers through this project are still in place.

Some of the operation and maintenance tasks are being outsourced, but the technical levels of the contractors commissioned with this are not necessarily adequate. Therefore, the RSCs have

worked to maintain the necessary technical level through efforts like providing technical guidance to contractors upon the start of consignments, or providing onsite guidance and supervision as needed.

3.4.3 Financial Aspects of Operation and Maintenance

At the time of the appraisal, in its Corporate Plan, the NWSDB stated that it would give consideration to the setting of rates needed to supply water, as well as the establishment and introduction of sewage rates, in order to recover its operation and maintenance expenses and ensure people's ability to pay. In addition, because this had been carried out in conjunction with reducing expenses and enhancing its fee collection system, no problems had been foreseen regarding the financial aspects. However, according to the study for the Jaffna Kilinochchi Water Supply and Sanitation Project carried out by the Asian Development Bank (ADB) in 2010, the NWSDB ran operating deficits between 2002 and 2009. The ADB study opined that, to improve its financial aspects, the NWSDB needed to revise its water rates, take countermeasures against non-revenue water, and streamline its organization.

Table 5 shows the budgetary allocation and execution status for each RSC as confirmed at the time of the ex-post evaluation. Since FY 2016, no budgetary shortfalls have occurred, and the necessary budgets have been allocated.

Table 5: RSC Budget Table

(Unit: million rupees)

	FY 2015	FY 2016	FY 2017
RSC (Western Central)			
Total budget	143.77	209.57	213.73
Total expenditures	163.60	177.92	183.00
RSC (Western North)			
Total budget	1,273.30	1,409.20	1,429.80
Total expenditures	1,274.76	1,213.92	1,275.08
RSC (Central) (Kandy)			
Total budget	1,936.06	2,403.14	2,460.75
Total expenditures	1,953.83	2,126.42	2,241.39

Source: NWSDB

Conversely, according to the financial outlook from the NWSDB's Corporate Plan, the public corporation's overall financial situation has been persistently in the red (as indicated in Table 6), with the amount of its deficits expected to increase in the future. The biggest factor behind these

deficits has been its repayment of the loans for project costs pertaining to capital investments and other such expenditures. However, these loans have been guaranteed by the government. Thus, it is likely that the NWSDB will be able to avoid financial catastrophe even in the worst-case scenario.

Table 6: Financial Outlook for the NWSDB

(Unit: million rupees)

	FY 2019	FY 2020
Total operating income	49,037,412	49,827,829
Total operating expenditures	43,166,722	45,674,666
Total debt repayment	40,964,524	57,394,488
Total expenditures	84,131,246	103,069,154
Surplus / deficit [Note 1]	-64,800,836	-118,042,162

Source: NWSDB

Note 1: Including the amount carried over from the previous fiscal year

The NWSDB reassesses its water rate structure once every three years to eliminate its chronic deficits. While it had already petitioned the government regarding its rate revisions in 2017, as of June 2018 these had not been approved and so it is impossible to offer an outlook for the future. However, the plan is to shift its basic balance into the black as soon as the new rate structure is approved.

As of this point in time, there are sufficient operation and maintenance costs, but the NWSDB is spending this even as it runs deficits. If the petitioned rate structure is approved, then this is expected to improve. However, this is impossible to foresee at the time of the ex-post evaluation. Thus, it is fair to say that there are problems regarding its financial aspects.

3.4.4 Status of Operation and Maintenance

Based on the on-site study at the time of the ex-post evaluation and the like, it was confirmed that the facilities installed and machinery procured through these projects were undergoing proper operation and maintenance. The Kadana water treatment plant from the KGWSP is already processing water in volumes that exceed its design capacity. The reason for this resides in the scenarios in the master plan and the fact that this project was implemented on the basis of these (by the time the facility, which was designed based on demand predictions from a certain point in time actually went into operation the situation was different from back when the demand conditions were predicted, so as demand has already continued to increase ahead of this it has resulted in insufficient supply). The subsequent plan to expand the Kadana water treatment plant is planned to be completed in 2020. Until then, the plant has no choice but to

operate above and beyond its design capacity, but it has been posited that there are no problems with this in a technical sense.

There are no problems with the institutional aspects of operation and maintenance. At the time of the ex-post evaluation, there were no problems with the operation of the facilities and machinery. In cases where some of the operation and maintenance tasks are outsourced, there are concerns regarding the technical capabilities of the contractors to which this is commissioned, and there are concerns over the amount of water being processed by the Kadana water treatment plant exceeding its design capacity. However, these are being handled in an appropriate manner. However, there are also concerns that delays in revising the rate structure will endanger the sustainability of the project's financial aspects. In light of the above, the projects' operation and maintenance have some problems regarding both their technical and financial aspects. Thus, the sustainability of the effects achieved through the projects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

As the population of Sri Lanka increases, the Water Sector Development Project and Water Sector Development Project (II) were implemented in Greater Colombo and Greater Kandy in order to accommodate the ever-rising demand for water. The objectives of these two projects are to provide water for domestic use in a safe and stable manner by installing and expanding water supply equipment, thereby contributing to improving the residential environment in the target regions. There were no changes to Sri Lanka's national plans related to water supply and sewage both at the time of the appraisal and the ex-post evaluation; thus, these were acknowledged as being consistent with development policies and priority issues. From the perspective of consistency with development needs, at the time of the appraisal, it was acknowledged that it was necessary to accommodate the increasing demand for water, while at the time of the ex-post evaluation, it was acknowledged that it was necessary to reduce the non-revenue water rate in Colombo, as well as needs for expanding distribution networks, reducing the non-revenue water rate, and improving the sewage system in Kandy. Thus, the projects are consistent with Japan's assistance policy and their relevance is high. The projects also added outputs by using the surplus with the project costs generated from fluctuations in the exchange rate. The project costs were lower than planned, but there were considerable overruns in the project period attributable to problems with implementation management. Therefore, the efficiency of the projects is fair. The majority of the indicators for operational effectiveness that denote project effectiveness were achieved. While the extent to which impacts such as improvements to the residential environment and sanitation and health were achieved is not necessarily clear, other positive impacts were observed. Therefore, the effectiveness and impacts of the projects are high. While there were no major problems with the institutional and

technical aspects of operation and maintenance, or the status of operation and maintenance, there have been delays in setting the rate structure designed to improve the financial aspects. Therefore, the sustainability of the projects is fair.

In light of the above, these projects are evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

It has previously been pointed out that improving the NWSDB's financial aspects is an important issue. The water rates must be revised in order to eliminate the NWSDB's chronic deficits. The approval of the Sri Lankan government is required to revise the rate structure. Thus, although this is something that exceeds the scope of the NWSDB's jurisdiction, a continuing appeal to the government should be made to encourage prompt approval and implementation of the revision.

4.2.2 Recommendations to JICA

None in particular

4.3 Lessons Learned

Examine design specifications that give consideration to the time period for the master plan's supply/demand estimates and pragmatic project implementation plans

For projects where master plans are formulated, like these projects, the projects are planned based on the supply/demand estimates found in the master plan. Conversely, by the time the facilities began operating after the delay and other problems that occurred during implementation for these projects, the time period for the supply/demand estimates from the time of the project planning had lapsed, resulting in a state of affairs in which demand exceeded the facility's capacity. In general, project plans are prepared on the assumption that projects will be implemented as planned. However, in developing countries, there is a certain degree of risk in presuming that project delays will not occur. Forethought should be given to considering facility specifications by foreseeing a certain degree of delays in a more practical manner.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	(1) Greater Kandy Water Supply Project (GKWSP) • Newly install 15 reservoirs • Newly install 6 pump stations	(1) Greater Kandy Water Supply Project (GKWSP) • Newly installed 8 reservoirs • Newly installed 5 pump stations • Additions to the project scope
	(2) Greater Colombo Water System Rehabilitation Project (GCWRP) • Central Greater Colombo: Newly install 1 reservoir, repair 1 reservoir, and 1 management office building • Kotikawatta – Mulleriyawa: Newly install 1 pump station, 1 reservoir, 1 water tower, and 1 pump shed • Improve the living environment in the tenement gardens	(2) Greater Colombo Water System Rehabilitation Project (GCWRP) • Central Greater Colombo: Newly installed 2 reservoirs, 1 management office building • Kotikawatta – Mulleriyawa: 1 water tower
	(3) Towns North of Colombo Water Supply Project (TNCWSP) • 2 reservoirs • Repair 1 reservoir • 2 pump sheds • 1 management office building	(3) Towns North of Colombo Water Supply Project (TNCWSP) • Largely as planned • Additions to the project scope
	(4) Greater Kandy Waste Water Disposal Project • Basic design, bid tendering assistance, consulting services	(4) Greater Kandy Waste Water Disposal Project • As planned
	(5) Strengthening organizations • Consulting services for capacity building	(5) Strengthening organizations • As planned
	(6) Kalu Ganga Water Supply Project (KGWSP) • 1 water treatment plant in Kadana • 14.5 km of water distribution	(6) Kalu Ganga Water Supply Project (KGWSP) • As planned

	pipes between Bandaragama - Piliyandala • 1 reservoir and 1 pump shed in Piliyandala • 1 reservoir and 1 pump shed in Moratuwa	
	(7) Countermeasures against non-revenue water • Replace water supply pipes in CBI District and Colombo 02 District • Improve pipes in order to connect to water supply pipe networks and water supply pipe mains in CBI District and Colombo 02 District	(7) Countermeasures against non-revenue water • Largely as planned • Additions to the project scope
	(8) Consulting services • Bid tendering assistance, construction supervision assistance • Revise the master plan • Assist in improving the capacity of the NWSDB	(8) Consulting services • As planned
2. Project Period	<u>Water Sector Development Project</u> March 2007–September 2012 (67 months) <u>Water Sector Development Project (II)</u> July 2008–December 2011 (42 months)	<u>Water Sector Development Project</u> June 2007–July 2015 (98 months) <u>Water Sector Development Project (II)</u> July 2008–July 2016 (96 months)
3. Project Costs	<u>Water Sector Development Project</u>	<u>Water Sector Development Project</u>
Amount Paid in Foreign Currency	5,630 million yen	13,231 million yen
Amount Paid in Local Currency	12,014 million yen (10,726 million rupee)	997 million yen (1,215 million rupee)
Total	17,644 million yen	14,228 million yen
ODA Loan Portion	13,231 million yen	13,217 million yen
Exchange Rate	1 rupee ＝ 1.12 yen	1 rupee ＝ 0.82 yen

	(As of 2006) Water Sector Development Project (II)	(Average between 2007 and 2015) Water Sector Development Project (II)
Amount Paid in Foreign Currency	4,396 million yen	8,269 million yen
Amount Paid in Local Currency	6,450 million yen (6,142 million rupee)	6,524 million yen (8,258 million rupee)
Total	10,846 million yen	14,793 million yen
ODA Loan Portion	8,388 million yen	8,269 million yen
Exchange Rate	1 rupee ＝ 1.05 yen (As of 2007)	1 rupee ＝ 0.79 yen (Average between 2008 and 2016)
4. Final Disbursement	Water Sector Development Project June 2015 Water Sector Development Project (II) November 2015	

Democratic Socialist Republic of Sri Lanka

FY2017 Ex-Post Evaluation of Japanese Grant Aid Project
The Project for Construction of Manmunai Bridge
External Evaluators: Ayumi Hori, Yumiko Onishi, and Tsuyoshi Ito, IC Net Limited

0. Summary

This project was implemented to facilitate smooth traffic flow and transportation of goods through the construction of a new bridge across the Batticaloa lagoon at Manmunai in Sri Lanka, and thereby contributing to vitalizing the local community and improving the quality of life for local residents.

The project is consistent with Sri Lanka's development policy and development needs as well as Japan's official development assistance policy, which was clear both at the time of the planning and the ex-post evaluation. The selection of the bridging route as well as the project's plan and approach were appropriate, making the project highly relevant. The project underwent design changes at the time of detailed designing. However, these changes were considered reasonable from the viewpoint of ensuring the quality and safety of the bridge, and the project was highly efficient because these changes did not affect the effects of the project as well as its cost and period, allowing the project cost to fall within the plan. With regard to effectiveness, the project failed to achieve the goal for the passenger car unit (hereinafter referred to as "PCU") as an operational indicator. However, when the target PCU was set in 2009, the movements of people other than residents who were engaged in post-civil war reconstruction projects might have been counted as part of the baseline, and the target might have been set higher. For this reason, the traffic volume was considered reasonable by comparing it with the 2017 data, which were calculated using traffic prediction software with various factors. Effectiveness and impacts of the project are high, as it was confirmed that other quantitative effects had been realized and that the promotion of exchange of people and goods had tremendous and diverse positive effects on the area around the bridge and its residents. Regarding sustainability, not much progress has been made in road repair because the roads leading up to the bridge are not placed under the control of the Road Development Authority (hereinafter referred to as "RDA"). The sustainability of the project's effects is fair because there is room for improvement in budget management and various types of regular inspections by the Eastern RDA, which supervises the bridge covered by the project.

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

1. Project Description

Project Location

Manmunai Bridge

1.1 Background

In the Eastern Province of Sri Lanka, the civil conflict had prevented proper maintenance and operation of roads and bridges for a long time, and their conditions had deteriorated. Furthermore, the after-effects of the tsunami disaster caused by the Sumatra Earthquake in December 2004 were still evident. Rehabilitation of pavement and roadbed, improvement of roads including widening, and replacement of old bridges as well as improvement of accessibility to economically vibrant coastal areas for the formerly conflict-affected inland were urgently required. After the tsunami disaster, priority was given to rehabilitation of trunk roads. In addition, because the Manmunai area is adjacent to Kokkaddicholai where an armed group named "Liberation Tigers of Tamil Eelam"[1] was based, restoration assistance from tsunami disaster in the area was delayed compared with other areas in the Eastern Province. After the end of the civil conflict in May 2009, reconstruction activities in the target area became finally operational and was fully launched. In this area, the ferry operation was the only means of transportation, but it was suspended during a flood; thus, the area was left without transportation under such circumstances. It was necessary to construct a bridge that would be functional even when floods struck the area. Improving accessibility by constructing the bridge was regarded as one of the most important elements for reconstruction of the Eastern Province. In light of the above, with Japan's grant aid project, the project was implemented to construct a bridge in Manmunai located in the Eastern Province, where recovery from the civil conflict and the tsunami disaster had been slow.

[1] Anti-government armed group in Sri Lanka, organized in 1976.

Source: Preparatory Survey Report

Figure 1: Location of the Bridge Constructed in the Project

1.2 Project Outline

The objective of this project is to facilitate smooth traffic flow and transportation of goods through the construction of a new bridge across the Batticaloa lagoon in Manmunai, thereby contributing to vitalizing the local community and improving the quality of life for local residents.[2]

Grant Limit / Actual Grant Amount	1,206 million yen / 951 million yen
Exchange of Notes Date /Grant Agreement Date	September 2011/ September 2011
Executing Agency	Road Development Authority (RDA)
Project Completion	May 2014
Contractor	Wakachiku Construction, Co., Ltd.
Consultants	Chodai Co., Ltd. / Oriental Consultants Co., Ltd.
Preparatory Survey	(Outline Design Study) July 2010–March 2011

[2] The objective of this project indicated on the ex-ante evaluation sheet was "to construct a bridge in Manmunai with the aim of facilitating smooth traffic flow and transportation of goods between across the Batticaloa lagoon, thereby contributing to recovery from disaster, reduction of flood damage, encouraging socio-economic development of the Eastern Province, and making the bridge a symbol of lasting peace in the area." However, " encouraging socio-economic development of the Eastern Province" and "a symbol of lasting peace in the area" are too much of a leap in logic as compare to the scope of the project. Thus, after review of the sequential logic of the project, "vitalization of local community and improvement in the quality of life for local residents." was measured as the impact of the project.

Related Projects	Japanese ODA loan • Provincial Road Improvement Project (2002) • Pro-Poor Eastern Infrastructure Development Project (2005) Grant Aid Projects • The Project for reconstruction of Gampola Bridge and Muwagama Bridge (2000) • The Project for the Construction of a New Highway Bridge at Manampitiya (2004) • The Project for Construction of New Mannar Bridge and Improvement of Causeway (2006) • The Project for Reconstruction of 5 bridges in Eastern Province (2008) Other Donors' Projects • Saudi Arabia: Kinniya Ferry Bridge (2006) • Saudi Arabia: Thambalagamum - Kinniya Road (2006) • World Bank (WB): Jayanthipura – Thirikkondiyadimadu Road (2007) • Spain: Oddaimavadi Bridge, Irakkandi Bridge, Puddavaikattu Bridge and Yan Oya Bridge (2007) • Asian Development Bank (ADB): Peradeniya – Badulla – Chankaladi Road (2008) • European Union (EU)/ADB Siyambalanduwa – Pottuvil – Akkaraipattu Road (2008) • Agence Française de Développement (AFD): Batticaloa – Trincomalee Road (A15), Construction of five bridges and Alli – Kanthale Road/Coastal Road (2008) • ADB: Talankuda – Manmunai – Mavadimunmari Provincial Road Rehabilitation Project (2010)

2. Outline of the Evaluation Study

2.1 External Evaluators

Ayumi Hori, Yumiko Onishi, and Tsuyoshi Ito, IC Net Limited

2.2 Duration of the Evaluation Study

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

Duration of the Study: October 2017 – January 2019

Duration of the Field Study: February 18–March 6, 2018; May 14–26, 2018

3. Results of the Evaluation (Overall Rating: A[3])

3.1 Relevance (Rating: ③[4])

3.1.1 Consistency with the Development Policy of Sri Lanka

When this project was planned, the national development plan, *Mahinda Chintana 2005*, highlighted the importance of reconstruction of the Eastern Province. The road sector development was in one of

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

[4] (3): High, (2): Fair, (1): Low

the main strategies to development and improvement of the regional and provincial road networks in the Eastern and Northern Provinces, which had been affected by the civil conflict and therefore underdeveloped compared with other parts of the country. Road rehabilitation in the tsunami-affected area was also considered a high priority. *Vision 2025,* Sri Lankan development plan both during the project implementation period and at the time of ex-post evaluation, underlines the importance of connecting between cities and towns inside and outside Sri Lanka, like development of trading or areas as hub, in order to facilitate further development of the country. As a mean to achieve this, investment in road construction is named. Furthermore, through replacement and construction of more than 70 bridges and development, the traffic system in the country will be improved. At the same time, as disaster countermeasure it will be realized of urban cities which are resilient against flood, drought and so on.

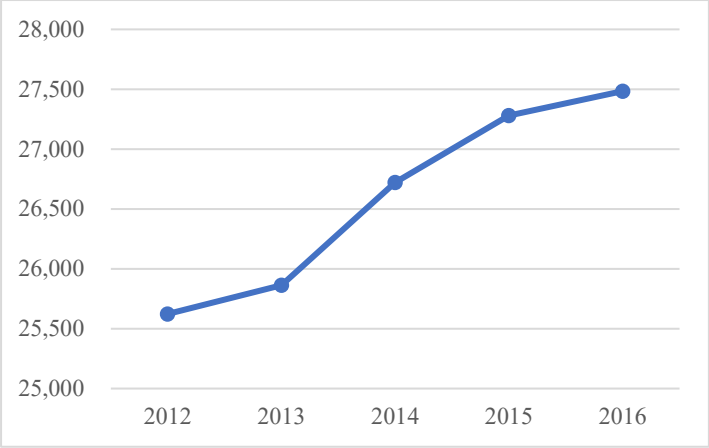
Mahinda Chintana 2005, which was referred to at the planning stage, and *Vision 2025*, which was referred to during the ex-post evaluation study, have a common policy direction: development and investment in road networks is indispensable to national development. Further, both recognize road rehabilitation as an important measure against natural disasters. Both have had consistent road policy of the country. Besides, the *National Road Master Plan (2007–2017)* is the latest official document of the RDA at the time of ex-post evaluation, which deals with the national road plan. It has consistently aimed to provide better accessibility for the entire population through improvement of road networks, thereby contributing to increased mobility of people and goods, and further development of the national economy. Thus, it is fair to say that this project was highly relevant to the development policy of Sri Lanka.

3.1.2 Consistency with the Development Needs of Sri Lanka

For this project, the needs survey was carried out in August 2008 and after the civil conflict ended in May 2009, Preparatory Survey was started on July 2010, which was approximately one year after the civil conflict. The timing of adopting and implementing this project when development support was needed for the area met the development needs. When it was planned, in order to rehabilitate the target area from the civil conflict and the tsunami disaster, rehabilitation of pavement and roadbed, improvement of roads including widening, and replacement of old bridges as well as improvement of accessibility to economically vibrant coastal areas for the formerly conflict-affected inland were urgently required to bring about the socio-economic recovery of the area. Improvement of accessibility by bridge construction was regarded as one of the most essential elements for restoration and reconstruction of the Eastern Province. In the target area, ferries had been the only mode of public transportation to cross the lagoon. Ferry services, however, were suspended during a flood, causing great inconvenience to local residents. Therefore, it was necessary to construct a bridge that remained functional when flooding occurred. At the time of ex-post evaluation, it was considered very important to improve poor road networks and accessibility, both of which were regarded as the bottlenecks to development of the transportation system and basic infrastructure in the Eastern Province. Therefore, the construction of the Manmunai bridge had been indispensable to enhance the safety and accessibility between Kattankudy and Kokkaddicholai across the lagoon.

At the time of ex-post evaluation, it was confirmed that there was no plan to construct another new bridge across the lagoon and the Manmunai bridge was the only bridge that connected both sides of the lagoon. The traffic survey carried out at ex-post evaluation corroborated the improved accessibility from the inland to the coastal areas. In addition, the population of the Manmunai South West area, which is located inland and is one of the most underdeveloped, has been rapidly growing since 2013 as shown in the figure below.

(Unit: person)



Source: Statistics handbook issued by the Batticaloa District Planning Bureau

Figure 2: Population Changes in Manmunai South West

As discussed above, it was confirmed that this bridge is the sole bridge that directly connects both sides of the lagoon, and its importance has been increasing as the traffic volume and population have swelled in size (see the details in "3.3 Effectiveness"). Improved accessibility by the bridge construction has greatly contributed to the fulfillment of socio-economic needs of inland communities. For these reasons, it is fair to say that this project met the development needs of the country both at the time of planning and ex-post evaluation.

3.1.3 Consistency with Japan's ODA Policy

The *Country Assistance Program for Sri Lanka* prepared by the Ministry of Foreign Affairs in 2004 described two pillars of Japan's ODA policy for Sri Lanka: (1) consolidation of peace and support for reconstruction and (2) assistance in line with mid- and long-term development visions. The latter required (a) development of economic infrastructure, (b) improvement of the country's capability to acquire foreign currency and (c) poverty alleviation. "Building trunk roads and telecommunication networks" was stated as one of the means to improve the country's capability to acquire foreign currency. Corresponding with the *Country Assistance Policy for Sri Lanka,* the *JICA Country-specific Program for Sri Lanka (2004)* also regarded (1) consolidation of peace and support for reconstruction and (2) assistance in line with mid- and long-term development visions as focus areas of JICA's assistance for Sri Lanka. It aimed to achieve the latter through improvement of economic infrastructure. Pursuant to

the same, “the Program for strengthening of road transportation capacities” was formulated. After the end of the civil conflict in 2009, the Government of Japan announced the implementation of a development assistance program for Sri Lanka with a maximum budget of US$ 1 billion. The Manmunai bridge construction project was incorporated into this program.

Because of the above reasons, Japan’s development assistance at the time of the planning which aimed to support consolidation of peace and recovery from conflict and disaster through development of economic infrastructure and improvement of trunk roads and telecommunication networks was highly relevant to Sri Lanka’s development plan,

3.1.4 Appropriateness of the Project Plan and Approaches

The Preparatory Survey report indicated that three options of bridge routes were proposed at the planning stage of the project. The ex-post evaluator asked a project management consultant in the Preparatory Survey to assess the bridge selection process and learned that the Manmunai route was adopted based on future prospects, traffic volume, distance from the closest bridge, and availability of ferry services. The evaluator confirmed the validity of the selection process. Further, through discussion with the consultant and the RDA, it was confirmed at the time of ex-post evaluation that there were no event that could undermine the appropriateness of the selection of the Manmunai route from the time of the selection prior to the implementation of the project.

In light of the above, this project has been highly relevant to Sri Lanka’s development policy and needs as well as Japan’s ODA policy. Therefore its relevance is high.

3.2 Efficiency (Rating: ③)

3.2.1 Output

In this project, the bridge and the causeway indicated in the table below were constructed as planned. Table 1 shows the details of the project outputs.

Table 1: Outputs

(1) New Bridge		
Bridge length		210 m
Bridge Width	Carriageway	7.4 m (two lanes)
	Walkway	Both sides 2.4 m (one side: 1.2 m)
Superstructure		
・Bridge type: PC simple deck slabs with pretension girder		
・Construction method: Girder erected by crane		

Substructure		
・Pier: Pile bent		
・Abutment: Inverted T-type abutment		
(2) Causeway improvement		
(1) Length		West approach: 195 m East approach: 293 m
(2) Roadway width	Carriage way	6.2 m (two lanes)
	Shoulder	3.6 m (one side: 1.8 m)

Source: Materials provided by JICA

However, some modifications were made after the Preparatory Surveys and Detailed Designing and outline is as followed.

After the Preparatory Survey, the following four modifications were made, and the reasons of modification are described as followed:

1) Modification of installation method of pile foundations: The supplementary geological survey carried out during the Detailed Designing revealed that the soil layers of the area were not as assumed at the time of the Preparatory Survey. The installation method of pile foundations and pile length were revised accordingly.
2) Change of extension joints: With regard to extension joints of the bridge, more appropriate joints were identified later compared with the type suggested at the time of the Preparatory Survey.
3) Installation of curb stones on the causeway: During the Detailed Designing, the width information of the causeway was clarified. Based on the information, it was suggested that curb stones, not hand rails, be installed on the causeway for better continuity.
4) Modification on bank protection of the causeway: The foundation of concrete block masonry was planned to be a cast-in-place concrete structure. However, based on the drawing of the causeway, it was decided to use mortar masonry for the foundation, which is widely used in the country and can be easily maintained and managed.

After the Detailed Designing, the following four additional modifications were made, and the reasons of modification are described as followed:

1) Modification of pile length: During the pile load test, it was not confirmed that the identified piles had the required bearing capacity. Then the bearing layers of the bridge required to be reviewed.
2) Revision of countermeasures against scouring: Original countermeasures against scouring required to be reviewed, taking into account of the outcomes of flood inundation at the construction site and riverbed measurements undertaken by the contractor.
3) Modification of revetment height and traffic safety measures: The revetment height was modified to widen the space under the bridge, thereby making bridge inspection easier. Further, concrete poles

were additionally installed on curb stones to easily recognize the carriageway from the shoulders even when flooding. This is because during a flood, some vehicles may try to pass the causeway, which is partially submerged.

4) Additional installation of ducts pipe for the electrical lines of streetlights: Ducts were installed for the electrical lines of streetlights between the bridge and the causeway.

The modifications from the Preparatory Survey to the construction stage were attributable to changes in the pile length, which resulted from changing the bearing layer of the bridge. Both the consultant and the RDA ensured that the modifications was necessary to enhance the quality and safety of the bridge and it was highly relevant modification. It was fair to say that the bridge design was modified at the right time in light of preventing the shoddy basement construction or delay in the construction schedule, attributed to lack of the bridge pile length. In regard to the possibility of whether modification of pile could be included in the planning stage or not, it would have been difficult for them to include the pile modification in advance, taking into account the natural environment and its change because lagoon environment including water level and flow velocity and geological strata condition were considerably different from those in Japan and also there were no relevant record available in Sri Lanka. For the reasons above, this evaluation study confirmed the validity of the design modifications reflecting the results of the geological survey. It was assured with the consultant and the RDA that the modifications had no negative resultant impact on the project effect, cost and time period.

3.2.2 Inputs

3.2.2.1 Project Cost

Although the total project cost was initially estimated to be 1,350 million yen (1,206 million yen borne by Japan and 140 million yen borne by Sri Lanka), in reality it was 988 million yen (951 million yen borne by Japan and 37 million yen borne by Sri Lanka), which is less than planned (73% of the estimate).

Table 2: Planned and Actual Project Cost

(million yen)

Category		Plan	Actual
(1) Construction cost		1,063	829
	Main works	715	662
	Others	348	167
(2) Design and maintenance cost		122	121
Total		1,185	951

Source: Materials provided by JICA

The Government of Sri Lanka made payments to the contractor in two installments. The first payment was delayed by one month because of a change in the banking arrangements, and the second payment was effected as scheduled, and the consultant confirmed there were no problems.

Table 3: Project Cost Borne by the Sri Lankan Side

	Plan (2010) (LKR 10,000)	Actual (LKR 10,000)
Land acquisition and compensation	0	0
Relocation of public facilities	0	25
Value Added Tax (VAT)	12,900	740
Cost to process Banking Agreement (B/A) and Authority to Pay (A/P)	100	0
Utility supply and installation of telephone lines	750	97
Installation of utility poles	Added	890
Administrative cost		3,015
Miscellaneous (local tax and others)		363
Total	13,750	5,130

Source: Materials provided by JICA

The Japanese Government expended only 79% of the planned budget. This was because of a reduction in the cost of the construction road in the lagoon that was changed from pier structure to embankment structure. In accordance with a proposal from the contractor, this change was approved after a thorough consultation with the RDA, which made sure that embankment structure would not negatively affect the volume of water supply during construction. It was confirmed that the change in the structure had no negative effect on the quality of the project outputs.

With regard to the Sri Lankan responsibility and expenditure, actual expenditure of VAT was significantly lower than planned amount. This was because originally the RDA was planning to pay VAT and then get reimbursed. However, a request for VAT exemption to the Ministry of Finance was made and approved, and thus, the payment on VAT was exempted. Besides, the Sri Lankan Government duly fulfilled all the requirements agreed at the planning stage.

3.2.2.2 Project Period

The planned project period was 33 months[5] between August 2011 and March 2014. The actual period was a total of 33 months from September 2011 to May 2014 (100% of the plan). Any changes made after the Detailed Designing are outlined above. The reason that the changes caused no extension of the project period was efforts exerted by the project management consultant and contractor during the project implementation period as discussed 2 points below:

1) Communication between the headquarters of the project management consultant in Japan and the supervisor in construction site was smooth. The trusting relationship between them had been developed. The headquarters immediately carried out necessary technical backstopping and

[5] Both the ex-ante evaluation sheet and Preparatory Survey Report do not clearly indicate the definition of starting and completion of the project. Thus, the project period is based on the ex-ante evaluation sheet, taking the G/A date as beginning and completion of the construction as project completion, totaling to 33 months, counting both the beginning and ending months with 32 months of implementation.

engaged in consultation with JICA over applications and procedure to get approval for design changes upon receipt of information from the supervisor. The procurement of materials in the construction site was also facilitated based on information from the headquarters.

2) The construction schedule was flexibly adjusted taking into account weather conditions of the area. Construction work is generally delayed during the rainy season. However, some works that can be carried out during the rainy season were implemented earlier than planned. This changed order of construction process helped avoiding extension of the construction period.

Although there were modifications to the design that was prepared at the time of the Detailed Designing, the project was completed as planned. In this regard, the efforts exerted by the contractor is noteworthy.

From the above, this project had design modifications however, it was confirmed that the design modifications were reasonable to enhance the quality and safety of the bridge and had no any impact on the project effect, cost and time period. The efficiency of the project is high because the project was implemented as planned with regard to cost and period.

3.3 Effectiveness and Impacts[6] (Rating: (3))

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

The quantitative indicators set at the planning stage were (1) average daily traffic volume[7] (PCU/12 hours), which is the operation indicator, and (2) travel distance between Western and Eastern shores, (3) travel distance from Western shore to Batticaloa town (km), (4) travel time between Western and Eastern shore,[8] (5) interrupted hours (hours/day) and (6) interrupted period due to flood (day), which are the effect indicators.

Because the executing agency had no data related to the above indicators, a traffic volume survey was undertaken.

Table 4: Baseline, Target and Actual Performance of Operation Indicator

Indicator	Baseline (2009)	Target (2017)	Actual (at the time of ex-post evaluation)
(1) Average daily traffic volume[9] (PCU/12 hours)	456	1,827–1,969	1,440

Source: Materials provided by JICA and Traffic Survey
Note: The baseline data was calculated on the condition of 12–24 ferry services per day.

[6] Sub-rating for Effectiveness is to be put with consideration of Impacts.
[7] The traffic volume survey used the same categorization of traffic means and PCU coefficient as Preparatory Survey.
[8] The ex-post evaluation study team actually drove a total of four times on the bridge; in the morning and in the afternoon on weekdays both towards the Eastern shore and the Western shore. Then, the driving time was averaged.
[9] The traffic survey was conducted under the same conditions as the Preparatory Survey (it was done between 6:00 and 18:00 for two weekdays and the collected data were averaged.) Each enumerator was assigned at West and East sides of the bridge to count the number of vehicles. The number of vehicles was recorded by vehicle type. The PCU was calculated by adding each vehicle type count multiplied by a PCU coefficient.

The PCU calculated based on the data collected in the ex-post evaluation was 1,440, which was below the target. Then the calculation approach was examined and the target was calculated based on the baseline data. There was a possibility that baseline data were not properly and accurately counted. According to the RDA Planning Department, the baseline survey was conducted in 2009 immediately after the end of the civil conflict, when the number of visitors to the area increased significantly. Then the baseline data might have included not only the number of local residents but also that of the visitors because of the difficulty in differentiating the visitors from local residents. In view of this, to examine validity of actual data, 1440, estimated traffic volume data of the year 2017[10] was obtained from the RDA Planning Department at the time of ex-post evaluation. The projected traffic volume excluding the number of bicycles on the Manmunai bridge was 1,006 and in reference to the method used for the projection, the PCU from the Traffic Survey was recalculated to 1,362 which was considerably higher than 1,006 and considered satisfactory. To crosscheck the validity of the projected data, PCU data at the point where the national road A4 meets with B344, which is at the end of bridge across the lagoon like Manmunai was compared.

In addition, looking into the number of the traffic, approximately 70% of the whole traffic volume was motorcycles and slightly more than 10% were cars and three-wheelers respectively. Between AM 6:00 to 8:00, a lot of bicycles, three-wheelers and large buses passed from Manmunai (West shore) to Batticaloa (East shore) while throughout the day a lot of medium goods vehicle passed from Batticaloa to Manmunai. It meant that people move from Manmunai to Batticaloa commuting to workplace and school in the morning while agricultural and livestock products are transported from Batticaloa to Manmunai as economic movement.

It was confirmed that the targets on all the five effect indicators were successfully achieved at the time of ex-post evaluation.

Table 5: Baseline, Target, and Actual Effect Indicators

Indicators	Baseline (2009)	Target (2017)	Actual (at the time of the ex-post evaluation)
(2) Travel Distance between Western and Eastern Shores	Approx. 32 km	Approx. 300 m	Approx. 300 m
(3) Travel Distance from Manmunai Western Shore to Batticaloa town	Approx. 27 km	Approx. 15 km	Approx. 15 km
(4) Travel Time between Western and Eastern Shore	Approx. 60 mins. (waiting time: 30-60 mins. + 10 mins. travel time by ferry)	Less than 1 min.	Less than 1 min.

[10] Variables included population (daytime and nighttime population, employed and unemployed), land use (area by land use purpose, floor area by use purpose and population density) and socio-economic issues (commodity prices both at shipping and in the market, income and the number of vehicles owned).

(5) Interrupted Hours (hours/day)	12 hours in night time (18:00–6:00)	0	0
(6) Interrupted period due to flood	Approx. 14 days	Approx. 1-2 days	Approx. 1-2 days[11]

Source: Ex-ante Project Evaluation Sheet

Reference of the actual data at the time of the ex-post evaluation was as follows

(2) Travel Distance between Western and Eastern Shores: Referred to the materials provided by JICA

(3) Travel Distance from Manmunai Western Shore to Batticaloa town: Verified on the map of the area

(4) Travel Time between Western and Eastern Shore: Confirmed through actual measurement

(5) Interrupted hours: Confirmed through interview with the RDA

(6) Interrupted period due to flood: Confirmed through interview with the RDA

3.3.1.2 Qualitative Effects (Other Effects)

The interviews with stakeholders[12] around the target area were used and qualitative effects on (1) stable transportation of agricultural products and (2) distribution of goods and interaction among local residents were examined.

(1) Stable transportation of agricultural products

The CEO of the Batticaloa Chamber of Commerce described: Before the bridge construction, to transport large-sized materials or any materials during a flood, they were required to use and travel on maintained roads with sufficient width, which increases the travel distance by 20–25 km. However, since the construction, it has become easier to transport products. They can travel three to four times a day now while it was only once a day in the past. They can now ship marine products to Colombo without losing their freshness and the volume of products transported has increased by more than 50%. Before the bridge construction, products were used to be delivered only to places on main roads. Now it has become possible to deliver products to villages and places far away from main roads.

A shop owner who sells and transports chicken, eggs and livestock feed, said that before the bridge construction, his delivery limitation was one to two bags of animal feed (100 kg/bag) in a day by ferry but after the construction he can transport up to 15–20 bags by truck. He added that it took 1.5 hours to transport materials to the other side of the lagoon in the past but now takes only five minutes.

A shop owner, who collects, sells and transports raw milk, said that he collected 50 liters of milk a day before the bridge construction but after the bridge construction he collects 250 liters a day because more dairy farmers come to him to sell raw milk.

(2) Distribution of goods and interaction among local residents between both shores

According to interviewees from schools, hospitals and the CEO of the chamber of commerce, religious

[11] It was due to the submergence of roads that connect with the bridge, not that of the bridge itself.

[12] The attributes of the respondents to the qualitative survey on the effectiveness and impacts of the project, are indicated in each part. The total number of interviewees in the survey was 36 (23 men and 13 women).

and cultural exchange has been increasing. More residents from the Eastern shore visit the Hindu temple in Kokkaddicholai, which is located on the Western shore. School principals from both shores said that their schools started to have interaction with each other through joint sports, cultural and music festivals, and school excursions are organized for students from Eastern shore schools to visit villages and different places on the Western shore. Before the bridge construction, children living on the Western shore felt culturally and socially inferior to their counterparts on the Eastern shore owing to underdevelopment of their area. However, at present, they attend schools on the Eastern shore and have more friends from the Eastern shore.

Bridge construction contributed to local residents by the reduction in such matters as distance and time to transport agricultural products. They can transport products in less time by truck, thereby maintaining the quality of the products. Therefore, it can be evaluated that the construction of the bridge has successfully provided a stable transportation of agricultural products. Further, by the bridge construction, residents interact more with those living on the other side and consequently cultural, religious and educational connections and interactions have been increased. It is fair to say that the construction of the bridge helped boost the interactions.

3.3.2 Impacts

3.3.2.1 Intended Impacts

The evaluation team confirmed the impacts of this project from two perspectives: (1) vitalization of the local community and (2) improvement of the quality of life for local residents.

(1) Vitalization of the local community

To find out how far this project contributed to vitalization of the local community, the evaluation team confirmed three points: (a) development of local industries, (b) the ripple effects of improved distribution of agricultural products, and (c) those of the exchange of people and goods between both shores.

(a) Development of local industries

According to Batticaloa District's statistics, 17% of the companies located in Batticaloa at the time of ex-post evaluation were mainly established after the construction of the bridge. After the civil war, a total of 145 new companies were registered with the county office between 2009 and 2017, and the number of registered companies, which stood at 2,033 in 2009, increased to 2,450 in 2017. According to the CEO of the chamber of commerce, business was being generated slowly but steadily, and these changes have made people more and more enthusiastic toward business. Furthermore, in June 2017, Brandix, the second largest apparel firm in Sri Lanka, invested US$ 19 million to build a factory on the eastern-shore side of the bridge. An officer of the company said that the bridge's construction was one of the decisive factors for the establishment of the factory in the area. Of the firm's 2,400 employees, 550, a little more than one fourth, commute to work from the west-bank side of the bridge.

Residents in the more southern part of the west bank, much of which is covered in jungle, say that they

no longer need to go over to the more developed eastern shore because villages on the western shore started to prosper after the bridge was built and that they now visit villages on their side of the bridge for shopping. This trend means growing economic demand on the western shore, suggesting that it is helping develop the western-shore side's economy.

(b) Ripple effects of stable transport of agricultural products

According to the CEO of the chamber of commerce, thanks to the construction of the bridge, the volume of Batticaloa's agricultural products supplied to the market grew by 50–60%. The CEO also said that, since construction of the bridge, shorter transport routes have enabled fuel cost reductions, lowering transport and delivery costs by 25%. The CEO of the chamber of commerce and the shop owner who sells and transports chicken, eggs and livestock feed emphasized that after the bridge was constructed, improved roads and truck transport helped reduce damage to such products, and that shorter transport and delivery times helped keep them fresh, allowing the stores to ship fresher ones. Before the construction of the bridge, products were often damaged during transport. For example, during ferry transport, blazing sunshine killed chickens, and livestock feed got wet as it was washed by waves in the lagoon. However, these problems were solved, which pleased the CEO and the owner. In addition, they commented that they were now able to ship products continuously even during the rainy season, contributing to stable product supply to the market.

(c) Ripple effects of the exchange of people and goods between the two shores

The CEO of the chamber of commerce added that Sinhalese and Muslims had started to do business together, lowering cultural barriers, and that a value chain had been built more firmly, attracting more business partners as well as buyers and sellers of products.

(2) Improvement of the quality of life for local residents

The evaluation team confirmed how the project had impact on improvement of the quality of life for local residents from three points of view: (a) improvement of access to emergency medical care, (b) improvement of access to educational institutions, and (c) improvement of access to public transportation.

(a) Improvement of access to emergency medical care

The results of on-site surveys indicated that at the time of the ex-post evaluation, among medical institutions that accepted emergency outpatients, all core hospitals not only in the city of Batticaloa but also on the western shore had an emergency outpatient system. Patients who are considered difficult for a local core hospital to treat are brought to a general hospital in Batticaloa. An officer at Mahiladitivu Hospital, located on the western-shore side of the bridge, said that since the construction of the bridge, the number of patients brought to the general hospital had risen, although the frequency was not so high. The officer also said that the construction of the bridge helped reduce the labor and cost needed to arrange an ambulance from the eastern to western shores when not enough ambulances were available.

After construction of the bridge, it became easy for doctors and their staff members to travel between the two shores, leading to a steady improvement in the quality of medical services, and after the bridge was built, an emergency outpatient system was established at hospitals on the western shore, enabling them to treat 30 emergency outpatients. A department of gynecology and obstetrics, which often treats emergency outpatients, was also newly installed in hospitals on the western-shore side after the bridge was constructed. The officer added that Mahiladitivu Hospital has had part-time doctors (supporting doctors called when hospitals on the western-shore side of the bridge could not treat patients sufficiently) come to the hospital since the bridge was constructed. Before the bridge was built, personnel who commuted to the hospital from the eastern-shore side sometimes stayed in the hospital and worked overnight, but today, they are commuting to work every day.

Furthermore, according to the officer, a sufficient amount of medicine and medical equipment has started to be delivered periodically since the construction of the bridge. The number of bus departures, a public means of transportation, on the western-shore side of the bridge (mainly from the south) increased from one to 12 per day, boosting the number of patients at the hospital.

(b) Improvement of access to educational institutions

According to schools on the western-shore side, students on the western-shore side attended school there because they basically liked a school to which they could commute from home (this tendency remains unchanged even today). Thanks to the construction of the bridge, however, schools on the western-shore side are now able to employ better-qualified teachers (especially math and science teachers) from the eastern-shore side (37 persons/40 persons), and this has improved the overall academic performance of students significantly. Another benefit is that teachers commuting from the eastern-shore side by ferry have arrived late for school much less frequently. Many students attend a prep school after school is over, but it seems that an increasing number of students attend a prep school on the eastern-shore side since the construction of the bridge.

According to schools on the eastern-shore side, there is no school for ninth-grade or higher students on the western-shore side, but the construction of the bridge has made it easy to attend a high school on the eastern-shore side. It seems that the construction of the bridge has led many students, who had formerly given up the idea of attending a school on the eastern-shore side because of the inconvenience of commuting, to decide to attend one. The number of students from the western-shore side has tripled. Many female students had commuted to a school on the eastern-shore side from the western-shore side by bus every day because their parents were worried about their children living in a dormitory away from home. Before the bridge was constructed, they sometimes could not commute to school during the rainy season because of the rising water level of the lagoon, but since the construction of the bridge, they said that they could attend school without being affected by weather. Male students live in the dormitory of a school on the eastern-shore side and return to the western-shore side over the weekend to see their family whenever they like because their parents object less to a dormitory life. They are pleased that they can return home easily across the new bridge.

(c) Improvement of access to public transportation

It was confirmed that private bus services had also increased since the construction of the bridge. Before the bridge was built, there were only government-run bus services, but at the time of ex-post evaluation, there were seven private and five public bus services between Manmunai and Batticaloa. Buses depart every 30 minutes between 5:30 a.m. and 6:30 p.m. Before the construction of the bridge, there was no bus service in the south, and southern people complained that they had had great difficulties in going to the city hall or banks because they had to go to the eastern-shore side using a cattle-pulled cart or on foot. Moreover, when there was no bus service, they had to go through the jungle to visit the city and were afraid that they might encounter an elephant, but since the bridge was built, the western-shore side, including the south, has developed economically, making new bus services from the south to the eastern-shore side available.

With regard to vitalization of the local community, the construction of the bridge has led to the development of local industries; economic benefits brought by the stable transport of agricultural products; and growing business opportunities due to exchange between both sides of the lagoon. Thus, it is fair to say that the project has had a tremendous impact on the local community. Regarding improvement of the quality of life for local residents, the project had painted a scenario in which the local community would benefit directly from better access to the coastal area from the inland in terms of emergency medical care, education and public transportation, but indirect development was observed as the convenience of the inland improved and the inland developed. As a result, the quality of life for local residents, which affects the fundamental aspects of their lives, has improved significantly.

Photo 1: Emergency ambulance transportation to the east-bank side of the bridge became easy

Photo 2: The opening of the bridge contributed to reducing truck delivery time and cost

3.3.2.2 Other Positive and Negative Impacts

(1) Impacts on the natural environment

Under Sri Lankan domestic law, when constructing a new bridge, it is necessary to conduct environmental impact assessment and obtain permission from the Central Environmental Authority (CEA) of the Ministry of Environment and Natural Resources. After the CEA checked the lagoon environment, it concluded that environmental impact assessment was not necessary because this project would not lead to crucial environmental problems and potential negative impact was under control. Besides, this project obtained permission from the CEA and satisfying both the conditions, fulfilling the

environmental standards established under the domestic law. In addition, during the construction work, contractors carried out environmental monitoring and shared information with the RDA. From October 2012 to March 2014, they conducted environmental assessments every day and issued a monthly report (15 reports in total) that summarized the results of assessments of such factors as air, water quality (pH value, electric conductivity, dissolved oxygen, turbidity, temperature and salinity), soil, land subsidence, vibration, noise, drainage at construction sites, the living environment of workers and so on[13]. Based on the standard of Environmental Management Plan, this survey used figures for October 2012 as its baseline which was before the construction, and during the monitoring, various indicators did not exceed the baseline. It was confirmed that mitigation measures described in Environmental Management and Monitoring Plan and monitoring items were implemented. Besides, it was also confirmed from the reports that residents had not filed any complaints. After the construction work, the RDA has been visually observing the impacts on environment (air pollution, noise, water quality, wastewater, soil, and living organisms) and there has been no issues.

At the time of the planning, there was concern that the transfer of fish traps near the former ferry station might affect fisheries, but it was confirmed through interviews with RDA officials and local residents that the newly constructed bridge did not affect fisheries. The fish traps are removable, and they were transferred from where they were before the bridge was built to both sides of the bridge today, and it was confirmed through local interviews that there was no problem with the catching of fish.

(2) Resettlement and Land Acquisition

In the implementation of this project, one case of land acquisition was confirmed, but appropriate actions were taken in accordance with Sri Lankan domestic law and the *JICA Guidelines for Environmental and Social Considerations (2004)*. According to the RDA, it was confirmed that the transfer and removal of existing utilities at the project site as required; necessary regulations for road traffic and ship; the maintenance of temporary yards and ensuring of safety at the project site were dealt with. Furthermore, it was necessary to transfer the ferry station on the western-shore side to the middle south during the construction work to connect the bridge to the road repaired by ADB, but it was confirmed that there had been no particular problem due to the transfer of the ferry station, according to RDA and Road Development Department (hereinafter referred to as “RDD”) .

(3) Other positive and negative impacts

Regarding ethnic composition in Batticaloa District, Tamils represent an overwhelming majority of the population, with 72.2%, 26.8% by Sri Lankan Moors,[14] and 1.0% by others. For this reason, this area has long been controlled by the Liberation Tigers of Tamil Eelam, and construction projects by Sinhalese businesses tend to cause troubles with local residents and problems happened to construction operation in the past. Therefore, in implementing construction projects, it was necessary for contractors to give priority to labor management, consisted of Tamils. When this project was carried out, the

[13] Various items on flora and fauna were was also monitored.
[14] Sri Lankan Moors are the third largest ethnic group in Sri Lanka and mainly believe in Islam.

contractors hired Tamils as workers, but problems attributed to ethnic conflicts did not occur. The contractor gave much consideration to maintaining the accuracy of work by, for example, instructing unskilled Tamil workers to take measurements using sticks whose measurement has been marked on it. Meanwhile, negative impacts on the local community because of discontinuation of the ferry service was not confirmed. The ferry company undertook RDD projects with a time limit fixed on contract, so there were no layoffs of workers or other problems due to the discontinuation of the ferry service, nor were any other negative impacts confirmed.

Regarding effectiveness, the PCU, an operational indicator, did not achieve the target, but it is fair to say that the volume of traffic is sufficient: the way the target was calculated was not necessarily appropriate, and it was considered appropriate when the data obtained from surveys of traffic volumes were compared with those computed using traffic volume prediction software. It was confirmed that other quantitative effects had almost achieved their target values and that the bridge's construction had promoted exchange of people and goods, resulting in tremendous and diverse positive impacts on the area around the bridge and its residents. Based on the foregoing analysis, this project has achieved its objectives. Therefore, effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ②)

3.4.1 Institutional/Organizational Aspect of Operation and Maintenance

As different agencies are responsible for managing the maintenance of the bridge and its access roads in this project, the RDA supervises the bridge including causeways, and the RDD oversees the access roads.[15] This project was implemented on a provincial road. However, because the provincial road had a traffic volume of over 250 vehicles[16] per day and connected national highways, the RDA had intended to upgrade the provincial road, including the bridge, to a national highway after the project to repair and widen it using loans from this project and ADB. With this upgrading, the RDA was supposed to become a maintenance and management agency for this project. After the project's completion, the plan for upgrading to a national highway was put on hold because of a change of government. However, at the time of ex-post evaluation, it was confirmed with the RDA's Planning Department and Batticaloa bureau chief that the procedures for upgrading were being followed again.

The RDD performs maintenance work for provincial roads once a year, but because of a lack of budget, it repairs roads with a higher order of priority, and the roads up to the Manmunai bridge are left unrepaired. The on-site survey at the time of ex-post evaluation confirmed large holes at several locations on the roads leading up to the bridge. These holes are believed to have been caused by the traffic volume increased after the opening of the bridge, worsening the points requiring further repair.

RDA Batticaloa, a subordinate organization of the Eastern RDA, assigns one engineer, one work supervisor, and four workers for maintenance management. These personnel are enough to handle

[15] National highways (Class A and B roads) are supervised by the central government's RDA and provincial roads (Class C and D roads) by the RDD.

[16] Reference from Preparatory Survey.

maintenance and repair if such work deals with minor repairs or issues of only the Manmunai bridge, but they are supposed to cover roads and bridges other than the Manmunai bridge. If maintenance and repair are urgently needed, it cannot be said that RDA Batticaloa has a sufficient number of personnel. Because the bridge is relatively new, the RDA believes that its current workforce is sufficient. However, based on experience with other bridges, it has nine maintenance assessment engineers, three senior engineers, a bridge inspection vehicle and other resources in the Eastern Province, and can take all necessary actions in the future.

3.4.2 Technical Aspect of Operation and Maintenance

At the time of planning, the RDA was an organization that specialized in road and bridge planning, design, construction, and maintenance management, and it was confirmed that its personnel were striving to receive various kinds of technical training, accumulate experiences in receiving training and studying abroad, and acquire and improve their technical capabilities. The RDA can maintain bridges using its own technical capabilities if they are small in scale (particularly concrete bridges). The RDA has a sufficient track record of road and bridge maintenance because it has so far implemented such projects with the support of various foreign countries. It was determined that there was no problem with the RDA's technical standards as an executing agency when this project was carried out. In addition, the technical level of its personnel required for operation and maintenance management improved through JICA's three-year technical cooperation named "Project for the Capacity Development on Bridge Management," including the training provided from November 2014 to November 2017 and JICA Group and Region-Focused Training. At RDA Batticaloa, after the training, senior engineers provided on-the-job training (OJT) on a daily basis. Training needs are collected mainly through baseline and questionnaire surveys. After the training, a bridge maintenance and evaluation unit was established.

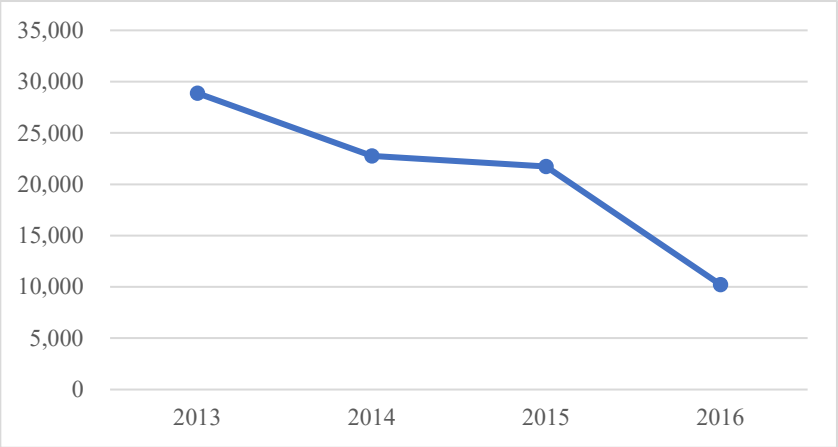
The manual for management and maintenance/inspection systems, which the RDA compiled in 1985, is used even today. Bridges and causeways are visually inspected by RDA Batticaloa personnel once a month. In the future, the RDA plans to effectively use an inspection, diagnosis and repair manual made through "Project for the Capacity Development on Bridge Management" by the end of 2018.

The RDA's inspection equipment includes a bridge inspection vehicle provided through this JICA technical cooperation project which is used to inspect the structural part of bridges, but there is only one such vehicle in Sri Lanka; in the Eastern Province, it has not been used to inspect all bridges. The Manmunai bridge has never been repaired or reinforced because it is a relatively new one, but the possibility of the bridge requiring serious repair in the future cannot be denied; therefore, daily inspection is important so that any signs of the need for such repair are not overlooked. At the RDA, a repair and reinforcement system, including the bridge maintenance and evaluation unit, is being established. The JICA technical cooperation project developed engineers over the three years. In addition, information on management is updated appropriately based on current situation, and a manual for maintenance and inspection have been compiled. Given this state of affairs, it is fair to say that the RDA has sufficient operation and maintenance technology.

3.4.3 Financial Aspect of Operation and Maintenance

While the RDA's overall expenditure has continued to grow, results show that its spending on road development and maintenance has gradually fallen each year since 2013. Because of growth in overall expenditure, the percentage of budget allocated to road development and maintenance within the RDA has changed.

(Million LKR)

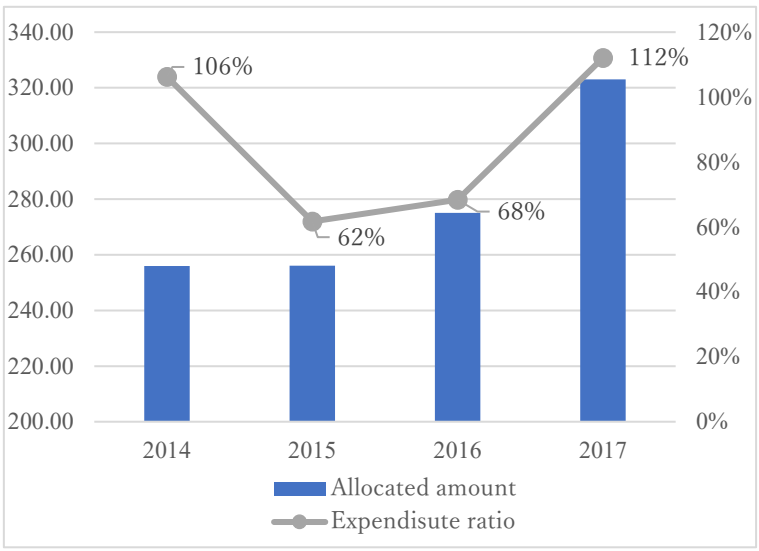


Source: Executing agency

Figure 3: RDA's Road Development and Maintenance Expenses

The amount of national budget allocated to the Eastern RDA continued to increase from LKR 256 million in 2014 to LKR 323 million in 2017, but the percentage of expenditure varied from one fiscal year to another. The RDA's budget related to road maintenance (Road Maintenance Trust Fund) is estimated at LKR 500 million annually from 2018 to 2020, indicating that sufficient budget is expected to be secured for the future.

(Million LKR)

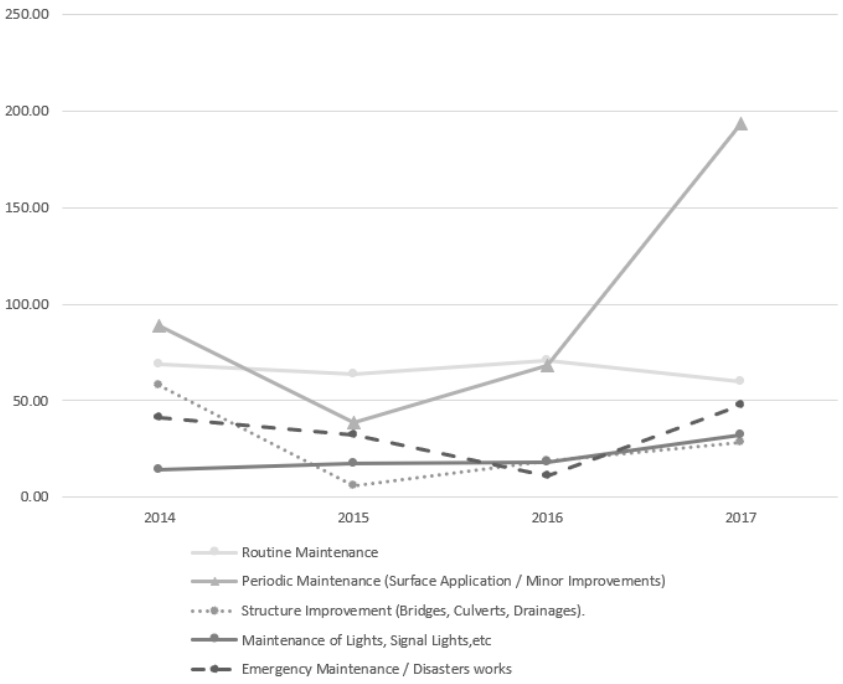


Source: Executing agency

Figure 4: Budget for the Eastern RDA

In 2015 and 2016, RDA did not use up the budget allocated to it as the percentage of expenditure to total budget remained low, at 60–70%. In 2017, expenditure exceeded the allocated budget as the percentage stood at 112%. As shown by the graph below, regular maintenance expenditure (surface/minor repair) varied from one fiscal year to another. This suggests that the accuracy of predicting future expenditure is low although maintenance work is performed periodically. If the fact that while expenditure exceeded allocated budget in 2014 and 2017, the percentage of expenditure to total budget in 2015 and 2016 remained at 60–70% is taken into consideration, the accuracy of estimating maintenance budget is also low. In the future, appropriate budget management is essential to secure the RDA's budget for, and make investments for maintenance .

(Million LKR)



Source: Executing agency

Figure 3: Results of the Eastern RDA's Expenditure

According to RDA Batticaloa, the Eastern RDA's budget is spent on roads and bridges based on the order of priority. A look at the Eastern RDA's budget and expenditure shows that it can make investments in various types of equipment at the right time as required if the Eastern RDA appropriately grasps and manages the amount of budget required for proper maintenance management for roads it covers, including bridges, and actually allocated maintenance management expenses. Meanwhile, the RDA's overall road development and maintenance expenses have continued to fall, but this trend does not affect the Eastern RDA's expenditure. Under the present circumstances, however, it is difficult to say that the Eastern RDA grasps the difference between the amount of budget required for proper maintenance for roads it covers, including bridges, and actually allocated maintenance expenses. The Eastern RDA needs to estimate and allocate budgets appropriately according to the budget the RDA

requests for the area under its supervision, the order of priority, and provincial policy. Therefore, it has some issues to address when financing its operation and maintenance.

3.4.4 Status of Operation and Maintenance

Structures to be repaired, including the bridge, causeways, and incidental equipment, were visually inspected (seen directly and from far away), and no damage, cracks, and other defects were detected, indicating that the bridge was in a favorable condition. The operation and management of their maintenance are visually inspected once a month according to the manual compiled by the RDA in 1985. In the past, prior to the ex-post evaluation, there was no situation that required repair. When evaluators visually inspected the bridge and causeways at the time of ex-post evaluation, they found graffiti on the road surface, concrete walls, and bridge clearance abutments, garbage stuck in the drainage, and other relatively minor problems. It is desirable to devise and take measures to prevent passers-by lacking in moral sense from tarnishing facilities. To manage serious repair work that may arise in the future without being too late, it is important to perform inspection duties (at normal times, periodically, and under abnormal circumstances) reliably and maintenance work at the places pointed out as required. To use targeted facilities effectively in the long run, it is necessary to establish and perform inspection duties and maintain the places pointed out during inspections.

The foregoing indicates that RDA Batticaloa has established a maintenance management system, but not much progress has been made in road repair because the roads leading up to the bridge are not supervised by the RDA. However, improvements are expected to be made if the fact that procedures are being followed to upgrade the road sectors concerned is taken into account. There is room for improvement in the lack of budget management and periodic inspections by the Eastern RDA, but it still has elbowroom for better budget management, has a maintenance management system, and trained engineers are working hard to further develop their organization through OJT.

Therefore, some minor problems have been observed in terms of the institutional, technical and financial aspect in this project's operation and management. Therefore sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was implemented to facilitate smooth traffic flow and transportation of goods through the construction of a new bridge across the Batticaloa lagoon at Manmunai in Sri Lanka, and thereby contributing to vitalizing the local community and improving the quality of life for local residents.

The project is consistent with Sri Lanka's development policy and development needs as well as Japan's official development assistance policy, which was clear both at the time of the planning and the ex-post evaluation. The selection of the bridging route as well as the project's plan and approach were appropriate, making the project highly relevant. The project underwent design changes at the time of detailed designing. However, these changes were considered reasonable from the viewpoint of ensuring

the quality and safety of the bridge, and the project was highly efficient because these changes did not affect the effects of the project as well as its cost and period, allowing the project cost to fall within the plan. With regard to effectiveness, the project failed to achieve the goal for the passenger car unit PCU as an operational indicator. However, when the target PCU was set in 2009, the movements of people other than residents who were engaged in post-civil war reconstruction projects might have been counted as part of the baseline, and the target might have been set higher. For this reason, the traffic volume was considered reasonable by comparing it with the 2017 data, which were calculated using traffic prediction software with various factors. Effectiveness and impacts of the project are high, as it was confirmed that other quantitative effects had been realized and that the promotion of exchange of people and goods had tremendous and diverse positive effects on the area around the bridge and its residents. Regarding sustainability, not much progress has been made in road repair because the roads leading up to the bridge are not placed under the control of the Road Development Authority RDA. The sustainability of the project's effects is fair because there is room for improvement in budget management and various types of regular inspections by the Eastern RDA, which supervises the bridge covered by 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

(1) Upgrading roads leading up to the bridge to national highways

The improvement of traffic access is not completed with the construction of bridges, and unless roads leading up to bridges are maintained and managed properly, improving traffic access and ensuring safety further cannot be expected. To that end, the RDA should upgrade roads leading up to the bridge to national highways soon.

(2) Implementation of careful monitoring and maintenance

Because the bridge is relatively new, it has never been diagnosed as requiring repair and reinforcement. However, the possibility of serious repair work becoming necessary in the future cannot be denied. Thus, in order not to overlook signs of the need for such work, it is proposed that RDA Batticaloa should establish a system to perform maintenance work to eliminate small abnormalities detected through periodic monitoring as required.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

Response for unexpected design changes take place

Despite design changes, the project was completed as planned because there was smooth communication between the consultant's head office in Japan and the site supervisor, and the construction process was flexibly changed considering local weather. When modifying the design of the

bridge, on-site investigations by specialized engineers are necessary. Engineering consultants in infrastructure can be classified into two major areas: (1) surveys and planning design and (2) supervision of construction work. When it is necessary to take actions in respect to natural conditions unforeseeable at the design stage, conditions of construction are not expected at the time of design or other events, engineers who exceed in (1) need to deal with the issues. However, in the case of unforeseeable significant design changes of this bridge made after Detailed Designing, it took time to solve the problem because (1) engineers were not able to visit the construction site. If (1) engineers can travel to the construction site, the additional effects listed below can be expected.

(a) Issues to address can be recognized properly.
If construction work proceeds with such issues vaguely recognized, it is unlikely that the most suitable actions will be taken.

(b) Surveys can be conducted swiftly and reliably to obtain necessary data in order to cope with problems.
It often takes time to collect data if laymen do so. Also, the accuracy of data collected could be low, it is likely that corrective actions may have to be taken on a larger scale.

(c) Delays in construction work can be minimized.
In some cases, construction work has to be stopped until the problem is solved, and this delays construction work.

(d) Appropriate explanations can be given to the implementing country and JICA.
Full explanations by the designer to the client contribute to voluntary, sustainable operation and maintenance management on the part of the recipient country.

If information or problems not expected at the design phase are revealed at the site, requiring design changes like this case, it is desirable that specialized engineers can travel to the site to confirm the situation and conduct on-site investigations.