Ex-Post Project Evaluation 2019:
Package I-1(the Philippines)

August 2020

JAPAN INTERNATIONAL COOPERATION AGENCY

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(Joint Venture)

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Republic of the Philippines

FY2019Ex-Post Evaluation of Japanese ODA Loan

"Agriculture Credit Support Project"

External Evaluator: Kenichi Inazawa, Octavia Japan, Co., Ltd.

0. Summary

The objective of this project was to vitalize investment activities that contribute to enhancing job creation and agricultural productivity in rural areas across the Philippines, by providing funds such as production funds, operating funds and capital investment funds from the Land Bank of the Philippines (hereinafter "LBP"), which is the Executing Agency of this project, to agricultural cooperatives (hereinafter "ACs"), Farmer's Organizations (hereinafter "FOs"), Small and Medium Enterprises (hereinafter "SMEs") and Large Agribusiness Enterprises (hereinafter "LAEs"), thereby contributing to poverty reduction in the Philippines. *The Medium-Term Philippine Development Plan* (2004–2010) and *Medium-Term Philippine Development Plan* (2017–2022) formulated by the Philippine Government indicated the importance of supporting the agricultural sector, dissemination of finance for small enterprises including agricultural finance, and reducing poverty. In addition, it was confirmed that the project is consistent with Japan's ODA policy, and with the demand for improvement in financial access for small-scale farmers and fishermen, etc. Therefore, the relevance of this project is high. With regard to efficiency, the output fell below the initial plan, and the project cost stayed within the planned amount. Meanwhile, the project period exceeded the initially planned timeframe, due to the time needed for the coordination and approval procedures within LBP following the changes in fund allocation (loan fund), and delay in activities such as loan screening and procedures as a result of these changes. Therefore, efficiency of the project is fair. With regard to the indicators that measure quantitative effects, about 60% of the target figure for the total sub-loan amount was achieved. The past due ratio reached more than the target figure. While the number of new borrowers was observed to be relatively large, it cannot be said with certainty that the number has reached the target, since the logic behind the target figure at the time of the project appraisal is unknown. With regard to the actual figures of the number of new employment and the production volume of small-scale farmers, fishermen, etc., it is difficult to determine the status of achievement since the target figures were not established at the time when they were supposed to during the baseline survey after the start of the project. However, given the comments received from entities such as the lending centers, which are the regional organizations of LBP, and ACs, which were in charge of lending to end-users, a certain level of contribution to job creation for

the borrowers' organizations, improvement of living standards, and reduction in poverty can be confirmed. In light of the above, the effectiveness and impact of the project is judged to be fair. No particular concerns exist in the structural, technical, or financial aspects of LBP, since debt collection has been carried out smoothly with the assistance of its head office and its lending centers, LBP has secured specialized staff, the non-performing loan ratio has shown no significant increase, and LBP is financially stable. Thus, sustainability of the effects realized through this project is judged to be high.

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

1. Project Description

Project Location

Tea Processing Facility Developed by the Loan of This Project (Negros Oriental Province)

1.1 Background

Before the start of the project, many of the micro-farmers and fishermen could not access financial and technical services. In particular, problems that surfaced as to financial services to the agricultural sector including the livestock and fishing industries, the food processing industry, and agriculture/fisheries-related services were; a shortage of medium and long-term funds, credit squeeze by financial institutions upon agriculture that carries high risks and high handling costs, the scarcity of necessary technical assistance given to borrowers by financial institutions to improve their borrowing capacity, and difficulty for borrowers to satisfy the lending criteria of financial institutions due to lack of creditworthiness, collateral, and other relevant elements. Therefore, there was a need to provide services such as technical assistance required to enhance the borrowing capacities of ACs, FOs, and other parties that cannot satisfy the lending criteria of financial institutions, in addition to providing loan funds for the agricultural sector, thereby

improving access to institutional loans for farmers, fishermen, FOs, and other relevant parties.

1.2 Project Outline

The objective of this project was to vitalize investment activities that contribute to job creation and improving agricultural productivity in rural areas, by providing funds such as production fund, operating fund and capital investment fund from LBP to the ACs, FOs, SMEs, and LAEs across the Philippines, thereby contributing to poverty reduction in the country.

Loan Approved Amount/ Disbursed Amount	14,608 million yen / 10,504 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	June 18, 2009 / November 25, 2009
Terms and Conditions	General Condition: Interest Rate: 1.40% Repayment Period : 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied Priority Condition: Interest Rate: 0.01%, 0.65% Repayment Period: 40 years (Grace Period: 10 years) Conditions for Procurement: General Untied
Borrower / Executing Agencies	Land Bank of the Philippines (LBP)
Project Completion	February 2017
Target Area	Whole Philippines
Main Contractor (Over 1 billion yen)	N/A
Main Consultant	Nippon Koei Co., Ltd. (Japan) / Philkoei International INC.(Philippines) (JV)
Related Studies（Feasibility Studies, etc.)	N/A
Related Projects	[Yen Loan] ・ ASEAN Development Fund (AJDF) Category B (LBP) (1992) ・ Rural / Agricultural Land Reform Support Policy Finance Project (1996) ・ Harnessing Agribusiness Opportunities through Robust and Vibrant Entrepreneurship Supportive of Peaceful Transformation (HARVEST) (2017) [Other international organizations, aid organizations, etc.] ・ Rural Finance Project (I) (II) (III) (1991-2007, World Bank)

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Octavia Japan, Co., Ltd.

2.2 Duration of Evaluation Study

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

Duration of the Study: August 2019－September 2020

Duration of the Field Study: October 27－November 16 2019 and February 16－23 2020

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

3.1 Relevance (Rating: ③[2])

3.1.1 Consistency with the Development Plan of the Philippines

Before the start of the project, the Philippine Government was aiming to achieve reduction in poverty through its *Medium-Term Philippine Development Plan* (2004–2010). Its specific measures included focus on support for the agricultural sector and dissemination of finance for small enterprises including agricultural finance. The government also set forth the promotion of loans for agricultural production through the food crisis measures (FIELDS program), proposed at the Philippines Food Summit in August 2008 as their initiative for food security.

At the time of the ex-post evaluation, the Philippine Government has formulated the *Medium-Term Philippine Development Plan* (2017–2022). As its poverty reduction strategy, the plan proposes the importance of redressing inequality and other relevant aspects in order to expand economic opportunities in the fields of agriculture, forestry, and fishery. As its specific initiatives, the plan aims to improve agricultural productivity and promote food security, in order to achieve balanced development goals amidst population increase. As one of its initiatives, the government aims to promote access to the value chain, technology and funding, and secure the rights and welfare of farmers and fishermen in order to increase financial opportunities for small-scale farmers and fishermen.

In light of the above, the Philippines places importance on poverty reduction and the improvement of agricultural productivity and food security through funding for small-scale farmers and fishermen at the time of the project appraisal and ex-post evaluation. Consequently, at the time of both the appraisal and ex-post evaluation, the consistency of this project with policy

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

and measures is acknowledged through the national plan, sector plan, and other relevant aspects.

3.1.2 Consistency with the Development Needs of the Philippines

Before the start of the project, about 75% of the poor demographic were mainly micro- and landless farmers and fishermen. Access to financial and technical services and other infrastructures was limited, while agricultural productivity was also stagnating. In particular, there was a shortage of medium and long-term funds necessary for the expansion of financial services to the agricultural sector including the livestock and fishing industries, the food processing industry, and agriculture/fisheries-related services. Problems that surfaced also included credit squeeze of financial institutions to the agriculture sector that carries high risks and high handling costs, the scarcity of necessary technical assistance given from financial institutions to borrowers to improve their borrowing capacity, and difficulty for borrowers to satisfy the lending criteria of financial institutions due to lack of creditworthiness, collateral, and other relevant elements. As a result, most borrowers were compelled to depend upon informal financial institutions that charge high interest. Therefore, there was an urgent need to provide services such as necessary technical assistance to enhance the borrowing capacities of ACs, FOs, and other parties that cannot satisfy the lending criteria of financial institutions, in addition to providing loan funds for the agricultural sector, thereby improving financial access for small-scale farmers, fishermen, FOs, and other relevant parties.

At the time of the ex-post evaluation, according to the abovementioned *Medium-Term Philippine Development Plan* (2017–2022), about 40% of the small-scale farmers, fishermen, and other relevant parties have limited access to formal financial institutions. Therefore, improvement of agricultural productivity is an ongoing challenge. The underlying factors that have been pointed out include small-scale farmers, fishermen, and other relevant parties' (a) lack of technology and capacity to propose implementable projects; (b) poor track record of creditworthiness; (c) lack of collateral permissibility; (d) limited information on loan products they can use. As mentioned above, while about 75% of them relied on informal financial institutions with high interest rate before the start of the project, access to formal financial institutions itself has improved (from approx. 75% in 2004 to approx. 40% in 2017), although the Philippine Government faces the ongoing need for the improvement of financial access for small-scale farmers, fishermen, and other relevant parties. Given these circumstances, the national government enacted laws (RA 10848 and RA 11203) for the creation of Agricultural Competitiveness Enhancement Fund (ACEF), and Rice Competitiveness Enhancement Fund (RCEF) in order to increase productivity

and competitiveness of small-scale farmers, fishermen, and other relevant parties. In collaboration with LBP, the Department of Agriculture has started providing low-interest loan (both funds have fixed annual interest of 2%) through the regional branches of LBP (hereinafter "lending centers"), since 2018. LBP has started lending to a wide range of organizations and individuals including small-scale farmers, fishermen, and ACs.

In light of the above, there is a need to improve financial access by providing necessary technical assistance for improving the borrowing capacities of small-scale farmers, fishermen, and FOs at the time of the appraisal and the ex-post evaluation. The loan programs for the agricultural sector are also ongoing. Consequently, the consistency of this project with development needs is judged to be high both at the time of the appraisal and ex-post evaluation.

3.1.3 Consistency with Japan's ODA Policy

In the *Country Assistance Program for the Republic of the Philippines*, formulated in 2008 by the Japanese Government, "Assistance for Empowerment of the Poor and Improvement of Living Conditions of the Poor" was proposed as the priority area, and "Improvement of Livelihood (Empowerment of the Poor)" as their developmental challenge. JICA (former JBIC) also formulated the *Medium-Term Strategy for Overseas Economic Cooperation Operations* in 2006, in which "poverty reduction through agricultural and rural development" was positioned as a priority area. Therefore, this project provides support for poverty alleviation in the Philippines, and its consistency with the priority areas in the aforementioned *Country Assistance Program* and *Country Operation Policy* is recognized. Therefore, the project's consistency with Japan's ODA policy is confirmed.

This project has been highly relevant to the Philippines'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

The project's output plan at the time of project appraisal and actual results at the time of the ex-post evaluation are as presented in Table 1. The underlined section in the Actual (At the time of the ex-post evaluation: 2019) signifies the main difference from the Plan.

Table 1: Planned Project Outputs and Actual Results

Plan (At the time of the project appraisal: 2009)	Actual Results (At the time of the ex-post evaluation: 2019)
(1) Two Step Loan (TSL) (i) Targeted sectors Agricultural, livestock and fishing industries, the food processing industry, and agriculture/fisheries-related services (ii)Use of fund Production fund, operating fund, capital investment fund, consulting services (iii)Targeted end-users Farmers, fishermen, FOs, ACs, SMEs, LAEs (iv)Lending scheme (a) (Retail) Direct loan from LBP (b) (Wholesale) Indirect loan through ACs, FOs, SMEs, LAEs, and Participating Financial Institutions (hereinafter "PFIs") (v) Sub-loan interest rate (a) Direct loan: LBP base rate (PDST-F rate (Philippine Dealing System Treasury Fixing rate) for 3 months + LBP administrative cost 1.5%) + LBP spread (2–6% for ACs and FOs; 2–4% for SMEs and LAEs) (b) Indirect loan: LBP base rate (PDST-F rate (Philippine Dealing System Treasury Fixing rate) for 3 months + LBP administrative cost 1.5%) + LBP spread of 2–6% + spread of 3–10% for ACs/FOs/SMEs/LAEs/PFIs. (vi) Sub-loan redemption period After 6 months and within 15 years (Note: in principle within 3 years) (vii) Sub-loan currency (sublease from LBP, PFI, ACs, etc.) Philippine Peso	(1) Two Step Loan (TSL) (i) Targeted sectors Agricultural, livestock and fishing industries, the food processing industry, and agriculture/fisheries-related services (ii)Use of fund Production fund, operating fund, capital investment fund, consulting services (iii)Targeted end-users Farmers, fishermen, FOs, ACs, SMEs, LAEs (iv)Lending scheme (a) (Retail) Direct loan from LBP (b) (Wholesale) Indirect loan through ACs, FOs, SMEs, LAEs, and PFIs (v) Sub-loan interest rate (a) Direct loan: 2012 Consumer Price Index (CPI) No.003 (for ACs/FOs/SMEs: between 5.25% (4.75% + Spread 0.5%) and 12.0%; for LAEs: between 6.0% (5.50%+ Spread 0.5%) and 12.0%) (b) Indirect loan: 2012 Consumer Price Index (CPI) No.003 (for ACs/FOs/SMEs: between 5.25% (4.75% + Spread 0.5%) and 12.0%; for LAEs: between 6.0% (5.50%+ Spread 0.5%) and 12.0%), for PFIs: 5.25% (4.75% +Spread 0.5%, SMEs with asset scale of 100 million PHP or less), 5.50% (5.0% + Spread 0.5%, LAEs with asset scale of 100 million PHP or more) (vi) Sub-loan redemption period After 6 months and within 15 years (Note: in principle within 3 years) (vii) Sub-loan currency (sublease from LBP, PFI, ACs, etc.) Philippine Peso and Japanese Yen
(2) Consulting services (i)Technical support for institutional reinforcement, improvement of borrowing capacities, etc. of the borrowers and loan candidates (ii)PR, expansion and marketing support for the project (iii)Sub-project formulation support (iv)Business development support for the borrowers and loan candidates, such as assistance in signing marketing contracts (v)LBP's capacity enhancement support	(2) Consulting services The services to the left have mostly been carried out, but some of them are incomplete. (Contract for the consulting services was terminated in April 2014 due to LBP's policy.)

(enhancing the client's information management, speeding up the loan procedure, etc.) (vi) Support for LBP for operating this project and its subprojects (appraisal, implementation, monitoring, and evaluation)	

Source: Documents provided by JICA, Answers on questionnaire by LBP, local interview results

Analysis of the difference between the plan at the time of project appraisal and actual results at the ex-post evaluation in Table 1 is shown below.

1） Two Step Loan (TSL)

Firstly, the lending scheme of the project is explained in Figure1. LBP provided direct loans (retail scheme) to FOs, ACs, SMEs, and LAEs, and indirect loans (wholesale scheme) to farmers and fishermen through ACs, FOs, SMEs, LAEs, and PFIs. With regard to lending to FOs and ACs, under an initiative LBP launched to improve access to formal financial institutions, LBP was to relax the conditions and targeted for the loan if the Production, Technical and Marketing Agreements[3] (hereinafter "PTMA") had been concluded between FOs/ACs and SMEs/LAEs. With regard to SMEs and LAEs, the conditions of the loans were that the Philippine capital accounted for at least more than 70% of them, and that a PTMA was concluded between SMEs/LAEs and farmers, fishermen, ACs, FOs, so that loans for SMEs and LAEs led to strengthening of business relationships with farmers, fishermen, FOs, ACs, etc.

Though there was no change from the project appraisal with regard to the Two Step Loan Sublease Scheme of the project, the range of the interest changed, as indicated by the underlines in Table 1. The following changes occurred for (v) sub-loan interest rate. After the start of the project, the sub-loan interest rate was revised by the Asset and Liability Committee[4] (ALCO), since the interest rate based on the Philippines' long-term interest rate index (PDSTF) was predicted to fluctuate significantly following the impact of the global financial crisis (2009) and the domestic economy slowing down as a result of the crisis. Specifically, a wider range of interest rate spread was established compared to the sub-loan interest rate at the time of the appraisal, in order to steadily cover the cost of the project funds, and for LBP to avoid the possibility of loss as much as possible. This is underlined by LBP expecting to lend to even more potential borrowers. With regard to (vii) sub-loan currency, LBP held a discussion with JICA after the start of the project, and included Japanese Yen as the currency covered, in addition to Philippine Peso. The

[3] Agreement aimed at securing the stability of production and product sales at markets, as well as product quality.
[4] An organization founded by commercial banks with the purpose to provide frameworks for strategically managing all of long- and short-term assets and debts of domestic commercial banks.

reasons behind this include the radical fluctuation in the exchange rates (trend towards weak yen) during the project implementation, which led the borrowers to think about the risk of the exchange rates, but also the fact that LBP expected to increase the number of potential borrowers. However in reality, there was no borrower that received a loan in Japanese Yen. Loans were only made in Philippine Peso[5].

(2) Consulting services

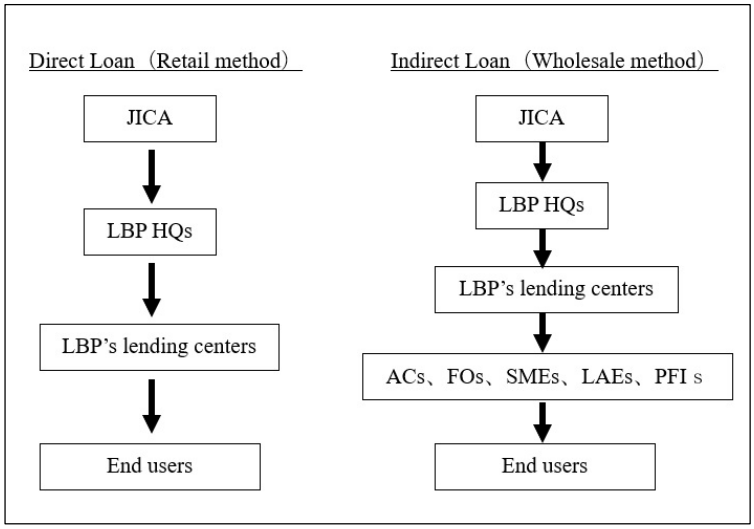
The TOR of the consulting services was implemented almost as planned. However, while Management Information System[6] (hereinafter "MIS") was improved and the project monitoring/evaluation system was built for (v) LBP's capacity enhancement support (enhancing the client's information management, speeding up the loan procedure, etc.) and (vi) support for LBP for operating this project and its subprojects (appraisal, implementation, monitoring, and evaluation), these systems stopped short of utilization. Moreover, the contract for the consulting services was terminated in April 2014 while the project was being implemented, due to LBP's policy. The reasons behind this include: (1) LBP being instructed by its executives to cut cost (reduce the cost of the consulting services); (2) MIS not conforming and coordinated with LBP's internal mission critical system[7], for which LBP was advised by the internal monitoring team to not use an external stand-alone system. Although JICA held discussions with LBP over and over again, LBP had made the choice and they kept their decision[8].

[5] The underlying factors are considered to include the Japanese businesses' expectation for business development in the agricultural sector as their opportunity to receive loans from LBP (loan from this project) increased by entering the Philippine market.

[6] A system centralizing the information of the entire organization for LBP's head office and its lending centers.

[7] One of the reasons for this non-conformity and lack of coordination may have been the lack of adjustment and communication between LBP and the corresponding consultant, although the details were unknown during the field survey at the time of the ex-post evaluation.

[8] Payment to the consultants was made for their services up until the termination (April 2014) only. With regard to the monitoring of the subprojects, as an alternative form of measurement it was decided that the lending centers would regularly report to the Project Management Office at LBP's head office. Meanwhile, LBP carried out its own technical and business support contributing to the improvement of loan repayment capacity of the end-users (farmers, fishermen, ACs, etc.). To understand the situation after the termination, multiple lending centers were visited during the field survey at the time of the ex-post evaluation, where interviews were carried out. The answer received was "seminars and workshops are held regularly for the end-users, visits to the borrowers are made regularly, and repayment support (e.g. adjustment of loan interest rate) and advice were given in accordance with the progress status of the project." There was also a comment that stated "the staff at the lending centers had the necessary capacity for providing assistance without relying on consulting services." Combined with the comments described in 3.3.1.2 Effectiveness and Qualitative Effects and 3.3.2.1 Impact and Qualitative Effects, it can be surmised that the resulting assistance has functioned as an alternative to the consulting services to a certain degree.



Source: JICA documents

Figure 1: Loan Flow of This Project's Loan (Direct method / Indirect method)

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost at the time of the project appraisal was planned to be 18,754 million yen (of this, 14,608 million yen was covered by yen loans). The actual total project cost was 13,151 million yen (of this, 10,504 million yen was covered by yen loans), which was within the plan (approx. 70% of the plan). Table 2 shows the planned project cost at the time of the appraisal and the actual project cost at the time of completion.

Table 2: Project Costs at the Time of Project Appraisal and Actual Results at the Time of Ex-post Evaluation

(Unit: Million Yen)

Item	Planned Costs at the Time of Project Appraisal			Actual Costs at the Time of Project Completion		
	Foreign Currency	Local Currency	Total	Foreign Currency	Local Currency	Total
Sub loan Of which, general conditions (category A: mainly for LAEs)	-	3,183	3,183	-	3,916	3,916
Sub loan Of which, priority conditions (category B: other than A above)	-	14,566	14,566	-	8,603	8,603
Total of sub loan	-	17,749	17,749	-	12,519	12,519
Consulting services (Category C)	222	205	427	100	112	212

Tax	-	51	51	-	30	30
Interest during construction	422	-	422	-	342	342
Commitment charge	105	-	105	-	48	48
Grand total	749	18,005	18,754	100	13,051	13,151

Source: Documents provided by JICA, Answers on questionnaire by LBP

The reasons for why the actual amount decreased compared to the plan include (1) the Philippine Government implemented economic policies such as rolling out an expansionary fiscal policy and lowering the interest rate, and banks began lending with the interest rate shown in Table 3, which led to the weakened competition, and appeal being lost for this project's loan interest rate compared to the banks' interest rate level after the start of the project[9]; (2) one of the target loan cases for lending to SMEs and LAEs was for them to have signed a PTMA with farmers, fishermen, FOs, or ACs, but there were the cases that did not meet this requirement[10]; (3) LBP switched its direction to focus on untraditional crops[11]. These factors mainly affected the sub-loan preferential terms (Category B in Table 2: Loan for those other than LAEs), which did not go as planned.

[9] Although the project's interest rate was almost at the same level as the banks' and was competitive at the time of the appraisal (Fiscal 2009), its competitiveness decreased gradually. Banks began to launch programs with lower interest rates for loans aimed at SMEs, farmers, fishermen, FOs, and ACs. As described in 3.2.1. Efficiency and Output, while the interest rate for sub-loans changed, the project's interest rate could no longer be said to be superior. According to LBP, "at the time when the loan agreement was signed (Fiscal 2009), it was thoroughly examined that the project and the banks had the same level of interest rates and were competitive. The project started under this understanding. However, the levels of loan interest rate of the banks from that year on started declining. Changing LBP's sub-loan interest rate according to market conditions meant a strain on the finances, thus it was extremely difficult to do so as far as the management policy goes." This does not indicate that the project's interest rate was less competitive compared to the loan programs of LBP and other domestic banks at the time of the appraisal, but that it was an incidence affected by the economic affairs at the time—an inevitable incidence faced by the project, so to speak.

[10] As described in 3.2.1 Efficiency and Output, one of the conditions of the loan was that PTMA was concluded between SMEs/LAEs and agricultural producers such as farmers, fishermen, ACs, FOs, so that loans for SMEs and LAEs led to strengthening of business relationships with the producers. However, in reality there are many producers who did not meet the conditions for PTMA. As a result, PTMA concluding by SMEs and LAEs did not proceed as expected, and lending to both parties did not increase as expected. More specifically, the producers face processes such as seeds, cultivation, purchase of agricultural equipment, and sales channels, but they did not have outsourcers and wanted to develop and respond for their own, which in reality did not meet the conditions for PTMA. PTMA was aimed at securing the stability of production and product sales at markets and maintain quality, among other goals, and its introduction was meaningful enough. However, it is thought that exemption of PTMA was worth taking into consideration to flexibly reflect the borrower's circumstances.

[11] This indicates that LBP shifted from traditional crops (e.g. rice, corn, etc.) to untraditional crops (e.g. sugarcane, cacao, etc.) during the project implementation. LBP anticipated that making allowances for the loan performance towards more profitable crops would increase the profit, which they predicted would likely contribute to steady repayment. This is a case in which large-scale farming of sugarcane and cacao could be expected to secure profit, but more loans being given to LAEs as a result of this caused disruption in the plan to lend loans to small-scale end-users such as farmers, fishermen, ACs, FOs, and SMEs.

（Reference) Table 3: Lending Interest Rate Level of Philippine's Banks During the Project Period

Year	Lending Interest Rate Level of Philippine's Banks
2009	7.311–9.247%
2010	6.547–8.698%
2011	5.618–7.747%
2012	5.565–7.838%
2013	4.603–6.930%
2014	4.384–6.801%
2015	4.470–6.877%
2016	4.300–6.671%
2017	4.137–7.109%

Source: Central Bank of the Philippines

3.2.2.2 Project Period

Table 4 shows the project's initially planned and actual periods. At the time of the project appraisal, the project period was planned for the seven years from November 2009 to October 2016 (84 months). However, actual project period was the 7 year 4 month period from November 2009 to February 2017 (88 months), slightly exceeding the plan (approx. 105% of the plan). With regard to the consulting services, as previously mentioned LBP secured a certain degree of implementing capacities they already had as an organization for these tasks, and it was deemed that they could carry out the initially planned TOR, thus the consulting services were terminated in April 2014. Meanwhile, with regard to (2) sub-loan lending, it slightly exceeded the plan although it almost went as planned. This is underlined by factors mainly including the time needed for adjustments and approval procedures within LBP following the changes[12] in fund allocation, and delay in aspects such as loan screening and procedures as a result of these changes, as well as procedures checking of the aforementioned PTMA procedures.

Table 4: Planned and Actual Project Periods

	Planned	Actual
(Whole project)	November 2009 – October 2016 (84months)	November 2009 – February 2017 (88months)
1) Consulting Services	November 2010 – October 2015	June 2010 – April 2014
2) Sub Loan	November 2009 – October 2016	June 2010 – February 2017

Source: Documents provided by JICA, Answers on questionnaire by LBP

[12] Approx. 4.6 billion yen of asset range was transferred over to Category A (loan for LAEs) from the initially planned Category B loans (loan to those other than LAEs).

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

The project was a two-step loan (TSL) for agricultural, livestock and fishing industries, the food processing industry, and agriculture/fisheries-related services in the Philippines, and subprojects could not be properly identified due to the project's nature. Therefore, neither Economic Internal Rate of Return (EIRR) nor Financial Internal Rate of Return (FIRR) was calculated at the time of the appraisal. Therefore, there was no recalculation at the time of the ex-post evaluation either.

Although the project cost was lower than planned, it can be said that the project period exceeded the plan. Therefore, the project's efficiency is judged to be fair.

3.3 Effectiveness and Impacts[13](Rating:②)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects

Table 5 shows indicators (baseline, target, and actual figures) to measure the quantitative effects of the project.

Table 5: Operation and Effect Indicators (baseline, target and actual figures) of This Project

Indicators	Baseline Figures	Target Figures	Actual Figures
	2009	2018	2019
		2 years after project completion	2 years after project completion
Sub-loan (operation indicators)			
(1) Total amount of sub-loans (Unit: million yen)	-	17,749	12,519 (Data at the time of the ex-post evaluation: November 2019)
(2) Past due ratio of the project[14] (Unit: %)	-	12.96% or less	Approx. 5% (Data at the time of the ex-post evaluation: November 2019)
(3) Number of new borrowers (Unit: cases)	-	100	452 (Number of new loans by indirect lending.

[13] Sub-rating for Effectiveness is to be put with consideration of impacts.

[14] The past due ratio is calculated according to the standards of the Central Bank of the Philippines. The country's standards are defined as delinquent loans over 3 months.

			Breakdown: 373 farmers & fishermen, agricultural cooperatives, 69 SMEs, and 10 LAEs. Data at the time of the ex-post evaluation: November 2019)
Job creation (effect indicator)			
(4) (Reference) Number of newly employed people (Unit: people)	(*Though it was meant to be determined during the baseline survey, this was not quantified)	(*Though it was meant to be determined during the baseline survey, this was not quantified)	6,296 *Note 1 (Data from 2019)
Improvement of agricultural productivity (effect indicator)			
(5)(Reference) Production volume by farmers & fishermen (Unit: increase rate: %)	(*Though it was meant to be determined during the baseline survey, this was not quantified)	(*Though it was meant to be determined during the baseline survey, this was not quantified)	15,370ha of production area (ha) by small-scale farmers and fishermen.*Note 2 (Data from 2019)

Source: Documents provided by JICA, Answers on questionnaire by LBP, LBP's documents
Note 1: Estimated figure proposed by LBP. Before the start of the project (before 2009), LBP and the National Economic and Development Authority (NEDA) collaborated to determine the indicators, through which the number of newly employed people was calculated as 8,300 from SMEs, and 1,930 from LAEs, amounting to a total of 10,230. While the reasons behind this are unknown, the figure in question (10,230) seems to not have been adopted for the project appraisal either way.
Note 2: Estimated figure proposed by LBP.

Five quantitative effect indicators were established at the time of the project appraisal, as shown in Table 5. The indicators for which target figures were set from the start were only (1) total amount of sub-loans; (2) past due ratio of the project; (3) number of new borrowers. Each indicator is described below.

・(1) As described in 3.2.1 Efficiency and Output, sub-loans were not given out as planned, and the actual total amount of sub-loans achieved about 60% of the target.

・(2) While the target figure for the past due ratio of the project was set as 12.96% or less, the actual figure was approx. 5%, indicating a generally positive repayment trend[15].

・(3) With regard to the target figure (100 cases) of the number of new loans, only the two following points were identified at the time of the appraisal: (i) LBP's loans are new, and; (ii) they are indirect loans (wholesale scheme) that go through ACs, FOs, SMEs, LAEs, and PFIs. However, the logic upon which the target figure was calculated was not made clear through browsing references of the field survey at the time of this ex-post evaluation, or through interviews with

[15] Meanwhile, with regard to cases in which repayment is overdue, LBP explained that the factors behind it included the decrease in agricultural income due to natural disasters such as typhoon, decline in sales price of agricultural products in the market, and increase in mortality rate of chickens due to breakdown of equipment in poultry farms. Moreover, after two to three years have passed from the project completion, this ratio is about the same as other loan programs of LBP besides this project.

parties involved in the project[16]. The actual figure (452 cases) is the data recorded at LBP. This means that while there is a large discrepancy between the target figure and the actual figure, it cannot be said with certainty that the number of loans increased/was achieved through this project when (1) the total amount of sub-loans has decreased in comparison to the plan.

・(4) With regard to the number of newly employed people, baseline and target figures were meant to be determined during the baseline survey conducted after the start of the project. However, in reality concrete figures have not been set during the survey[17]. Meanwhile, comments received through the interview conducted on the lending centers visited during the field survey claimed that "it feels like the number of employment has increased in the past five to ten years in the borrowers' organizations who received loans from LBP, including loans from this project. Though it depends on the sector, there seems to be a high tendency of this among SMEs and LAEs. I think that securing employment brings stable income and leads to vitalization of the rural economy." However, given the fact that LBP has not carried out regular monitoring of the actual figures after the start of the project, in addition to the fact that the baseline and target figures were not determined during the baseline survey, the actual figures of this indicator lack information for judgment, therefore they can only be treated as reference figures.

・(5) With regard to the production volume by farmers and fishermen, baseline and target figures were meant to be determined during the baseline survey after the start of the project as well, but these were not established. Meanwhile, it was confirmed through interviews with LBP in an internal lending committee after the start of the project that the organization aimed to achieve a 5% higher production volume for future by farmers and fishermen than the level before the start of the project[18]. On the other hand, the actual figure is the production area (ha) by small-scale farmers and fishermen, and the extent of the increase ratio could not be confirmed. As the baseline and target figures did not exist and LBP has not carried out regular monitoring of the actual figures, the level of achievement cannot be measured as it lacks information for judgment. Therefore, the actual figures of this indicator can only be treated as reference figures[19].

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[16] The LBP's view is that perhaps(ii) the number of borrowers through indirect loans did not meet the estimate, and it simply counted the number of new loans given from LBP head office to its lending centers. However, the circumstances at the time of the appraisal were not made clear.

[17] The baseline survey was conducted in 2011. However, this was to examine the circumstances in each field, mainly the farmers, fishermen, ACs, etc., and it did not determine aspects such as the figures for the indicators for the ex-post evaluation.

[18] In this committee, the production volume also took into account the fact that this is influenced by elements such as the planted acreage, yield/ha, and double- or triple-cropping.

[19] As described in 3.2.1. Efficiency and Output, MIS and project monitoring and evaluation systems were developed through the project's consulting services, but these stopped short of utilization. Therefore, it can be surmised that regular recording and monitoring of the indicators' data were not adequate, and it may not be possible to keep track of the baseline, target and actual figures.

3.3.1.2 Qualitative Effects (Other Effects: Improving the review and management capabilities of LBP and agricultural cooperatives)

During this field survey, an interview survey[20] was conducted with regard to the improvement of screening and operation by LBP (head office and lending centers) as well as the ACs. The following are examples of the results during these interviews:

・"There is little difference in this project's loan when compared it to the screening, operation and debt collection of LBP's other loan programs. LBP has been increasing the number and amount of loans given every year including this project's loan, and the productivity and competitiveness is a challenge in the agricultural sector. We will work on acquiring new techniques, provide appropriate and necessary information to the borrowers, and expand the loans" (LBP head office)

・"There are few cases where loan repayment of the project have been delayed. In the agricultural sector, repayment is particularly swift if no time is required from planting to harvest. Meanwhile, there is little difference in this project's repayment when compared to other loan programs of LBP" (lending center)

・"Lending centers visit ACs and other organizations regularly and check their loan status, and establish mutual understanding about the challenges and common grounds. We are also working to increase the motivation of the borrowers such as lightening their burden on the interest rate if the profit increases (provision of incentives)" (lending center, ACs)

・"(Though not limited to this project's loans), there are sometimes requests from the borrowers to lower the interest rate. Whenever this is the case, we take their situation into consideration, and sometimes adjust the interest rate. Those are addressed on a case-by-case basis, in view of the project plan formulation, submission of financial statements, and whether the project is realizable or not, among other considerations. The important point is whether the borrower side can handle the funds or not" (lending center, ACs)

[20] Based on the information provided by and discussed with LBP, regions were chosen to target those areas where a relatively large number of loans were given to ACs, SMEs, etc., and where visits for the ex-post evaluation mission were accepted (the Provinces of Bulacan, Pampanga, and Nueva Ecija in the central Luzon Island, and the Provinces of Isabela and Nueva Vizcaya in the north of the island, and the Province of Cebu in Cebu Island, and the Province of Negros Oriental in Visayas Islands), and interviews were held with staff from the LBP head office as well as its lending centers in the corresponding regions (targeting a total of eight organizations, six men and five women amounting to a total of 11 respondents), and with staff of ACs that receive loans from LBP and were in charge of lending to farmers and fishermen registered with that AC (targeting a total of seven organizations, three men and four women amounting to a total of seven respondents).

As understood from the comments above, it can be concluded that there is little difference between this project's loan and LBP's other loan programs. No remarkable points could be identified in the aspect of quality improvement for screening and operation capacities specialized in this project, such as the capacity for screening and examining the borrowers, speeding up of the procedures, and improvement of the loan services. In particular, there were quite a few staff in charge at ACs and other organizations who were not aware that the loans were from JICA with regard to indirect lending (wholesale scheme), the flow of which is for LBP to provide loans to ACs through lending centers as part of a program that includes this project's loan, which the ACs then would lend to the farmers and fishermen registered at the respective ACs. Moreover, with regard to direct lending, some cases were identified to recognize this project's loan (JICA's two-step loan) and LBP's other loan programs, and inform the borrowers that the loan is from JICA. However, it was also confirmed that there were some staff members at the lending centers that were not aware of the differences. Many of the comments above describe the situation surrounding loans by LBP including this project's loan. While they do not show the clear qualitative effects (improvement of the screening and operation capacities through the project implementation), it can be surmised that the debt collection and operation capacities of the lending centers, ACs, etc., had been secured somewhat more than at the time of the project commencement, when looking only at the results of this interview survey.

3.3.2 Impacts

3.3.2.1 Intended Impacts

Contribution to Poverty Reduction through Job Creation in Rural Areas and Improvement of Living Standards for Farmers and Fishermen

During this field survey, Regions II (Provinces of Isabela and Nueva Vizcaya), III (Provinces of Bulacan, Pampanga, and Nueva Ecija), VII (Provinces of Cebu and Negros Oriental) were visited and interviews[21] were carried out on the end-users such as those from the agricultural, livestock and fishing industries, the food processing industry, and agriculture/fisheries-related services who received LBP's loans including this project's loan. Below are excerpts of comments received.

[21] Based on the meeting with the staff in charge during the visits at the lending centers, interviews were carried out targeting a total of eight organizations and 28 people (19 men and 9 women), after gaining an understanding of and selecting the agricultural, livestock and fishing industries, the food processing industry, and agriculture/fisheries-related services (relatively large-scale organizations) that are loosely expected to have received loans from this project.

[NPOs running agricultural, livestock, and food processing industries and its end-users such as their registered farmers]

・"Upon receiving LBP's loan (including this project's loan) between 2014 and 2016, we expanded the number of our branches mainly around the Province of Cebu. The number of staff has increased by threefold" (NPO), "We have launched new businesses after receiving LBP's loan, such as food items using coconut, cacao plantation, and poultry farming" (NPO), "Thanks to NPO's loans, we have been able to diversify our operation. Before we used to only plant and harvest rice, but now we utilize the loan to cultivate bananas" (end-user), "Agricultural income has increased, and I have been able to send my three children to university" (end-user)

[End-users of agricultural companies that operate rice polishing business]

・"I know that it's JICA's two-step loan (this project's loan). The staff in charge at the lending center told me about it, and I heard that it is an inter-governmental loan. I have been running a rice polishing business for about 20 years, and I have been able to introduce more rice polishing equipment, expand the business, and create more jobs using this loan. I have been able to respond to a wide range of demands, whether for feed or for polished rice. There has been a significant increase in the number of people employed, when compared to before receiving the loan. We employ local residents (young people)" (end-user)

[Agricultural cooperatives and end-users registered with them]

・"I have been consistently receiving loans from LBP for over 30 years since the establishment. I did not know it was JICA's loan. The main industry is cacao cultivation and pig farming. Cacao is vulnerable to diseases, and stable harvest is an imperative issue, but there is a potential for the future. I predict that there will be an increase in the cultivation through utilization of the loan" (agricultural cooperative), "I have been pig farming for over 10 years using LBP's loan. The profit has been increasing. I was able to send my children to school" (end-user)

For reference, Table 6 shows the trend in the poverty rate in the regions visited during this field survey and across the Philippines. There is a downward trend in almost every region and nationally. While it is difficult to conclude the direct correlation between the poverty rate and this project's loan, as many other factors are considered to be at play, when considering that the project takes a share in LBP's loan, it can be surmised that the project has played a role in achieving job creation for the borrowers' organizations, improvement of living standards, and poverty reduction.

Table 6: Trend of Poverty Rate in the Regions (region level) Visited in This Survey

(Unit: %)

Region (Province)	2009	2012	2015	2018
Region II (Region including the Provinces of Isabela, Nueva Vizcaya)	20.2	17.0	11.7	12.3
Region III (Region including the Provinces of Bulacan and Nueva Ecija)	10.7	10.1	8.9	5.0
Region VII (Region including Cebu and Negros Oriental)	26.0	25.7	23.6	13.2
National	20.5	19.7	16.5	12.1

Source: Philippine Statistics Authority (PSA)
Note: Data on poverty rate is gathered every three years by PSA.

Photo 1: Facilities of the Rice Milling Company Finances by This Project (Nueva Ecija Province)

Photo 2: Cacao Production Financed by This Project(Cebu Province)

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Natural Environment

With regard to the project's subprojects (borrowers), it was confirmed through questionnaire and interviews with LBP that there has been no negative impact on the natural environment during the project implementation and after its completion[22]. If a problem occurs in the natural environment, LBP is supposed to take measures based on the applicable regulations stipulated in the Philippine Environmental Code or Environmental Clearance Certificate (ECC). It was confirmed through the interview survey and observation that there was no negative impact on the natural environment of the ACs, SMEs, and the surrounding sites visited during the field survey either.

[22] Through the field survey, it was confirmed that there were no cases where Category A projects were included in the subprojects.

Monitoring for the subprojects (borrowers) during the project implementation and after its completion involves the following: (1) lending centers, which are LBP's regional branches, visit the sites regularly and perform monitoring/check, for aspects including the environmental impact of the conditions surrounding the site; (2) staff from LBP head office's Environment Program Management Department (hereinafter "EPMD") visit the sites regularly (about once every one to two years), and similarly check whether there is negative impact on the environment, whether disposal of waste is appropriate, whether there is impact on the surrounding area of the site, etc.; (3) environmental departments of the local municipalities where the subprojects are located carry out on-site checks as necessary[23].

2) Resettlement and Land Acquisition

It was confirmed through questionnaire given to LBP and interviews with ACs, SMEs, LAEs, etc., visited during this field survey that, as with the impact on the natural environment described above, no negative impact has realized with regard to resettlement and land acquisition. Moreover, it was confirmed that there were no subprojects (borrowers) or resettlement that entailed land acquisition.

In light of the above, with regard to the indicators measuring quantitative effects, (1) the total amount of sub-loans has stopped at about 60% of the target figure; (2) past due ratio of the project has achieved more than the target figure; (3) the logic behind the target figure at the time of the appraisal is unknown with regard to the number of new borrowers, therefore the actual figure has not necessarily met the target, and; with regard to (4) the number of newly employed people and (5) production volume by farmers and fishermen, while the actual figures could be recognized to a certain extent, the baseline and target figures were not determined during the baseline survey and no regular monitoring or record of the actual figures could be confirmed, therefore no detailed evaluation can be made on the status of achievement. Meanwhile, given the results from the interview survey acquired from lending centers, ACs, etc., it can be said that the capacities for debt collection and operation has been secured by the lending centers, ACs, etc., that handle LBP's loan including this project's loan. Moreover, it can be surmised that the project has played a role in achieving job creation, improvement of living standards, and poverty reduction. Based on a holistic review of the above, the effectiveness and impact of the project is judged to be fair.

[23] Monitoring plan and results of the subprojects could not be acquired through this survey.

3.4 Sustainability (Rating: ③)

3.4.1 Institutional / Organizational Aspect of Operation and Maintenance

The Executing Agency of this project is LBP. LBP is a governmental financial institution established with the purpose to assist the agricultural sector. Since its establishment in 1963[24], the organization has been providing advice and instruction on business management for many years. During the project implementation, Project Management Office (PMO) was established by the Program Management Department (PMD), which is under the Agricultural and Domestic Banking Sector (ADBS) of the LBP head office. During the project implementation, PMO was in charge of tasks such as smooth progression of the project, procurement, marketing/promotion, loans, capacity development of the borrowers, and monitoring of repayment. After the completion of the project, PMO (three staff members) continues to handle the tasks in collaboration with EPMD (10 staff members) and Account Management Team (AMT, two staff members). PMO visits the borrowers' organizations regularly and collects debt and performs repayment monitoring (around once every one to two years). In addition, LBP has 45 lending centers throughout the country, whose field representatives (from several to several dozen of them) visit the borrowers' organizations regularly (once every month to six months), screen creditworthiness, manage accounts of the borrowers, develop new loans, and collaborate/make arrangements with ACs, SMEs, LAEs, PFIs, etc.

With regard to the number of LBP staff members above, the LBP head office and its lending centers' opinion is that "this number is enough for the present operational structure." As for the project, LBP is specialized in debt collection and repayment monitoring, and it can be concluded that they are not in a situation where hiring more staff is particularly necessary. LBP has indicated that hiring more staff would be inevitable if a new loan program was to be introduced. Based on these, it can be said that the organizational structure has been established in a way that corresponds to the scale of the organization and its tasks.

In light of the above, it can be concluded that there are no major issues in the aspect of LBP's organization and structure.

3.4.2 Technical Aspect of Operation and Maintenance

LBP has many staff members that have specialized skills in loans, debt management and

[24] LBP is a governmental financial institution (funded 100% by the Philippine Government), established with the purpose of agrarian reform and assisting the agricultural sector.

collection, etc[25]. Regular training is also held for the staff. Recent cases of such training between 2018 and 2019 include content such as “lending seminars (basics and advanced), and “management and financial management skills improvement.” OJT inductions are also provided in a timely manner to the new recruits, and the staff undergoes the loan staff development training (six months) after entering the organization. LBP performs banking tasks based on the lending manual that covers its processes, management, checks, etc.

In light of the above, it can be concluded that there are no major issues in LBP’s technical aspect.

3.4.3 Financial Aspect of Operation and Maintenance

Table 7 shows the loan status of LBP as a whole, and Table 8 shows changes in current assets.

Table 7: Whole Loan Status of LBP

Year	Number of Loans	Total Loan Balance (Unit: 100 million PHP)	Total Non-performing Loans (Unit: 100 million PHP)
2014	15,627	3,858.0	68.2
2015	18,713	5,370.2	63.9
2016	21,404	5,193.6	71.7
2017	23,537	6,743.5	65.9
2018	24,741	7,988.0	91.3

Source: LBP

Table 8: Trends in Current Assets[26]

(Unit: 100 million PHP)

2015	2016	2017	2018
7,228.5	8,672.5	9,722.8	10,326.0

Source: LBP

Recently LBP has been expanding its business scale, such as by increasing the number of loans given to SMEs, LAEs, etc., in the country. With regard to Table 7, according to LBP the numbers of loans, eligible borrowers, and amount of loan balance have been on an upward trend in recent years. In such circumstances, the loan ratio of this project is not necessarily high compared to the total balance of loans[27], but a high screening standard and debt collection capacities can be concluded to have been secured to a certain extent, since the total amount of non-performing loans has not necessarily indicated significant growth against the total balance of loans. LBP has also given comments such as “the scale of loans has been growing year by year, but the ratio of non-

[25] Many of the staff members have graduated from four-year universities and have a background in the financial sector (general knowledge in the financial sector, financial analysis, and degree in economics and finance).
[26] Liquid assets refer to the accounting asset that can be converted into cash or cost normally within a year.
[27] For approx. 799.8 billion PHP of total balance of loans, the project’s total amount of loans is approx. 5 billion PHP.

performing loans has not changed much. There is no big fluctuation throughout the year."

Table 8 indicates the trend of liquid asset of LBP as a whole. LBP's liquid asset is made up of cash, inter-bank loans, government securities, negotiable securities of non-governmental organizations, etc. The table shows that this asset has been on an upward trend in the most recent years. This indicates that there is a large amount of working capital at hand, which is expected to further expand the loan business.

The capital adequacy rate[28] of LBP was 11.77% in 2017, and 12.69% in 2018 (source: LBP). Since both years satisfy the capital adequacy ratio standard (8% or over) of the Bank for International Settlements (BIS), financial stability can be recognized.

In light of the above, it can be concluded that there are no major issues in LBP's financial aspect.

3.4.4 Status of Operation and Maintenance

The total amount of loans by this project is approx. 5 billion PHP, while the cumulative amount of repayment at the time of the ex-post evaluation is approx. 4.75 billion PHP. The repayment rate is high at around 95%. According to LBP, repayment rate of other loan businesses besides this project is about the same between three to four years after the lending has completed.

At the time of the ex-post evaluation (February 2020), LBP is planning on setting up a revolving fund that gives out loans with the same terms, using the surplus capital that emerges from the gap between the repayment period of the sub-loans and that of this project's loan. Refinancing will be carried out through this fund.

No major problems have been observed in the institutional/organizational, technical, financial aspects and current status of the operation and maintenance system. Therefore, sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of this project was to vitalize investment activities that contribute to enhancing job creation and agricultural productivity in rural areas across the Philippines, by providing funds such as production funds, operating funds and capital investment funds from the LBP, which is the Executing Agency of this project, to ACs, FOs, SMEs and LAEs, thereby contributing to

[28] Ratio of capital adequacy to the total amount of asset (loan and bond held). The higher the figure, the higher the stability of the bank credited.

poverty reduction in the Philippines. *The Medium-Term Philippine Development Plan* (2004–2010) and *Medium-Term Philippine Development Plan* (2017–2022) formulated by the Philippine Government indicated the importance of supporting the agricultural sector, dissemination of finance for small enterprises including agricultural finance, and reducing poverty. In addition, it was confirmed that the project is consistent with Japan's ODA policy, and with the demand for improvement in financial access for small-scale farmers and fishermen, etc. Therefore, the relevance of this project is high. With regard to efficiency, the output fell below the initial plan, and the project cost stayed within the planned amount. Meanwhile, the project period exceeded the initially planned timeframe, due to the time needed for the coordination and approval procedures within LBP following the changes in fund allocation (loan fund), and delay in activities such as loan screening and procedures as a result of these changes. Therefore, efficiency of the project is fair. With regard to the indicators that measure quantitative effects, about 60% of the target figure for the total sub-loan amount was achieved. The past due ratio reached more than the target figure. While the number of new borrowers was observed to be relatively large, it cannot be said with certainty that the number has reached the target, since the logic behind the target figure at the time of the project appraisal is unknown. With regard to the actual figures of the number of new employment and the production volume of small-scale farmers, fishermen, etc., it is difficult to determine the status of achievement since the target figures were not established at the time when they were supposed to during the baseline survey after the start of the project. However, given the comments received from entities such as the lending centers, which are the regional organizations of LBP, and ACs, which were in charge of lending to end-users, a certain level of contribution to job creation for the borrowers' organizations, improvement of living standards, and reduction in poverty can be confirmed. In light of the above, the effectiveness and impact of the project is judged to be fair. No particular concerns exist in the structural, technical, or financial aspects of LBP, since debt collection has been carried out smoothly with the assistance of its head office and its lending centers, LBP has secured specialized staff, the non-performing loan ratio has shown no significant increase, and LBP is financially stable. Thus, sustainability of the effects realized through this project is judged to be high.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

None

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

(1) Need for Project Risk Management for Realization of Project Effects

Lending through this project did not go as initially expected for reasons including the loan's interest rate becoming less attractive compared to that of the banks after the start of the project, there being the agricultural producers such as ACs, FOs, etc., that did not meet the requirement of having signed a PTMA, and LBP having shifted its direction to focus on untraditional crops. Meanwhile, loans aimed at LAEs expanded. While the overall scale of loans decreased, the continuity of the project persisted, and its effects were secured to a certain degree. Based on this background, it can be concluded that project risk management for realization of project effects was taken into consideration from the beginning, and that it is significant that it functioned that way in reality. In formulating similar projects in the future, it may be worth considering to add flexibility to the loan structure (i.e. setting multiple routes for loans) while considering the demand for loans.

(2) Importance of Continually Performing Monitoring to Check the Project's Smooth Progress

Though MIS (designed to centralize the information of the whole organization including the LBP head office and its lending centers) and project monitoring and evaluation systems were developed through the project's consulting services, these stopped short of utilization. Firstly, it may have been necessary for the consultants involved with the project (including local consultants), aid implementation sides, and the Executing Agency to thoroughly understand the situation surrounding the project and the status and demand of the Executing Agency while working on preventing such situations, and thoroughly communicate, collaborate and build good relationships. If the project monitoring and evaluation systems were to remain unused as they did in this project, it is desirable to agree among the relevant parties on when and how to perform continuous monitoring and collect information, and work on communicating with each other at all times.

(3) Considering Selection and Establishment of Pilot/Sub-projects for Appropriate Follow-up of Target and Actual Figures Related to Effectiveness and Quantitative Effects

A baseline survey was carried out during the project implementation on agricultural sectors.

However, it was to examine the circumstances in each sector, mainly the farmers, fishermen, ACs, etc., and it did not determine target figures for the number of newly employed people and product volume by farmers and fishermen after the project completion. Therefore, there was disruption in data collection and judgment on target and actual figures related to some of the effectiveness and quantitative effects. There were also cases in which the amount of loan from this project has not necessarily been communicated for the loans from the lending centers to its end-users. Based on this background, when formulating similar projects in the future, it is considered beneficial for both JICA and the Executing Agency to carry out discussions and selections on multiple pilot and sub-projects from the beginning of the project commencement, continuously acquire and check the data to measure the effectiveness, and utilize it to manage the progress.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	(1) Two Step Loan (TSL) (i) Targeted sectors Agricultural, livestock and fishing industries, the food processing industry, and agriculture/fisheries-related services (ii)Use of fund Production fund, operating fund, capital investment fund, consulting services (iii)Targeted end-users Farmers, fishermen, FOs, ACs, SMEs, LAEs (iv)Lending scheme (a) (Retail) Direct loan from LBP (b) (Wholesale) Indirect loan through ACs, FOs, SMEs, LAEs, and PFIs (v) Sub-loan interest rate (a) Direct loan: LBP base rate (PDST-F rate (Philippine Dealing System Treasury Fixing rate) for 3 months + LBP administrative cost 1.5%) + LBP spread (2–6% for ACs and FOs; 2–4% for SMEs and LAEs) (b) Indirect loan: LBP base rate (PDST-F rate (Philippine Dealing System Treasury Fixing rate) for 3 months + LBP administrative cost 1.5%) + LBP spread of 2–6% + spread of 3–10% for ACs/FOs/SMEs/LAEs/PFIs. (vi) Sub-loan redemption period After 6 months and within 15 years (Note: in principle within 3 years) (vii) Sub-loan currency (sublease from LBP, PFI, ACs, etc.) Philippine Peso	(1) Two Step Loan (TSL) (i) Targeted sectors Agricultural, livestock and fishing industries, the food processing industry, and agriculture/fisheries-related services (ii)Use of fund Production fund, operating fund, capital investment fund, consulting services (iii)Targeted end-users Farmers, fishermen, FOs, ACs, SMEs, LAEs (iv)Lending scheme (a) (Retail) Direct loan from LBP (b) (Wholesale) Indirect loan through ACs, FOs, SMEs, LAEs, and PFIs (v) Sub-loan interest rate (a) Direct loan: 2012 Consumer Price Index (CPI) No.003 （ for ACs/FOs/SMEs: between 5.25 % (4.75% + Spread 0.5%) and 12.0%; for LAEs: between 6.0% (5.50%+ Spread 0.5%) and 12.0%) (b) Indirect loan: 2012 Consumer Price Index (CPI) No.003 (for ACs/FOs/SMEs: between 5.25 % (4.75% + Spread 0.5%) and 12.0%; for LAEs: between 6.0% (5.50%+ Spread 0.5%) and 12.0%), for PFIs: 5.25% (4.75% +Spread 0.5%, SMEs with asset scale of 100 million PHP or less), 5.50% (5.0% + Spread 0.5%, LAEs with asset scale of 100 million PHP or more) (vi) Sub-loan redemption period After 6 months and within 15 years (Note: in principle within 3 years) (vii) Sub-loan currency (sublease from LBP, PFI, ACs, etc.) Philippine Peso and Japanese Yen

	(2) Consulting services (i)Technical support for institutional reinforcement, improvement of borrowing capacities, etc. of the borrowers and loan candidates (ii)PR, expansion and marketing support for the project (iii)Sub-project formulation support (iv)Business development support for the borrowers and loan candidates, such as assistance in signing marketing contracts (v)LBP's capacity enhancement support (enhancing the client's information management, speeding up the loan procedure, etc.) (vi) Support for LBP for operating this project and its subprojects (appraisal, implementation, monitoring, and evaluation)	(2) Consulting services The services to the left have mostly been carried out, but mainly regarding (v)LBP's capacity enhancement support (enhancing the client's information management, speeding up the loan procedure, etc.) (vi) Support for LBP for operating this project and its subprojects (appraisal, implementation, monitoring, and evaluation), improvement of the management information system (MIS) and development of project monitoring and evaluation system were established, but they were completed without being used. Contract for the consulting services was terminated in April 2014 due to LBP's policy.
2. Project Period	November 2009 – October 2016 (84 months)	November 2009 – February 2017 (88 months)
3. Project Cost Amount Paid in Foreign Currency	749 million yen	100 million yen
Amount Paid in Local Currency	18,005 million yen	13,051 million yen
Total	18,754 million yen	13,151 million yen
ODA Loan Portion	(14,608 million yen)	(10,504 million yen)
Exchange Rate	1 PHP = 1.88 JPY, 1 USD = 90.4 yen (as of March 2009)	1 PHP = 2.20 JPY, 1 USD = 99.12 yen (The average value is based on which the exchange rate is divided by the IMF's International Fiscal Statistics (IFS) 2010-2017.)
4. Final Disbursement	March 2017	

Republic of the Philippines

FY2019 Ex-Post Evaluation of Japanese ODA Loan

"Agrarian Reform Infrastructure Support Project (Phase III)"

External Evaluator: Kenichi Inazawa, Octavia Japan, Co., Ltd.

0. Summary

This project aimed to raise the income level of the residents of Agrarian Reform Communities (hereinafter referred to as ARCs[1]) across the country, thereby contributing to poverty reduction in these areas. For this purpose, the project provided support to infrastructure development such as installation of small-scale irrigation facilities, and establishment of information marketing centers and institutional development of organizations that promote exchange of information and wide-ranging cooperation in ARCs. The *Medium-Term Philippine Development Plan (2004–2010)* and the *Philippine Development Plan (2017–2022)* formulated by the Philippine Government both indicated the importance of addressing inequality and other relevant aspects including that of productivity in agriculture and rural businesses in order to expand economic opportunities in the fields of agriculture, forestry, and fishery. In addition, it was confirmed that the project was consistent with Japan's ODA policy, and that there was a demand for continued provision of agrotechnical services, support for institutional formulation, financial services, and infrastructure development to micro-farmers and other relevant parties in the ARCs. As such, the relevance of this project is high. With regard to efficiency, the actual project cost was almost as that of initially planned but the figures did not reach the planned targets such as the number of information marketing centers, number of institutional formulation and enhancement of federations of agricultural cooperatives, areas for construction and rehabilitation of communal irrigation facilities, and number of construction of water supply systems. Given these, it cannot be concluded that the results were necessarily efficient relative to the planned outputs. Additionally, the project period exceeded the initially planned timeframe, due to the prolonged negotiation with landowners for land acquisition, which affected the commencement of construction work in some areas. In light of the above, efficiency of the project is judged to be low. Many indicators that

[1] According to the *Republic Act No. 7905* which was adopted in February 1995, ARCs are defined as "barangays (the smallest unit of LGU indicating a village, district, or ward), community organizations, or organizations undertaking the integrated development of an area through cooperatives." However, the Department of Agrarian Reform (hereinafter DAR), which is the Executing Agency of this project, established agrarian reform zones (KAR Zones) in 2003, and does not have clear differentiation between barangays, community organizations and cooperatives, as their initiatives include expansion of the targeted area of ARCs to non-ARC barangay regions and LGUs. While 1,216 LGUs in the country are home to 9,724 barangays, DAR has confirmed the existence of 2,216 ARCs. A total of approximately 1.52 million people are estimated to be residents of the 2,216 ARCs (source: DAR, data from 2017). There are some cases where one or more barangays, agricultural cooperatives, etc., act as ARCs.

measure quantitative effects show that these effects have been achieved almost as planned, or exceeded the plan. Moreover, through interviews with people relevant to the project, such as those from agricultural cooperatives, federations of agricultural cooperatives, LGUs (hereinafter LGUs) and farmers, it can be considered that the impact of the project has manifested in terms of increased agricultural productivity and revenue, improved quality of life of residents of the targeted ARCs, and reduction of poverty. In light of the above, the effectiveness and impact of the project is judged to be high. With regard to operation and maintenance in the LGUs , irrigators' associations, agricultural cooperatives, federations of agricultural cooperatives, and water users' associations visited during this field survey, no particular major concerns are thought to exist in the conditions of their organizational structures, technical aspect, financial affairs, and operation and maintenance. Thus, sustainability of the effects realized through this project is judged to be high.

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

1. Project Description

Project Location

Communal Irrigation Facilities Constructed by This Project/Rice Field (Pampanga Province)

1.1 Background

Since the Marcos administration, the Philippine Government has promoted agrarian reform with the view of helping farmers become economically self-reliant. Under the *Comprehensive Agrarian Reform Program* (hereinafter referred to as CARP), which was launched in 1987 under the Aquino administration, the government (1) distributed land to landless farmers, (2) supported their post-distribution farming activities, (3) supported the establishment of ARCs, and (4) mediated in disputes over the allotment and distribution of lands. Before the start of this project in 2006, 83% of the CARP's goal of allotting 8.06 million hectares (ha.) of farmlands was already

achieved. However, access to financial and technical services and other infrastructures was limited for the poor and the agricultural productivity was stagnating, in addition to land ownership proving difficult for this class of people. Assistance to farmers who had received land allotment was weak in terms of, among others, infrastructure, institutional formulation, and financial and technical services. Thus, there was high necessity of assistance for farmers to improve productivity and increase their income. Prior to this project, ODA loan "Agrarian Reform Infrastructure Support Project (Phase 1)" and "Agrarian Reform Infrastructure Support Project (Phase 2)" were implemented. The Phase I project provided basic infrastructure development and organizational strengthening support for 78 ARCs nationwide. Based on the recommendations derived through the Phase I project, 150 new ARCs nationwide were targeted and implemented for the phase 2. With regard to the phase 2 project, in addition to basic economic infrastructure development, support was provided for organizing farmers and strengthening LGUs, which contributed to improving agricultural productivity and livelihoods of local farmers.

1.2 Project Outline

The objective of this project was to raise the income level of residents in the targeted ARCs in 54 provinces across the Philippines by providing (1) support for infrastructure development such as installation of small-scale irrigation facilities in 129 ARCs and (2) establishment of information marketing centers and development for organizations that promote exchange of information and wide-ranging cooperation between the ARCs targeted by the project and the surrounding area, thereby contributing to poverty reduction in rural areas of the country.

Loan Approved Amount/ Disbursed Amount	11,802 million yen / 11,672 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	December 3, 2007 / December 18, 2007
Terms and Conditions	General Condition: Interest Rate: 0.01%, 1.5% Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied Priority Condition: Interest Rate: 0.75% Repayment Period: 40 years (Grace Period: 10 years) Conditions for Procurement: General Untied
Borrower/	Government of the Republic of the Philippines / Department of Agrarian Reform

Executing Agency	
Project Completion	February, 2020
Target Area	The Whole Philippines
Main Contractor (Over 1 billion yen)	No more than one billion yen
Main Consultant (Over 100 million yen)	Nippon Koei Co., Ltd. (Japan)
Related Studies (Feasibility Studies, etc.)	N/A
Related Projects	[(Japanese) ODA Loan] ・Agrarian Reform Infrastructure Support Project (1995) ・Agrarian Reform Infrastructure Support Project (Phase 2) (1999) ・Mindanao Sustainable Settlement Area Development Project (2001) ・Mindanao Sustainable Agrarian and Agriculture Development Project (2012) ・Rural Farmers and Agrarian Reform Support Credit Program (LBP) (1996) ・Rural Farmers and Agrarian Reform Support Credit Program (DAR) (1996) [Grant Aid] ・ The Project for Development of Agrarian Reform Communities in Marginal Areas (2001) ・ The Project for the Bridge Construction for Expanded Agrarian Reform Communities Development (2009) ・ The Project for the Bridge Construction for Expanded Agrarian Reform Communities Development, Phase 2 (2012) [Other international organizations, aid organizations, etc.] ・ Agrarian Reform Communities Project (1999, Asian Development Bank) ・Second Agrarian Reform Communities Project (2008, World Bank) ・Italian Agrarian Reform Community Development Support Program (2018, Italy) ・Convergence on Value-chain Enhancement for Rural Growth and Empowerment (Project ConVerge) (2016, International Fund for Agricultural Development (IFAD))

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Octavia Japan, Co., Ltd.

2.2 Duration of Evaluation Study

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

Duration of the Study: August 2019–September 2020

Duration of the Field Study: November 17–December 12, 2019 and February 24–March 3, 2020

2.3 Constraints during the Evaluation Study

Until at the time of the second field survey period of the evaluation (February 2020), there are still subprojects that are yet to be handed over to the LGUs. At the time of the project appraisal, project completion was defined as "when hand-over of all components in the targeted ARCs to the maintenance body (i.e., LGUs) is completed." With hand-over of some sub-projects confirmed pending during the second field survey period, it can be concluded that the project is not yet finished. Therefore, evaluation of the efficiency aspect of the project is conducted with this in mind.

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

3.1 Relevance (Rating: ③[3])

3.1.1 Consistency with the Development Plan of the Philippines

At the time of the project appraisal, the Philippine Government formulated the *Medium-Term Philippine Development Plan (2004–2010)*, which positioned CARP as one of the main policies for poverty reduction. Of which, initiatives such as the completion of farmland allotment and provision of support to the beneficiary farmers were proposed as priority policies by the Department of Agrarian Reform (hereinafter DAR), which is the Executing Agency of agrarian reform.

At the time of the ex-post evaluation, the Philippine Government has formulated the *Philippine Development Plan (2017–2022)*. As its poverty reduction strategy, the plan proposes the importance of redressing inequality and other relevant aspects in order to expand economic opportunities in the fields of agriculture, forestry, and fishery. Moreover, the plan places importance on improving agricultural productivity and working on securing food safety, in order to achieve balanced development goals amidst population increase. DAR has also formulated *DAR's Thrusts and Policy Directions (2016–2022)*, which shows its direction in areas such as the productivity in agriculture and rural businesses, promotion of tourism and investment in rural

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

[3] ③: High, ②: Fair, ①: Low

areas, and enforcement of land ownership and control.

In light of the above, providing support to the farmers, fishermen and the poor, improving agricultural productivity, and securing food safety, among other efforts, are considered important in the national plans and sector plans at the time of the project appraisal and the ex-post evaluation. Therefore, the project's consistency with the policies and measures can be confirmed.

3.1.2 Consistency with the Development Needs of the Philippines

Before the start of this project, the poverty level was high among the micro- or landless farmers and fishermen, among others in the countryside. For the poor, land ownership proved difficult and access to financial and technical services and other infrastructures was limited, while agricultural productivity was also stagnating. Assistance was needed to improve farmers' productivity and increase their income.

At the time of the ex-post evaluation, DAR has continued providing assistance for the micro-farmers, fishermen, the poor, and landless farmers, based on the abovementioned *DAR's Thrusts and Policy Directions (2016-2022)*. Specific examples include (1) initiating and streamlining legal procedures; (2) increasing issuance of Certificates of Land Ownership Awards (hereinafter referred to as CLOAs), which is an official certification for land distribution; (3) implementing and arranging programs that help farmers retain their CLOAs and stay in their farms. DAR has also been proceeding with its assistance to micro-farmers and other relevant parties within ARCs whether before or after their CLOA ownership, in aspects of agrotechnical services, institutional formation, financial management services, and infrastructure development. As an example, the Department has drafted a program that foresees the ageing problem of micro-farmers and other relevant parties, thus encouraging children to take over farming business as a way to support their livelihoods.

In light of the above, it can be concluded that the project is highly consistent with the development needs of the Philippines, given the continuing demand for assistance in agrotechnical services, institutional formulation, financial services, and infrastructure development at the time of the appraisal and the ex-post evaluation.

3.1.3 Consistency with Japan's ODA Policy

In the *Country Assistance Program for the Republic of the Philippines*, formulated in 2000 by the Japanese Government, the priority challenges were identified as (1) securing sustainable economic growth; (2) alleviating poverty; (3) environmental protection; (4) human resources

development; and (5) improvement of governance. In it, importance was placed on agricultural and rural development, which would contribute to alleviating poverty. Poverty reduction was also given importance in the *Medium-Term Strategy for Overseas Economic Cooperation Operations* formulated by JICA (former JBIC) in 2005. Similarly, poverty reduction through agricultural and rural development was positioned as a priority area in the *Country Assistance Strategy* formulated by JICA in 2006. Therefore, this project contributes to poverty reduction in the rural areas of the Philippines, and its consistency with the priority areas in the aforementioned *Country Assistance Program* and *Medium-Term Strategy for Overseas Economic Cooperation Operations* is recognized. Therefore, the project's consistency with Japan's ODA policy is confirmed.

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

3.2 Efficiency (Rating: ①)

3.2.1 Project Outputs

Table 1 shows the planned project outputs at the time of the project appraisal and the actual results at the time of the ex-post evaluation. (The underlined part is the main difference from the planning stage)

Table 1: Planned Project Outputs at the Time of Project Appraisal and Actual Results at the Time of Ex-post Evaluation

Planned Project Outputs (At the time of project appraisal: 2007)	Actual Results (At the time of ex-post evaluation: 2019)
1) Support for infrastructure development in ARCs (129 ARCs in 54 provinces across the country) (i) Construction and rehabilitation of communal irrigation facilities (approx. 111 systems, covering approx. 21,845 ha), construction of post-harvest treatment facilities (approx. 67 facilities), building of new market access roads & improvement of existing roads (approx. 677 km), construction of bridges (approx. 1,334 m), construction of water supply systems (approx. 81 systems, servicing approx. 33,865 households) (ii)Institutional formulation and enhancement (111 irrigators' associations, 81 water users' associations, 129 agricultural cooperatives) *The "institutional formulation and enhancement" here	1) Support for infrastructure development in ARCs (136 ARCs in 54 provinces across the country) (i) Construction and rehabilitation of communal irrigation facilities (120 systems, covering 12,611 ha), construction of post-harvest treatment facilities (68 facilities), building of new market access roads & improvement of existing roads (701 km), construction of bridges (1,822 m), construction of water supply systems (70 systems, servicing 21,461 households) (ii) Institutional formulation and enhancement (128 irrigators' associations, 84 water users' associations, 328 agricultural cooperatives: *DAR formulated and enhanced another 192

has the same definition as the "number of businesses established" presented in 3.3.1.1 Quantitative Effects, 3.1 Effectiveness (Operation & Effect Indicators).	agricultural cooperatives using its own funds, thus the actual figure upon completion increased to a total of 328)
2) Support for development of areas around ARCs (i) Establishment of information marketing centers (approx. 26 facilities) (ii) Improvement of existing access roads (approx. 30 km) (iii) Institutional formulation and enhancement (targeting around 54 federations of agricultural cooperatives)	2) Support for development of areas around ARCs (i) Establishment of information marketing centers (8 facilities) (ii) Improvement of existing access roads (*none implemented in this project) (iii) Institutional formulation and enhancement (targeted 21 federations of agricultural cooperatives)
3) Consulting services Overall project management, development for organization, construction supervision	3) Consulting services Implemented as planned.

Source: Documents provided by JICA (at the time of project appraisal), answers on questionnaire by DAR, JICA documents, interview results with DAR, NIA, and DPWH (at the time of ex-post evaluation)

Analysis of the differences between the planned project outputs at the time of the project appraisal and actual results at the ex-post evaluation shown in Table 1 is shown as follows.

1) Support for infrastructure development in ARCs

With regard to the actual outputs in the ARCs, including infrastructure development support, there were 7 more facilities than planned, totaling 136. Before the start of this project, DAR formulated the output plan at the time of the project appraisal based on the requests submitted by its Regional offices, after identifying the approximate target areas and estimated the project components in collaboration with the National Irrigation Administration (hereinafter NIA), and the Department of Public Works and Highways (hereinafter DPWH), which are DAR's cooperating agencies. However, after the project's commencement, the final number of targeted ARCs changed to 136, considering accessibility issues of some of the proposed project sites, cases in which the implementing capacities of LGUs (maintenance bodies of the facilities after completion) were considered questionable, and where more ARCs were requesting for inclusion to the project[4]. In relation to these changes, DAR has stated that "the figures in the output plan including the targeted number of ARCs are built upon the requests submitted by each region, and the Department predicted before the start of the project that the figures would be closely examined through detailed design and preparatory survey (see 3.2.2.2 Project Period, 3.2 Efficiency), which take place after the project has started. Had it invested more labor and budget and conducted a detailed survey, the Department may have been able to establish planned figures (baseline figures)

[4] JICA and National Economic and Development Authority (hereinafter NEDA) have agreed to the series of changes in 2013.

and target figures. However, unable to afford these, it was left with no choice but to address this after the project had started. This means that the planned figures (baseline figures) and target figures were not based on actual situation but just mere estimates." Given the prerequisite being revision of the indicators after the start of the project, the output plan at the time of the project appraisal was not necessarily a thoroughly examined version[5]. Comparison and analysis of the plan at the time of the project appraisal and actual results are conducted as follows, with the abovementioned background in mind.

The discrepancies between the planned and actual figures in Table 1 are particularly significant for the irrigation service area (12,611 ha. against approx. 21,845 ha.) and serviced household population for water supply systems (21,461 against approx. 33,865 households), in (i) Construction and rehabilitation of communal irrigation facilities. According to DAR, the initially planned figures (approx. 21,845ha.) were not clear about the soil and ground condition of the project sites, and that landowners and water sources were not identified before the start of the project. The areas were thoroughly reexamined through detailed design and preparatory survey that was conducted only after the start of the project[6] (13,648 ha.). The comparison with this figure shows that the result came out almost as planned, but the validity of the initially planned figure remains questionable. With regard to the construction of water supply systems, some of the ARCs selected through the initial plan turned out to be salt-damaged, flood-prone, have shortage of groundwater, and its water sources depleted[7]. In quite a few cases, development had to be deferred, resulting to decreasing number of developments and households supplied with water. (ii) Institutional formulation and enhancement were implemented almost as planned. Seminars and other initiatives took place, which included promotion of organic farming, business plan formulation, and financial planning.

2) Support for development of areas around ARCs

(i) The number of information marketing centers has decreased compared to the plan. As its explanation, this decline is related to the decrease in the number of federations of agricultural cooperatives (from 54 to 21) that were targeted for institutional formulation and enhancement stated in (iii) below. The number of developed centers decreased to eight facilities, which is

[5] Inadequate collection of information on ARCs and lack of sufficient research and statistical data on the landless farmers in the Philippines, as well as data often using estimated figures are some of the examples contributing to this background.

[6] DAR held a discussion with NEDA and JICA in 2013, and each confirmed the change in the planned figures.

[7] According to DAR, there have also been cases where the water source was confirmed at the time of the planning, but then depleted due to earthquakes.

proportionate to the decrease in the targeted number of federations of agricultural cooperatives[8].

(ii) Improvement of existing access roads was not implemented in this project. Improvement of existing roads (provincial roads and municipal roads) was in the initial plan along with the development of information marketing centers, but such improvement was no longer needed as the centers were established adjacent to main roads such as national roads for convenience[9].

(iii) With regard to the numbers of institutional formulation and enhancement (support for the federations of agricultural cooperatives), firstly "federations of agricultural cooperatives" refer to institutional unions made up of several agricultural cooperatives. According to the criteria set forth by the Cooperative Development Authority (CDA), in principle a federation is formed when there are 14 primary agricultural cooperatives organizing themselves into a federation. Federations can make agricultural cooperatives' activities more powerful and comprehensive. At the time of project appraisal, DAR predicted that there would be one federation for each of the 54 provinces targeted for the project and anticipated to enhance the skills of the staff of such federations through initiatives such as training. However, it became clear after the project started that some provinces did not necessarily have 14 agricultural cooperatives. That is to say the organizations in these provinces did not meet the criteria set by the Department of Agriculture, so the actual number of targeted federations was lowered to 21 from 54.

3) Consulting services

Support related to overall project management, development for organization, and construction supervision was provided as initially planned.

Given the above, even though there was a preparatory survey mentioned in 3.2.2.2 Project Period, 3.2 Efficiency, the discrepancies were significant between the initially planned figures and the actual figures, leaving their efficiency questionable.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost at the time of the project appraisal was planned to be 17,037 million yen (of this, 11,802 million yen was covered by ODA Loan). The actual total project cost was 16,935

[8] Out of the eight facilities that were developed, two used the existing facilities to reduce the project cost, as it was discovered after the start of the project that it was possible to utilize the facilities of the Department of Agriculture, the Department of Trade and Industry's Board of Investments, and LGUs (those confirmed to have a remaining lifespan).

[9] According to DAR, the necessity of improving the existing roads was not clear during the planning, but was included in the plan as a project component.

million yen (of this, 11,672 million yen was covered by ODA loans), which was within the plan (approx. 99% of the plan). However, as indicated by Table 2 (Planned Project Costs at the time of the appraisal) and Table 3 (Actual Project Cost at the time of Project Completion), the cost required for the civil works has exceeded the plan (approx. 131% of the plan).

Table 2: Planned Project Costs

(Unit: Million yen)

Item	Planned Project Costs at the Time of Project Appraisal		
	Foreign Currency	Local Currency	Total
Civil Works	2,912	6,795	9,707
Institutional Development	-	1,631	1,631
Preparatory Survey	-	283	283
Procurement of Equipment	110	-	110
Consulting Services	936	480	1,416
Price Escalation	220	-	220
Contingencies	162	436	598
Administration Costs	-	1,396	1,396
Tax	-	1,676	1,676
Total	4,340	12,697	17,037

Source: Documents provided by JICA

Table 3: Actual Project Cost at the time of Project Completion (PHP and JPY basis)

Item	Actual Costs based on PHP[10] (Total amount of foreign and local currency, unit: 1,000 PHP)	JPY Equivalent (Unit: Million Yen)
Civil Works	5,900,882	**12,746**
Institutional Development	550,653	1,189
Preparatory Survey	116,382	252
Procurement of Equipment	48,093	104
Consulting Services	641,736	1,386
Administration Costs and Tax	582,334	1,258
Total	7,840,080	16,935

Source: Answers on questionnaire by DAR
Remarks: Exchange rate: 1 yen = 0.46 PHP (1 PHP = 2.16 yen: average value during project implementation)

According to DAR, NIA, and DPWH, the reasons for the increased cost for civil works in comparison to the plan include the following: (i) construction work cost increased for the development of communal irrigation facilities and roads due to the rise of labor cost and escalation of prices of construction materials during the project implementation. In addition, the cost for

[10] Total amount of foreign currency was about 4,295 million yen (about 1,988.267 million PHP), total amount of local currency was about 12,640 million yen (about 5,851.814 million PHP). Yearly data of breakdown on the foreign and local currencies of each cost item could not be obtained, and only total amounts are shown.

construction works including recovery work and repair in the Cordillera Administrative Region (CAR) rose significantly due to damages from the typhoons; (ii) in some development projects of new market access roads and improvement projects of existing roads, weak grounds were discovered near the project sites, thus retaining walls and guardrails were additionally installed to improve the soil and address safety, and the thickness of the road surface was raised to 20 cm from the initially planned 15 cm, anticipating future increase in traffic. These are understood to have been difficult to predict at the time of the project appraisal, thus considered excusable. However, the output plan at the time of the appraisal was not clear, and bearing in mind the fact that the cost for the construction work (Table 3) was higher than with contingencies utilized (Table 2), the project cost cannot be said with certainty to have been efficient relative to the output plan.

3.2.2.2 Project Period

Table 4 shows the project's initially planned and actual periods. At the time of the project appraisal, the project period was planned for the seven years from December 2007 to August 2014 (84 months). However, the actual project period was the 12 year 3 month period from December 2007 to February 2020 (147 months), significantly longer than planned (approx. 175% of the plan).

The main reasons for the extended period were: (1) prolonged negotiation with land owners for land acquisition which delayed the commencement of construction work in some ARCs; (2) delayed internal proceedings in some of the LGUs, which are the cooperating agency and the maintenance bodies after the project's completion, especially on matters related to budget allocation and procurement of labor force and materials that tended to be delayed, leading to delayed commencement of the construction work; (3) changes in the leadership as a result of the national and local elections that took place during the project's implementation period, which disrupted the project's progress. These factors made it necessary for DAR to rearrange and renegotiate with the LGUs regarding some of the project components, which was a lengthy process. Another factor for the delay is the existence of subprojects that have not yet been transferred to the LGUs at the time of the ex-post evaluation (February 2020)[11].

[11] At the time of the project appraisal, completion of the project was defined as "when hand-over of all components in the targeted ARCs to the maintenance bodies is completed." As the hand-over was confirmed pending, the project is concluded to be incomplete at the time of the ex-post evaluation. The two subprojects concerned are the market access roads in the Province of Ifugao in CAR, and Province of Southern Leyte in Region 8. The reasons for the delay include: (1) delayed selection of the construction company and longer time taken than expected to confirm budget and construction methods for the difficult work that was anticipated for road development in the mountainous region (the road in the Province of Ifugao); (2) after construction work was completed, the roads were damaged by typhoons, which then required repair work (both roads in the Provinces of Ifugao and Southern Leyte). Meanwhile, most subprojects

Table 4: Planned and Actual Project Periods

	Planned	Actual
(Whole project)	December 2007–August 2014 (84 months)	December 2007–February 2020 (147 months)
1) Consulting Services	September 2008–August 2014	April 2008–March 2015
2) Preparatory Study	January 2008–June 2013	January 2008–April 2014
3) Civil Works	March 2008–August 2014	April 2008–February 2020 *Note
4) Institutional Development	March 2008–August 2014	May 2008–August 2015

Source: Documents provided by JICA, Project Completion Report (PCR), Answers on questionnaire by DAR
Note: Since some of the sub-projects have not been handed over, timing point at conducting the secondary field survey (February 2020) will be the end point.

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

Financial Internal Rate of Return (FIRR)

The project was not designed to incur return such as fee revenues, thus FIRR was not calculated at the time of the project appraisal. Therefore, there was no recalculation at the time of the ex-post evaluation.

Economic Internal Rate of Return (EIRR)

The Economic Internal Rate of Return (EIRR) was recalculated at the time of the ex-post evaluation using the improvement of productivity and agricultural product prices, reduction of production cost and water pumping labor hours as profit, and project cost and the operation and maintenance costs as costs, and assuming a project life of 30 years. The result was 16.5%, which is lower than 18.5% assumed at the time of the project appraisal. The main reason is that, while the benefits have not changed much, costs such as the construction cost and the operation and maintenance costs were affected by the inflation rate and other relevant factors more than what was predicted at the time of the appraisal.

Given the above, the actual project cost was almost as initially planned, but the number of information marketing centers, number of institutional formulation and enhancement of federations of agricultural cooperatives, area for construction and rehabilitation of communal irrigation facilities, and number of constructions regarding water supply systems decreased in comparison to the initial plan. In particular, the construction and rehabilitation area of the communal irrigation facilities, which had a large project cost, and the number of information marketing centers decreased significantly. Therefore, it cannot be said that the results were

were completed almost as planned.

necessarily efficient relative to the output plan. The actual project period exceeded the initially planned timeframe, due to the prolonged negotiation with landowners for land acquisition which affected the commencement of construction work in some areas. Based on a holistic review of the above, the project's efficiency is judged to be low.

Photo 1: Irrigation Canal Facilities Constructed by This Project (Pampanga Province)

Photo 2: Farm to Market Access Road Constructed by This Project (Bohol Province)

3.3 Effectiveness and Impacts[12] (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

Table 5 shows indicators (baseline, target, and actual figures) to measure the quantitative effects of the project. Some indicator's target figures were the same as the planned scope presented in 3.2.1 Project Outputs, 3.2 Efficiency.

Table 5: Operation and Effect Indicators (baseline, target, and actual) of This Project

Indicators	Baseline	Target (2016) [2 years after project completion]	Actual
1) Agricultural income per household (Unit: PHP/year/household)	(107,913) *Note 1	Increased 30% from the baseline figure (*30% increase from the baseline figure is about 140,000)	Approx. 110,000–150,000 (Data from the ex-post evaluation in 2019. The sources are entities such as agricultural cooperatives interviewed during the field survey)

[12] Sub-rating for Effectiveness is to be put with consideration of impacts.

(2) Irrigation area benefited by the project (Unit: ha)	-	21,845 (However, given the discussion with NEDA and JICA in 2013, the target figure was revised to 13,648 ha)	12,497 (Data at the time of completion in 2018. Source: NIA)
(3) Institutional formulation and enhancement of irrigators' associations (Unit: groups)	-	111 (However, given the discussion with NEDA and JICA in 2013, the target figure after revision is 134)	128 (Data at the time of completion in 2018. Source: DAR)
(4) Rice yield per harvest season (Units: ton/ha/season)	(3.64) *Note 1	5.0	4.5–6.5 (Data from the ex-post evaluation in 2019. The sources are DAR and NIA, as well as entities such as agricultural cooperatives interviewed during the field survey)
(5) Number of agri-enterprises established (Unit: number)	-	129	328 *Note 2 (Data at the time of completion in 2018. Source: DAR and Project Completion Report)
(6) Number of training participants (Unit: people)	-	18,031	29,489 (Data at the time of completion in 2018. Source: DAR and Project Completion Report)
(7) Reduction of required time to major destinations such as markets (Unit: %)	N/A (provided it is reduced by 40%) *Note 1	40% reduction	40–50%+ (Data from the ex-post evaluation in 2019. The sources are entities such as DPWH, LGUs, and agricultural cooperatives interviewed during the field survey)
(8) Reduction in transportation costs for agricultural products (Unit: %)	N/A (provided it is reduced by 40%) *Note 1	40% reduction	30–50%+ (Data from the ex-post evaluation in 2019. The sources are entities such as DPWH, LGUs, and agricultural cooperatives interviewed during the field survey
(9) Population supplied with water by this project (Unit: household)	-	33,865	21,461 (Data at the time of completion in 2018. Source: DAR)
(10) Institutional formulation and enhancement of water users' associations (Unit: groups)	-	81	84 (70) *Note 3 (Data at the time of completion in 2018. Source: DAR)
(11) Institutional formulation and enhancement of federations of agricultural cooperatives (Unit: groups)	-	54	21 (Data at the time of completion in 2018. Source: DAR)

Source: Documents provided by JICA, baseline survey report, answers on questionnaire by DAR, DAR's documents, interview results with DAR/NIA/DPWH, LGUs, agricultural cooperatives/agricultural cooperatives, etc.

Note 1: The figures in the parentheses are based on the baseline survey (2014) conducted during this project's implementation.

Note 2: Apart from this project, the figure includes a resulting figure from the institutional formulations and enhancements of agricultural cooperatives conducted using DAR's own funds.
Note 3: The number of facilities that were the target for "institutional formulation and enhancement of water users' associations," for which the work has been done were 84, but the number of facilities that are operating as organizations at the time of the ex-post evaluation is indicated in the parenthesis.

Each indicator shown in Table 5 is explained as follows.

(1) With regard to the "Agricultural income per household," the baseline figure is the one that was calculated based on the baseline survey, and the target figure was anticipated to increase 30% from the baseline figure. Results of the interviews[13] conducted during the field survey with agricultural cooperatives, federations of agricultural cooperatives and farmers, to identify the rough amount of income while visiting the following regions: Region I (Provinces of Ilocos Norte, and Ilocos Sur), Region III (Provinces of Pampanga and Nueva Ecija), and Region VII (Province of Bohol) reveal that the annual household income of project beneficiaries ranges from 110,000 to 150,000 PHP. Based on this, it can be surmised that the target figure is almost achieved since the same answers were received from each region.

(2) With regard to "Irrigation area benefited by the project", the project developed 12,611 ha. of farmland area, and the actual figure is calculated to be the planted area of 12,497 ha. This is low compared to the initial target figure 21,845 ha. The reasons are as described in 3.2.1 Project Outputs, 3.2 Efficiency.

(3) With regard to "Institutional formulation and enhancement of irrigators' associations", the results have slightly exceeded the target figures. This is because there were some cases where multiple irrigators' associations existed in the targeted ARCs. According to DAR and NIA, in one ARC there was a case where the scale of the irrigators' association was large with multiple water sources and multiple pumping facilities, and the association was decentralized.

(4) "Rice yield per harvest season" was confirmed to be almost as planned, or achieved more than the target figure according to the interviews with DAR, NIA, agricultural cooperatives, etc. The reason for this is that the irrigation facilities of this project have contributed to efficient water distribution.

(5) The "Number of agri-enterprises established" indicates the number of households and farmers organizations that received enterprise support (training) for agribusiness or in the

[13] Key informant interviews were conducted with a total of 10 organizations and 28 people (21 men and 7 women), after the targeted regions were selected with the considerations including the following points in mind, based on the discussions with DAR headquarters and its regional offices: (1) invested project budget was relatively large; (2) ARCs in which communal irrigation facilities, post-harvest treatment facilities, access roads, bridges, water systems, etc., were developed and rehabilitated as outputs of this project, which may also have synergistic effect; (3) no security concerns around the project sites.

agricultural sector. The training provided was hands-on, aimed at the households and farmers organizations in the targeted ARCs to be able to access the appropriate production techniques and fully utilize the developed facilities such as the irrigation facilities. Such training included provision of information and instruction on agribusiness, project plan formulation, operation methods for organizational management and financial plan drafting, as well as promoting production techniques of crops such as rice, corn, vegetables, watermelon, and melon, selling organic produce, and popularizing food processing and handicrafts. The figure (328) includes a resulting figure from executing the project using DAR's own funds[14], apart from this project.

(6) The "Number of training participants" increased in proportion to the abovementioned "Number of agri-enterprises established (328)," and total of 29,489 beneficiaries/individuals benefitted. There was no data of the actual figure of training participants to compare to the initial actual figure (number of businesses established: 136). According to DAR, this at least exceeded the target figure (18,031 people).

(7) As for the "Reduction of required time to major destinations such as markets," it was confirmed through the interviews during the field survey that the time required was significantly reduced. It can be surmised that about 40 to over 50% reduction in the time required has been achieved, as it can be understood through these comments: "it used to take a whole day on an unpaved road to transport agricultural products from ARCs to markets and clients before the start of the project, but with the road now paved with concrete we can access these places in two to three hours"; "there is more travel of people and goods with the improved accessibility between ARCs."

(8) Similarly, the "Reduction in transportation costs for agricultural products" was recognized through interviews. It can be surmised that about 30 to over 50% cost reduction has been achieved, as it can be understood through these comments: "the bottleneck of unpaved roads was the high cost for gasoline, but since the road has been paved with concrete it has been possible to curb the cost"; tires do not need changing as often"; "it made the transportation of production inputs such as seeds, seedlings and fertilizers easy, and I think the transportation cost of agricultural products in general has improved."

(9) The "Population supplied with water by this project" fell below the target figure for reasons described in 3.2.1 Project Outputs, 3.2 Efficiency.

(10) The number of executed initiatives such as training covered by "Institutional formulation

[14] DAR states that this increase was due to receiving more requests than expected from households and farmers organizations who wanted the support. DAR claims that they decided to accept as many requests as they could.

and enhancement of water users' associations" was 84, exceeding the target figure. However, the number of these associations that are operating as organizations at the time of the ex-post evaluation is 70. Before start of this project, although support for institutional development, including 84 water user's associations was identified, 14 of them were found to be unfeasible because the population served was less than originally expected or in some areas it was difficult to provide water.

(11) The reasons for the number of "Institutional formulation and enhancement of federations of agricultural cooperatives" are as described in 3.2.1 Project Outputs, 3.2 Efficiency.

3.3.1.2 Qualitative Effects (Other Effects)

Interview survey was conducted on the executives of agricultural cooperatives, federations of agricultural cooperatives, irrigators' associations, and LGUs in the targeted ARCs of the regions visited during the field survey[15]. The following are the effects of the project based on these interviews.

(1) Improvement of income through infrastructure development

Results of the interviews with farmer-members of agricultural cooperatives and their federations during the field surveys reveal that each household is earning between 110,000 and 150,000 PHP a year from agricultural activities. This confirmed the achievement of the target income increase as also supplemented by the following comment from an interviewee: I think income from selling agricultural products is increasing every year, while the labor required in farming is decreasing."

(2) Improvement of logistics and services in and out of the project's target ARCs through construction of new farm-to-market access roads and improvement/rehabilitation of existing roads

Time required to major destinations such as markets has been reduced following the development of market access roads. Traffic in goods and people in and out of ARCs is active. It can be considered that improvement in logistics and services in target ARCs have been achieved, as it can be understood through these comments from the interviewees: "before, travel was difficult on the muddy unpaved road when it rained, but thanks to the road being paved with concrete, I can reach the destination quickly and safely. It is also easy to predict how long it may

[15] The survey was conducted using the same methods as those describe in footnote no. 14 under 3.3.1.1 Quantitative Effects (Operation and Effect Indicators), such as the survey method, number of respondents, selection methods, and gender ratio.

take to the destination"; "thanks to the road, it is easy to transport inputs required for agricultural products, such as seeds, seedlings, and fertilizers. I can now easily carry agricultural products to the market"; delivery of "administrative services (e.g. services of firefighting and police vehicles) seem to have also improved."

(3) Economic ripple effects on the neighboring areas of the project site as a result of the establishment of information marketing centers

Through interviews with the executives of the federations of agricultural cooperatives of the information marketing centers visited during the survey, the following comments were received: "Before the start of this project, even if we wanted to create agricultural goods and commercialize them, we did not know how to do it. At this time of the ex-post evaluation, we have been able to display products and samples at the local specialties sales corner in the information marketing center, and negotiate with visiting buyers for the purchase volume and business opportunity"; "product development is a good motivation to produce for the agricultural cooperatives and its members"; "in line with the effects of the developed market access roads and irrigation facilities, it is now easy to promote agricultural products through the center." In some cases observed during the field visit, pamphlets that introduce the activities were created, and PR and promotional activities for the agricultural products were carried out, as well as active sales promotion at the trade fair held annually in Manila. In light of the above, it can be considered that the increased communication between agricultural cooperatives through the centers has played a role in sales promotion of the agricultural products that have been produced.

3.3.2 Impacts

3.3.2.1 Intended Impacts

Contribution to Improvement of Quality of Life and Poverty Reduction for Local Residents

1) Qualitative effect

Interview survey was carried out on the members of agricultural cooperatives, federations of agricultural cooperatives, irrigators' associations, water users' associations, and LGUs staff in the same regions, in order to observe the improvement of the living conditions of the poor, and understand the state of poverty reduction, same as in the interview survey in 3.3.1.2 Qualitative Effects (Other Effects)[16]. Below are excerpts of comments received.

○Communal irrigation facilities and post-harvest treatment facilities

[16] A group discussion was held with a total of 12 organizations and over 50 people participating (about 30 men and 20 women). Sites where interviews were held were selected based on the selection method described in footnote no. 14.

“Production volume of rice went up, which increased the family income. This produced a comfortable amount of assets, which could be put into savings that enabled me to send my son to university”; “the increased income enabled me to buy a vehicle such as a tricycle”; “the selling price of rice is sometimes unstable these days, but improved self-sufficiency and increased production of rice have been a good motivation for us farmers.”

○Building of new market access roads and improvement of existing roads

“It feels like the developed roads have led to the expansion of sales opportunities for agricultural products, increase of income, and improved logistics and transport”; “the improved road accessibility to other cities and villages has led to increased sales opportunities for agricultural products”; “improved road accessibility has created price competition for daily necessities and agricultural products, which I could purchase at a cheaper price than before. ”

○Water supply infrastructure

“Before the installation of the water supply facilities, the water of this region was not entirely safe. Though rare, we sometimes drank water that got mixed with that from a water treatment tank. Currently the water from the water supply facilities is safe, and I am not concerned about it”; “my skin feels different from before when I wash my body.”

The abovementioned comments indicate that the living standards have improved in the targeted ARCs as there is more diversity and comfort in their lives.

2) Quantitative effect

Table 6 shows the number of landless farmers (estimated figure)[17]. The change can be observed in the comparison between 2003 (before the start of the project) and 2019 (after completion). It can be said that efforts including allotment of land to landless farmers, mediation of disputes over the allotment of land, and resolution of rights issues have been successful. Moreover, development of infrastructure and provision of soft support (e.g. organizational development) such as training on farming skills and knowledge in the ARCs, as it was done in this project, can be concluded to be supporting farming by landless farmers.

[17] DAR calculates the estimate figure by identifying the farmland from an approximate land area and taking into account multiple elements, such as the number of Certificates of Land Ownership Awards (CLOA) issued, and the attributes of the farmers. Data only exists for 2003 and the end of September 2019.

Table 6: Trend of the Number of Landless Farmers Nationwide (Estimated values)

2003 (Before starts of project)	End of September 2019 (at the time of ex-post evaluation)
3,375,917 people	2,403,250 people

Source: DAR's documents

Table 7 shows the regions visited during the survey and the national poverty rate, which shows a generally declining trend.

Table 7: Trend of Poverty Rate in the Regions (region level) Visited in This Survey

(Unit: %)

Region (Province)	2006	2009	2012	2015
Region I (Region including the Provinces of Ilocos Norte and Ilocos Sur)	19.9	16.8	14.0	9.6
Region III (Region including the Provinces of Pampanga and Nueva Ecija)	10.3	10.7	10.1	8.9
Region VII (Region including Bohol Province)	30.7	26.0	25.7	23.6
National	21.0	20.5	19.7	16.5

Source: Philippine Statistics Authority (PSA)
Note: Data on poverty rate is gathered every three years by PSA. The data from 2018 is not published at the time of the ex-post evaluation (February 2020).

Box. (Reference) Environment Surrounding Agriculture and Discussion Regarding the Future Initiatives by the Executing Agency

The gap of wealth distribution shown in Table 7 above is on a downward trend. Meanwhile, with regard to rice which is the major crop of the region (region level) visited during the survey, its yield trend has shown a general increase since the start of the project (2007) as seen in Table 8, though this growth has stagnated since 2015 in Regions I and VII. This is considered to be due to the impact of decreasing farming population and progressing urbanization. As shown in Table 9, the national farming population is on a downward trend[18], and urbanization is progressing as seen in Table 10. Table 11 shows that the national working population has increased, and unemployment rate is on a downward trend. What underlies these trends is considered to be the ongoing trend of population influx from rural regions into the metropolitan, such as the capital region of Manila and urban area of Cebu. This means that the environment surrounding agriculture in the Philippines may be changing. The measures and initiatives by

[18] In addition to this, the average age of farmers is considered to be on an upward trend. Though there is no concrete statistical data for this, when agricultural cooperatives and farmers were asked during the interview survey about the average age, their answers centered around mid to late 50s. Many interviewees also claimed that there are not many young farmers this time.

DAR, including this project, are thought to have contributed to the reduction of the number of landless farmers, and improvement of farmers' income and their living environment. However, for future programs, it may be necessary to carefully reflect on the state of these elements (it is important to explore how support should be, for example whether to continue with the initiatives such as small-scale infrastructure development and providing training as done through this project, or whether to work on eliminating landless farmers by focusing on solving legal challenges, as explained in 3.1.2 Consistency with the Development Needs, 3.1 Relevance).

Table 8: Trend of Rice Yield in the Region (region level) Visited During the Survey

(Unit: ton)

	2009	2012	2015	2018
Region I (Region including the Provinces of Ilocos Norte and Ilocos Sur)	1,351,715	1,737,695	1,777,121	1,720,044
Region III (Region including the Provinces of Pampanga and Nueva Ecija)	2,805,467	3,220,607	3,304,310	3,615,115
Region VII (Region including Bohol Province)	276,818	327,120	336,194	309,459

Source: Philippine Statistics Authority (PSA)
Note: Data exists for every year, however due to the space restriction the table shows data from every three years.

(Reference) Table 9: Trend of the National Farming Population

(Unit: thousand people)

2009	2012	2015	2018
12,403	12,092	11,294	9,998 (about 81% of that in 2009)

Source: Philippine Statistics Authority (PSA)
Note: Data exists for every year, however due to the space restriction the table shows data from every three years.

(Reference) Table 10: Trend of Urbanization (based on the trend of urban population: comparison between 2010 and 2015)

(Unit: %)

	2010	2015
Region I (Region including the Provinces of Ilocos Norte and Ilocos Sur)	12.7	20.5
Region III (Region including the Provinces of Pampanga and Nueva Ecija)	51.6	61.6

Region VII (Region including Bohol Province)	43.7	49.4
National	45.3	51.2

Source: Philippine Statistics Authority (PSA)
Note: The data is collected every five years. Only two years of data could be obtained.

(Reference) Table 11: Trend of the National Working Population and Unemployment Rate

	2009	2012	2015	2018
Working population at age 15 and over (Unit: thousand people)	59,237	62,985	64,939	71,339
Unemployment rate (Unit: %)	7.5	7.0	6.3	5.3

Source: Philippine Statistics Authority (PSA)
Note: Data exists for every year, however due to the space restriction the table shows data from every three years.

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Natural Environment

Before the start of the project, formulation of Environmental Impact Assessment (EIA) report was not mandatory under the Philippines' domestic law. However, some subprojects required Environmental Compliance Certificates (hereinafter ECC), in which case necessary procedures were asked to be taken before executing the project. Through a questionnaire and interviews with DAR, NIA, and DPWH, it was confirmed that right-of-way acquisition procedures had been completed smoothly after the start of the project, with regard to ECC or Certificate of Non-Coverage (hereinafter CNC) notifications[19].

It was confirmed through interviews with entities such as DAR, as well as LGUs, agricultural cooperatives, irrigators' associations, and water users' associations visited during the field survey, that there was no negative impact on the natural environment through factors such as air pollution, noise and tremors, or waste disposal, during the project implementation or after its completion[20].

2) Resettlement and Land Acquisition

Through a questionnaire and interviews with DAR, NIA, DPWH, and LGUs, it was confirmed that there were no subprojects that entailed resettlement. With regard to right-of-way acquisition, some subprojects (mainly market access roads) required this process for the implementation, but

[19] The two subprojects that required ECC were: bridge in the Province of Quirino (Region II), and irrigation project in the Province of Davao Oriental (Region XI). Other subprojects were eligible for CNC notifications.
[20] After handing over the subprojects, in principle the LGUs' Municipal Environment and Natural Resource Office (MENRO) is responsible for environmental monitoring. If a problem occurs in the environmental aspect, the office is supposed to take necessary measures. It was confirmed through an interview with DAR that there has not been any particular issue by the time of the ex-post evaluation, thus there is no actual example of such measures.

landowners provided their land for free (donated)[21], thus there was no compensation payment. Since no disputes have occurred during the project implementation or after completion, it is considered that no negative impact has occurred.

In light of the above, out of the 11 indicators that measure effectiveness and quantitative effects, eight of them achieved the figures almost as planned, or exceeded the plan. These eight indicators are: agricultural income per household; institutional formulation and enhancement of irrigators' associations; rice yield per harvest season; number of businesses established; number of training participants; reduction of required time to major destinations such as markets; reduction in transportation costs for agricultural products; institutional formulation and enhancement of water users' associations. Some of the indicators should have been adjusted at the time of the project appraisal since the analysis items for efficiency and effectiveness overlap. In any case, the initial target figures can be concluded to have basically been achieved through the project implementation. Moreover, the project can be considered to have played a role in poverty reduction, as the interview survey revealed that the project has achieved increase in agricultural productivity and revenue, improvement of living standards, and some degree of improvement in the quality of life for the residents of the targeted ARCs. Based on a holistic review of the above, the effectiveness and impact of the project is judged to be high.

3.4 Sustainability (Rating: ③)

3.4.1 Institutional / Organizational Aspect of Operation and Maintenance

The Executing Agency of this project is DAR. The operation and maintenance system of the facilities that were developed through this project is as follows.

○Market access roads and bridges

DAR has concluded Minutes of Understanding (hereinafter MOU) with each LGU within the ARCs. Based on the MOU, the LGUs provide operation and maintenance budget and staff for 10 years after the subprojects are handed over to them, and are in charge of operation and maintenance with the cooperation from the barangays around the project site. The local barangay staff only conducts weeding around the developed roads and clean the road surface, but the LGUs

[21] As an example, landowners welcomed the increasing price of their land caused by road development, when part of the road was targeted for acquisition for the development of a market access road (they were hopeful for the value to go up even if they had to provide their land). According to DAR, LGUs were in charge of negotiation with the landowners and procedure for land acquisition, in line with the domestic laws. The data on actual number of targeted owners and area could not be obtained, but DAR stated that most of their areas were small-scale.

allocate the operation and maintenance budget as necessary. In addition, when disaster such as a typhoon occurs, the LGU's technical staff visit the site, check the damage situation, consider necessary support, and rehabilitate based on the LGUs' budget. However, there may be differences in the response depending on the financial status of the LGUs.

○Communal irrigation facilities

The irrigators' associations within the targeted ARCs are in charge of operation and maintenance. The irrigators' associations collect the irrigation service charges through the affiliated association members, and allocate these for the operation and maintenance costs of the irrigation facilities that have been developed. There are also cases in which some LGUs are in charge of operation and maintenance of these facilities in collaboration with the irrigators' associations.

○Post-harvest treatment facilities

The agricultural cooperatives within the targeted ARCs are in charge of operation and maintenance. Operation and maintenance tasks are carried out using the agricultural cooperatives' budget.

○Water supply system

The water users' associations within the targeted ARCs are in charge of operation and maintenance. Maintenance cost is covered by the water bills collected from the beneficiaries. As with the communal irrigation facilities, there are also regions where some LGUs are in charge of operation and maintenance of these facilities in collaboration with the water users' associations.

○Information marketing centers

The federations of agricultural cooperatives are in charge of operation, such as maintenance of the information marketing centers, and selling agricultural products. Staff members are dispatched from each agricultural cooperative to run the organization. As previously mentioned, federations of agricultural cooperatives require at least 14 agricultural cooperatives to form, and their operation and maintenance is supported by the financial contributions of each cooperative and sales revenue of agricultural products sold at the center.

It was confirmed through the interviews with the agricultural cooperatives, federations of agricultural cooperatives, irrigators' associations, water users' associations, and LGUs in the regions visited during the survey, that there was no particular shortage of staff who are in charge of the operation and maintenance.

With regard to the storing system of the maintenance equipment, the operation and maintenance

bodies for communal irrigation facilities, post-harvest treatment facilities, and water supply systems generally purchase and store the supplies and parts from local private companies. LGUs are supposed to be in charge of addressing market access roads and bridges. However, as mentioned above, this does not require large-scale maintenance, therefore there were no particular cases of purchase/storage that could be confirmed.

According to DAR, in principle they are not involved in operation and maintenance after the subprojects are handed over to them. However, DAR regional offices visit the subproject sites when necessary, and monitor the facilities' conditions and how they are being utilized[22]. When problems arise, DAR stated that they notify the provincial government in which the LGU and the subproject is located, and request appropriate measures. As already mentioned, though DAR does not have the responsibility over operation and maintenance of the developed facilities, they understand that they are following up on the project by monitoring these facilities regularly.

In light of the above, it can be concluded that there are no particular major issues in the aspect of operation and maintenance system for the facilities that have been developed through the project. Meanwhile, the project has many subprojects, and it is desirable for DAR to continue visiting and monitoring the subproject sites regularly to secure the quality of the facilities, and maintain a system that can resolve arising issues.

3.4.2 Technical Aspect of Operation and Maintenance

No particular major issues were observed in the technical aspect of operation and maintenance by the irrigators' associations, agricultural cooperatives, LGUs, water users' associations, and federations of agricultural cooperatives in the regions visited during this survey. Each organization is made up of experienced operation and maintenance staff members with generally five years or more experience working there. It was confirmed through the interview survey that they properly understood the importance of their tasks.

Each organization provides a variety of education and training for its staff. These cover the themes including financial management, development for organization, agribusiness and marketing, developing and planning business in water supply systems and post-harvest treatment facilities, promoting sales of agricultural products, and practicing operation and maintenance.

[22] All facilities developed through this project are subject to visits at least once a year. As previously mentioned, there are two subprojects (market access roads) which have not yet been handed over. Therefore, DAR must continue monitoring these subprojects and make arrangements smoothly with the LGUs until the hand-over is complete.

3.4.3 Financial Aspect of Operation and Maintenance

Below is an explanation of the financial aspect of operation and maintenance by the irrigators' associations, agricultural cooperatives, LGUs, water users' associations, and federations of agricultural cooperatives in the regions visited during this survey. Although this survey conducted interviews in multiple regions, each project component described below takes one region as an example[23].

○Market access roads and bridges

Sarrat Municipal Office (LGU, Ilocos Norte Province) visited during this survey bears the expense of 500,000–700,000 PHP annually for the barangays around the area where the road is located, in line with the MOU agreed with DAR[24]. Table 12 shows the revenue and business tax income of the LGU. Business tax income has more than doubled in the most recent four years, indicating the trend of business tax income being high in line with the increase in revenue. According to the municipal office, "budget allocated for maintenance of the roads developed through this project is adequate. Revenue has increased year by year." The LGU has also pointed out that the increase in fixed asset revenue and the number of new businesses are also contributing factors.

Table 12: Sarrat Municipal Office's (LGUs) Revenue and Business Tax Income

(Unit: 1000 PHP)

	Year 2016	Year 2017	Year 2018	Year 2019 *Note 1
Revenue	12,323	14,020	16,644	17,328
Of which, business tax income	2,022	3,295	4,217	5,249

Source: Sarrat Municipal Office (Ilocos Norte Province, population approx. 3,000)
Note: Data for 2019 is as of the end of November

○Communal irrigation facilities

It was confirmed through interviews with the irrigators' associations visited during this survey, that many ARCs have high collection rates of irrigation service charges. Some associations have a collection rate almost as high as 100%. It was also confirmed that appropriation of these

[23] In this survey, financial data were obtained only from the organizations visited in Ilocos Norte and Ilocos Sur.

[24] The LGU strictly follows the agreed MOU, and allocates the project budget for operation and maintenance tasks of the market access roads every year. This is paid out of the budget item called Annual Investment Program. If this is insufficient, the same will be paid out of the supplementary budget. As for other items, 5% of the whole budget of the LGU is allocated to disaster measures every year, meaning typhoon damages will be addressed using this budget. Moreover, in some cases they pay the barangays development cost for cleaning the road or installing street lights and poles, and the barangays are in charge of executing such work. According to DAR, a similar trend can also be observed in other LGUs, but it varies in scale due to their different financial capacities.

collected charges on maintenance costs was adequate[25].

○Post-harvest treatment facilities

Revenue (profit is the amount after deduction of the operation and maintenance costs) of the agricultural cooperatives in charge of the operation and maintenance (San Nicolas Agricultural Cooperative in the Province of Ilocos Norte) is shown in Table 13. The reasons for increased profit in 2018 compared to the year before given by this agricultural cooperative was that they have been a recipient of a grant of agricultural equipment than in the past from the Department of Agriculture, such as farming tools, and have worked on more efficient production.

Table 13: Profit and loss (income minus the expenses, such as the operation and maintenance costs) of San Nicolas Agricultural Cooperative (Province of Ilocos Norte), in charge of the operation and maintenance of the post-harvest treatment facility

(Unit: 1000 PHP)

2017	2018
157	310

Source: San Nicolas Agricultural Cooperative

○Water supply system

At San Jose and San Cristobal Water Users' Association (Province of Ilocos Norte), which was visited during this field survey, the water bill revenue is 435,600 PHP[26] per year. According to the association, "the amount of bills collected is proportionate to the number of registered households. The amount is enough to allocate on the operation and maintenance costs for managing the water distribution facilities and water sources. Collection rate of water bills is also high." The amount and method for collection is decided by each association, and it can be considered that there are no particular concerns about this.

○Information marketing centers

For Federation of Patriotic Farmers Cooperatives of Nueva Ecija (Province of Nueva Ecija), which was visited during this field survey, their final profit saw net positive, as indicated by the profit and loss statement in Table 14 (most recent two years). It was confirmed through the interviews that they have made profit after deduction of the operation and maintenance costs, and that their budget is also sufficient.

[25] This is underlined by the fact that water cannot be drawn to the irrigation farmland without paying for its service, which affects planting and output. Therefore, collection of the service charges is smooth, and these charges are appropriated as the maintenance cost for the irrigation facilities. It is also thought that the project has been successful in aspects such as improving operation and thoroughly communicating within the organizations, through its initiatives in institutional formulation and enhancement (such as training).

[26] Monthly revenue from this is 36,300 PHP. Breakdown: payment of 150 PHP per household x 242 households.

Table 14: Profit and Loss Statement Regarding the Federation of Patriotic Farmers Cooperatives of Nueva Ecija

(Unit: 1000 PHP)

	2018	2019
Total sales	3,030	2,755
Total expenses	2,908	2,631
Final profits	122	124

Source: Federation of Patriotic Farmers Cooperatives of Nueva Ecija (Province of Nueva Ecija)

In light of the above, it can be concluded that there are no particular major issues in the financial aspect of operation and maintenance for the facilities that have been developed through the project.

3.4.4 Status of Operation and Maintenance

The operation and maintenance condition of the facilities in the regions visited during this survey is explained below. No particular major issues were observed in the operation and maintenance condition of the facilities by the irrigators' associations, agricultural cooperatives, LGUs, water users' associations, and federations of agricultural cooperatives.

○Market access roads and bridges

It was confirmed that there were no problems with the condition of the road surface. No major damages were observed. Local barangays clean the road surface and the bridges and weed the roadside regularly.

○Communal irrigation facilities

The irrigators' associations utilize the irrigation service charges they have collected, and carry out activities such as cleaning the irrigation waterways, managing the drainage, and cleaning the sluice gates. Maintenance condition also appeared to be good.

○Post-harvest treatment facilities

No damages or other issues were seen on the rice storehouses, and no problems were confirmed for the operation condition of the dryers.

○Water supply system

No particular issues are considered to exist in maintenance by the water users' associations. It was also confirmed that tasks including operation check and regular inspection of the water distribution facilities are performed regularly.

○Information marketing centers

No particular issues were observed in the operation and maintenance of the centers' facilities (agricultural products' sales corner, training and conference rooms, etc.) by the federations of agricultural cooperatives. No large-scale or regular maintenance is particularly required, and the extent of such tasks include cleaning and replacing parts for electric fixtures.

No major problems have been observed in the institutional/organizational, technical, financial aspects and current status of the operation and maintenance system. Therefore, sustainability of the project effects is high.

Photo 3: Established Water Supply Facility (Ilocos Norte Province)

Photo 4: Established Information Marketing Center (Bohol Province)

Photo 5: Established Post-harvest Treatment Facility (Office/drying facility, Ilocos Norte Province)

Photo 6: Established Post-harvest Treatment Facility/Warehouse (Pampanga Province)

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed to raise the income level of the residents of ARCs across the country, thereby contributing to poverty reduction in these areas. For this purpose, the project provided support to infrastructure development such as installation of small-scale irrigation facilities, and establishment of information marketing centers and institutional development of organizations that promote exchange of information and wide-ranging cooperation in ARCs. The *Medium-Term*

Philippine Development Plan (2004–2010) and the *Philippine Development Plan (2017–2022)* formulated by the Philippine Government both indicated the importance of addressing inequality and other relevant aspects including that of productivity in agriculture and rural businesses in order to expand economic opportunities in the fields of agriculture, forestry, and fishery. In addition, it was confirmed that the project was consistent with Japan's ODA policy, and that there was a demand for continued provision of agrotechnical services, support for institutional formulation, financial services, and infrastructure development to micro-farmers and other relevant parties in the ARCs. As such, the relevance of this project is high. With regard to efficiency, the actual project cost was almost as that of initially planned but the figures did not reach the planned targets such as the number of information marketing centers, number of institutional formulation and enhancement of federations of agricultural cooperatives, areas for construction and rehabilitation of communal irrigation facilities, and number of construction of water supply systems. Given these, it cannot be concluded that the results were necessarily efficient relative to the planned outputs. Additionally, the project period exceeded the initially planned timeframe, due to the prolonged negotiation with landowners for land acquisition, which affected the commencement of construction work in some areas. In light of the above, efficiency of the project is judged to be low. Many indicators that measure quantitative effects show that these effects have been achieved almost as planned, or exceeded the plan. Moreover, through interviews with people relevant to the project, such as those from agricultural cooperatives, federations of agricultural cooperatives, LGUs and farmers, it can be considered that the impact of the project has manifested in terms of increased farming productivity and revenue, improved quality of life of residents of the targeted ARCs, and reduction of poverty. In light of the above, the effectiveness and impact of the project is judged to be high. With regard to operation and maintenance in the LGUs, irrigators' associations, agricultural cooperatives, federations of agricultural cooperatives, and water users' associations visited during this field survey, no particular major concerns are thought to exist in the conditions of their organizational structures, technical aspect, financial affairs, and operation and maintenance. Thus, sustainability of the effects realized through this project is judged to be high.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

・There are two subprojects that have not yet been handed over at the time of the ex-post

evaluation[27]. It is desirable for DAR to promptly take appropriate measures to facilitate the proper hand-over of these subprojects to LGUs in collaboration with DPWH and LGUs which are maintenance bodies.

・DAR regularly visits and monitors the subproject sites. Though DAR does not hold the responsibility for operation and maintenance of the developed facilities, it is desirable for them to continue monitoring the extent and results of utilization of these facilities.

4.2.2 Recommendations to JICA

・It is desirable for JICA Philippine Office to check, follow-up DAR and submit requests as necessary until the procedures are completed for the long-delayed handing-over of the abovementioned subprojects. Moreover, it is desirable for the office to regularly check the progress of ex-post monitoring activities of DAR as mentioned above, and keep track of the condition of the facilities.

4.3 Lessons Learned

(Need to adjust the output plan and quantitative effect indicators during the pre-implementation phase as much as possible and understand effect and impact of the project)

・Before the start of the project, there was no adequate amount of information on ARCs, or enough survey and statistical data on landless farmers. Thus the output plan was not thoroughly examined to a satisfactory level. This is considered to have been excusable, and DAR's actions could be considered appropriate when they created and revised the indicators related to the output plan and quantitative effects following the approval of JICA and NEDA during the course of project implementation. But it is desirable to invest time and budget to establish baseline figures after reconfirming target figures and adjust quantitative effect indicators on or before the start of the project. It is not always correct to carry out project supervision and monitoring after the start of the project or during the project implementation, with changes in the planning scope and indicators. In formulating similar projects in the future, it is desirable for the Executing Agency and JICA to appropriately adjust the output plan and quantitative effect indicators before the start of the project, as much as possible. JICA, the Executing Agency, and project consultants in charge of case management (including local consultants) must enhance their focus on efforts to keep track of the effects and impact of the project before its commencement, premised on the initially

[27] Market access roads in the Province of Ifugao in CAR, and Province of Southern Leyte in Region 8.

planned project scope and figures of the quantitative effect indicators, and have the attitude to continue this monitoring during the project implementation.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	1) Support for infrastructure development in ARCs (129 ARCs in 54 provinces across the country) (i) Construction and rehabilitation of communal irrigation facilities (approx. 111 systems, approx. 21,845 ha), construction of post-harvest treatment facilities (approx. 67 facilities), building of new market access roads & improvement of existing roads (approx. 677 km), construction of bridges (approx.1,334 m), construction of water supply systems (approx. 81 systems, approx. 33,865 households) (ii)Institutional formulation and enhancement (111 irrigators' associations, 81 water users' associations, 129 agricultural cooperatives) 2) Support for development of areas around ARCs (i) Establishment of information marketing centers (approx. 26 facilities) (ii) Improvement of existing access roads (approx. 30 km) (iii) Institutional formulation and enhancement (targeting around 54 federations of agricultural cooperatives) 3) Consulting services Overall project management, development for organization, construction supervision	1) Support for infrastructure development in ARCs (136 ARCs in 54 provinces across the country) (i) Construction and rehabilitation of communal irrigation facilities (120 systems, 12,611 ha), construction of post-harvest treatment facilities (68 facilities), building of new market access roads & improvement of existing roads (701 km), construction of bridges (1,822 m), construction of water supply systems (70 systems, 21,461 households) (ii) Institutional formulation and enhancement (128 irrigators' associations, 84 water users' associations, 328 agricultural cooperatives: *DAR formulated and enhanced another 192 agricultural cooperatives using its own funds, thus the actual figure upon completion increased to a total of 328) 2) Support for development of areas around ARCs (i) Establishment of information marketing centers (8 facilities) (ii) Improvement of existing access roads (*none implemented in this project) (iii) Institutional formulation and enhancement (targeted 21 federations of agricultural cooperatives) 3) Consulting services Implemented as planned.
2. Project Period	December 2007–August 2014 (84 months)	December 2007–February 2020 (147 months)

3. Project Cost Amount Paid in Foreign Currency	4,340 million yen	4,295 million yen
Amount Paid in Local Currency	12,697 million yen	12,640 million yen
Total	17,037 million yen	16,935 million yen
ODA Loan Portion	(11,802 million yen)	(11,672 million yen)
Exchange Rate	1 yen = 0.43 PHP, 1 USD = 119 yen (as of November 2006)	1 yen = 0.46 PHP, 1 USD = 101.97 yen (The average value is based on which the exchange rate is divided by the IMF's International Fiscal Statistics (IFS) 2008–2019.)
4. Final Disbursement	April 2017	

Republic of the Philippines

FY2019 Ex-Post Evaluation of Japanese ODA Loan Project

"Environmental Development Project"

External Evaluator: Tokiko Ito, Octavia Japan, Co., Ltd.

0. Summary

This project was implemented with the goal of reducing emissions of environmental pollutants by providing Local Government Units (hereafter referred to as "LGUs"), private corporations, and Government Owned and Controlled Corporations (hereafter referred to as "GOCCs"), etc. with mid-to-long tenor loans for capital investment in the environmental sector throughout the Philippines through the Development Bank of the Philippines (hereafter referred to as "DBP"), thereby contributing to environmental protection and the improvement of living conditions. The relevance of this project is high given that the provision of concessional mid-to-long tenor funds in the environmental sector and environmental improvement and protection are consistent with the country's development policy, development needs, and Japan's official development assistance (hereafter referred to as "ODA") policy, which prioritizes support for environmental protection measures. The project cost was almost as planned, although a part of the loan conditions and DBP's co-payments were changed to meet the demand for lending. The project period exceeded the planned timeframe because it took more time than expected for various licensing procedures, so it was extended to disburse loans as much as possible; thus, the efficiency of the project is fair. At the time of the ex-post evaluation, many of the sub-loans had not matured. As for the quantitative effect indicators for the sub-projects, those indicators that achieved the target values were confirmed, but the target year setting was unclear, and there were projects where the construction and installation of the target facilities were incomplete. On the other hand, this project was recognized for its contribution to environmental improvement and protection as well as improvement of the living environment. At the time of ex-post evaluation, although it is difficult to evaluate the entire project, the project's effectiveness and impact is judged to be fair based on the actual values of the indicators at the time of the ex-post evaluation. The sustainability of the project's operation and maintenance is high because there are no particular problems with the structural, technical, financial, and operation and maintenance conditions of the organization.

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

1. Project Description

Project Location

Sewage Treatment Facility
Developed by the Project

1.1 Background

The Philippines had been confronted with serious environmental problems including water shortage, water pollution, air pollution, and an increasing volume of waste due to its growing population and especially because of increasing economic activities centered in Metro Manila. The country's government had actively taken steps to deal with environmental degradation, mainly through the development of a legal and institutional framework. However, it had not been sufficiently enforced, and an urgent response to the rapid environmental degradation was needed. On the other hand, to promote capital investments in the environmental sector, providing mid-to-long tenor funds to private corporations is essential. However, due to the difficulty in generating returns and high investment risks from investment in environmental policy, private financial institutions (hereafter referred to as "PFIs") are reluctant to provide enough mid-to-long tenor fund. Hence, it is necessary to provide mid-to-long tenor funds through public financial institutions under the concessional loan conditions.

1.2 Project Outline

The objective of this project is to reduce emissions of environmental pollutants in the Philippines by providing LGUs, private corporations, GOCCs, water districts (hereafter referred to as "WDs"), and cooperatives/associations with the mid-to-long tenor funds through DBP, thereby contributing to the improvement of living conditions and environmental protection.[1]

[1] The document supplied by JICA (Japanese language) states that this project "aims to reduce the emission of environmental pollutants and to improve the living environment, thereby contributing to the protection of the country's environment." In this study, it was revised based on the contract document (English) with the executing agency.

Loan Approved Amount/ Disbursed Amount	24,846 million yen/24,814 million yen	
Exchange of Notes Date/ Loan Agreement Signing Date	September 2008/September 2008	
Terms and Conditions	Interest Rate	Preferential Terms [2] /General Terms[3]/Consulting Service 0.65%/1.4%/0.01%
	Repayment Period (Grace Period	40 years/30 years/40 years 10 years/10 years/10 years)
	Conditions for Procurement	General Untied
Borrower/ Executing Agency	Development Bank of The Philippines (DBP)	
Project Completion	January 2017	
Target Area	All the country	
Main Contractor(s) (Over 1 billion yen)	N/A	
Main Consultant(s) (Over 100 million yen)	GHD Pty. Ltd. (Australia)/PADECO Co., Ltd (Japan)/Orient Integrated Development Consultants, Inc. (Philippines)/Engineering and Development Corp. of the Philippines (EDCOP) (Philippines) (JV)	
Related Studies (Feasibility Studies, etc.)	-"Special Assistance for Project Formation for Environmental Development Project" (2005) -"Special Assistance for Project Formation for Philippines Water Revolving Fund" (2006) -United States Agency for International Development (USAID) "Feasibility Assessment Study" (2005) -USAID "Design and Implementation Framework" (2006)	
Related Project	[(Japanese) ODA Loan] -"Environmental Infrastructure Support Credit Program Phase (I) (II)" (March 1996, December 1999) [Technical Cooperation Projects] -"Establishment of Ecological Solid Waste Management in three cities" (2007–2010) -"Master Plan on Solid Waste Management for Boracay Island and Municipality of Malay in the Philippines" (2007–2008) [Other Aid Agency] -Reduction of emission in Metro Manila, Sewerage improvement in provincial cities, Solid waste management for LGUs (USAID) (Before the start of this project, the official business name was unknown)	

2. Outline of the Evaluation Study

2.1 External Evaluator

Tokiko Ito, Octavia Japan, Co., Ltd.

[2] Applicable to the parts that contribute to the global environment (water supply and sewerage, new and renewable energy, industrial pollution control, and waste management) and poverty reduction.
[3] Applicable only to water supply excluding preferential terms.

2.2 Duration of Evaluation Study

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

Duration of the Study: August 2019–July 2020

Duration of the Field Study: November 17–December 7, 2019, February 25–March 4, 2020

2.3 Constraints during the Evaluation Study

This study examines the ODA two-step loan project. At the time of the ex-post evaluation, there were 42 prematurity or outstanding loans out of 78 sub-loans. In addition, there were sub-projects that were under construction or during the trial period of facilities. Furthermore, no documents shared with the executing agency regarding the target year of the operation and effect indicators of the projects could not be confirmed. Based on the above, it was difficult to obtain actual values to measure the operation and effect indicators' degree of achievement and to make evaluation judgments through this study. Thus, evaluation judgment was made based on the actual values and information at the time of the ex-post evaluation.

3. Results of the Evaluation (Overall Rating: B[4])

3.1 Relevance (Rating: ③[5])

3.1.1 Consistency with the Development Plan of the Philippines

At the time of the appraisal, the Philippine government's development policy, *Mid-Term Philippine Development Plan* (2004–2010), focused on environmental protection and appropriate supervision of natural resources. In addition, it advocated reliable implementation of environmental laws such as laws for air cleansing and water purification.

At the time of the ex-post evaluation, the Philippine government has identified infrastructure development and climate change response as important foundations in the *Philippine Development Plan* (2017–2022). The infrastructure development is oriented toward investing the government budget while also using official development assistance (ODA) and promoting public-private partnership (hereafter referred to as "PPP"). It also points out the importance of the environmental protection and the appropriate and reliable management of natural resources to strengthen capacity to respond to climate change and natural disasters.

Thus, the project is in line with the country's development policy given that it was a project that financed the field of environmental protection and pollution control.

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

[5] ③: High, ②: Fair, ①: Low

3.1.2 Consistency with the Development Needs of the Philippines

Prior to the start of the project, the Philippines had serious environmental problems (water shortage, water pollution, air pollution, increased discharge of waste, etc.), especially in Metro Manila. Based on the country's environmental standards, 35% of all the rivers were classified as potable, and the sewerage coverage was 4% nationwide and 10% in Metro Manila; sewers caused severe water pollution in rivers and the sea. As for the air atmosphere, the concentration of pollutants in the air in urban areas was much higher than the country's environmental standard. Regarding waste, the collection rate of municipal solid waste generated throughout the country was 70% in urban areas and 40% in rural areas, and uncollected waste was illegally dumped and inadequate self-treatment without sanitary landfilling or incineration was carried out. Providing the mid-to-long tenor funds to private corporations was indispensable for promoting capital investment in the environmental sector to deal with these issues. However, the supply of the mid-to-long tenor funds by PFIs has not progressed much in investing in environmental measures, which generally generate little profit and have a high investment risk. Therefore, the mid-to-long tenor funds under the concessional loan conditions through public financial institutions was required.

Furthermore, at the time of the ex-post evaluation, according to the *Philippine Development Plan* (2017–2022), in terms of water supply and sanitation, the quality of water resources by use has been deteriorating based on the country's environmental standard due to population growth and expansion of residential and industrial areas. It was shown that 14.5% of households do not have access to safe water and the sewerage coverage rate for general households is 4%. New and renewable energy facilities account for only half the capacity that can be discharged in the Philippines. Regarding air quality, there is concern that the number of private cars, the largest pollutant emission source, has increased sharply (44% increase from 2006 to 2015); however, a slight improvement was seen from 2011 to 2015 due to effective management such as monitoring and regulation by the government. Continuous management that does not loosen is required. Regarding waste, the amount of general solid waste generated throughout the country has been increasing, but only 37% of LGUs have sanitary landfills in accordance with the country's policies. One of the factors is attributed to LGUs' lack of funds, facilities, and technology. Furthermore, as for capital investment in the environmental sector, according to DBP and the end-users, it is said that although the supply of funds through PFIs is progressing, the supply of mid-to-long tenor

funds has not advanced much.[6] Thus, mid-to-long tenor funds under the concessional loan conditions through public financial institutions are required.

Therefore, through the appraisal and ex-post evaluation, the project was in line with the development needs because the measures for environmental issues have been needed, the funding other than the administrative budget and the participation of private corporations have been highlighted for this measure, and it provides mid-to-long tenor funds under the concessional loan conditions for environmental projects.

3.1.3 Consistency with Japan's ODA Policy

Japan identified "environmental protection and disaster prevention" as a priority in the *Country Aid Policy* (August 2000). Moreover, the priority areas were set as "supports for global issues" in JICA's *Overseas Economic Cooperation Operation Policy* (2005–First half of 2008) and "supports for environmental protection measures" in the *County Assistance Implementation Report* (2006). In addition, the Philippines is one of pilot countries for the *US-Japan Clean Water for People Initiative* (2002).[7] In this project, the Philippine Water Revolving Fund (hereafter referred to as "PWRF"), which is jointly established with the United States Agency for International Development (USAID) and DBP based on this initiative, was planned to finance the water supply and sanitation sectors.

The project provides mid-to-long tenor funds through public financial institutions that promote investment in the field of environmental protection and pollution control in the Philippines. Therefore, the project was in line with Japan's ODA policy.

3.1.4 Appropriateness of the Project Plan and Approach

During the implementation of the project, the loan interest rate of the project became less competitive compared to the lower interest rate of commercial banks (see "3.2 Efficiency, 3.2.1 Output 1), Sub-loan interest rate" below). In response, under the loan conditions set at the time of the appraisal, the borrowing of target end-users (borrowers) (LGUs, private corporations, GOCCs, WDs, and cooperatives/associations) did not progress as planned. With the concurrence of JICA, DBP has promoted lending by changing (1) the share of equity requirement of LGUs, WDs, and

[6] Regarding the interest rate conditions for PFIs, a concrete answer from DBP or PFIs could not be obtained during the field survey.

[7] The governments of Japan and the United States confirmed the partnership between two countries, including cooperation on global issues, in the Japan-US *Partnership for Security and Prosperity* (2001). Based on this, at the "World Summit on Sustainable Development" (2002), this initiative was announced as a joint Japan-US effort on water supply to expand Japan-US cooperation in the development sector.

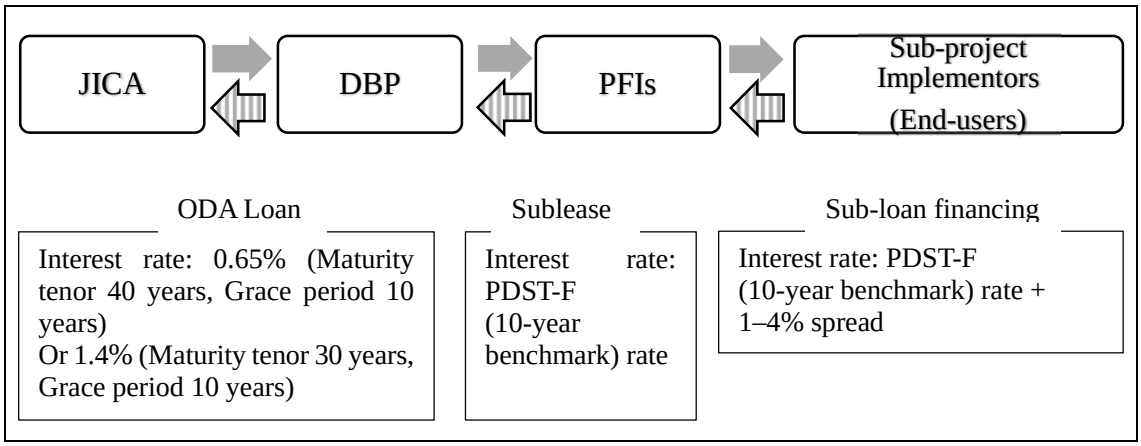
cooperatives/associations, (2) the loan conditions such as co-financing conditions, and (3) the fund allocation of the preferential conditions and the general conditions during the project implementation. These changes do not mean that the interest rate of the project was inferior at the time of the appraisal but rather that the market interest rate was affected by economic policy after the financing was started. In other words, it was an unavoidable event that the project faced in the circumstances surrounding the financing that had changed from the time of the appraisal. It is considered that appropriate and realistic measures were taken.

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

3.2 Efficiency (Rating: ②)

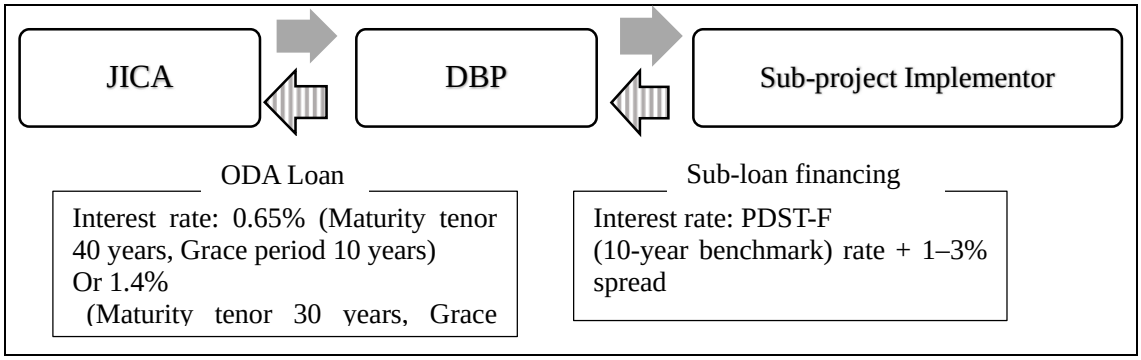
3.2.1 Project Outputs

This project provided loans of the concessional mid-to-long tenor funds for capital investment in the environmental sector to LGUs, private corporations, GOCCs, WDs, and cooperatives/associations through DBP. The mechanisms of the financing schemes for this project are shown in Figures 1, 2, and 3.



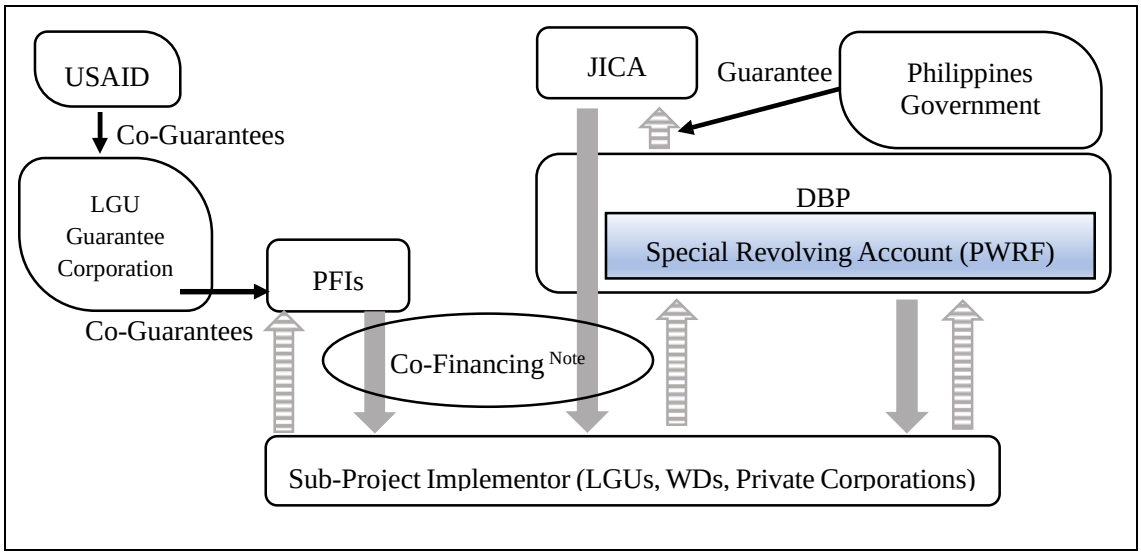
Source: Made by external evaluator based on the document provided by JICA

Figure 1: Mechanism of Wholesale Scheme



Source: Made by external evaluator based on the document provided by JICA

Figure 2: Mechanism of Retail Scheme



Source: Made by external evaluator based on the document provided by executing agency and JICA

Note: DBP: Financing 50%–75% of total project fund
Microfinance Institutions (MFIs): Financing 25%–50% of total project fund

Figure 3: Mechanism of Revolving Fund

The planned and actual output is shown in Table 1.

Table 1: Planned and Actual Output

Item	Plan (2008)	Actual (2019)
1. Two-Step Loan		
1) Eligible sector	Water supply and sanitation, new and renewable energy, industrial pollution control, solid/health care/hazardous waste management	As planned
2) Eligible Usage of the Sub-Loan	-Establishment and improvement of water supply and sewage facilities -Development of new and renewable energy and transaction costs for Clean	-Mostly as planned -CDM application procedures cancelled due to lower credit (emission

	Development Mechanism (here after referred to as "CDM")[8] application procedures -Installation and improvement of facilities that will prevent or reduce industrial pollution -Establishment and improvement of solid/health care/hazardous waste management facilities -Initial working capital pertaining to the above -Interest during construction	allowance) prices
3) Eligible End-Users	Private corporations, LGUs, GOCCs, WDs, and cooperatives/associations	There was no participation from GOCCs. Probably because there were other ODA funds available with good lending terms.
4) Financing Scheme	(i) Wholesale lending via PFIs or microfinance institutions (hereafter referred to as "MFIs") (ii) Retail lending from DBP (iii) Co-financing by DBP and PFIs through PWRF (only for the water supply and sanitation sub-projects)	- Almost as planned (See Figure 1, 2 and 3) - (i) There were no loans from MFIs because no applications for sub-projects met the conditions for this project loan.
5) Sub-Loan Interest	(i) Wholesale lending: Philippine Dealing System Treasury Reference Rate AM (hereafter referred to as "PDST-R1"; 10-year benchmark) rate + spread 1–4% (ii) Retail lending: PDST-R1 (10-year benchmark) rate + spread 1–3% (iii) Co-financing of DBP and PFIs using PWRF: The loan conditions are the same as those of sub-projects in other sectors.	- Both (i) & (ii) use PDST-Fixing (hereafter referred to as "PDST-F")[9] for 10-year benchmark. - (iii) As planned
6) Repayment Period of Sub-Loans	As for (i) & (ii), 3 to 15 years (within 20 years depending on cash flow of project funds; Grace period: up to 5 years), and as for (iii), up to 20 years (Grace period: up to 3 years)	As planned
7) Sub-Loan Limit Ratio	-Private: 80% of total project cost -LGUs, GOCCs, WDs and cooperatives/associations: 90% of total project cost (DBP can eliminate the 10% capital quota of LGUs and WDs as necessary for (iii))	-LGUs, GOCCs, WDs and cooperatives/associations: 10% equity requirement was waived with JICA's concurrence. -(iii) Co-financing facility

[8] A mechanism in that the developed countries that have set greenhouse gas reduction targets seek to contribute to the sustainable development of developing countries by providing them with technologies and funds and jointly implementing projects that contribute to reduction and absorption of greenhouse gas emissions, as well as obtaining a certain amount of reduction and removal of greenhouse gas as credits (emission allowances). CDM can be applied to some of the greenhouse gas emission reduction targets of developed countries and can secure additional investment in the energy sector in developing countries. It was adopted at the Third United Nations Framework Convention on Climate Change (COP3) held in Kyoto (1997).

[9] PDST-F is used as a reference value after 2007 as instructed by the Ministry of Finance, Money Market Association of the Philippines.

	-(iii) Co-financing facility (Total project cost excluding the above end-user's equity) • 50–75% loan cap of total project cost from DBP and 25–50% loan cap of total project cost from PFIs/MFIs (100% of loan from DBP for fund under PWRF is not eligible) • 25% loan cap of the total amount of (iii) to private corporations.	•Except for 5 loans less than 50 million PhP (10 in the process of appraisal), DBP funded 100% of the loan with JICA's concurrence. •25% loan cap of total amount of (iii) to private corporations was waived with JICA's concurrence.
8) Currency of Sub-Loans	Philippine peso	As planned
2. Consulting Service	Assistance in promotion/dissemination/marketing of the project, formulation of sub-projects, management of sub-projects (appraisal, implementation, monitoring and evaluation), coordination with concerned government agencies and other stakeholders, and training for DBP, PFIs, MFIs, and end-users	-Almost as planned -Training for MFIs was not implemented because they did not participate.

Source: Documents provided by executing agency

In this project, 78 sub-loans were released for a total of 73 sub-projects targeting the entire Philippines. The breakdown of the 68 end-users by type was 34 private corporations, 18 LGUs, seven WDs, and nine electric cooperatives.[10] The breakdown by sub-sector is shown in Table 2. Regarding the execution of these sub-loans, through the consulting service of this project, publicity and dissemination related to the financing of this project, including the purpose of strengthening cooperation, were carried out to the Environmental Management Bureau (hereafter referred to as "EMB") of the Department of Environment and Natural Resources, the Local Water Utilities Administration (hereafter referred to as "LWUA"), other related organizations such as the League of Cities and the League of Provinces, and prospective customers. In addition, as sub-project management support, efforts were made to promote financing, such as revision of the environmental guidelines for DBP (Environmental Due Diligence Manual), preparation of various manuals, and holding of training seminars for DBP staff.[11]

[10] The number of end-users is not the same as the number of sub-loans and sub-projects, because the end-users may carry out multiple sub-projects or use multiple sub-loans.

[11] More specifically, more than 150 meetings were held with prospective customers nationwide, in addition to briefings for industry groups and explanations/discussions with relevant government agencies, including the purpose of strengthening cooperation. Through related organizations, publicity and dissemination were carried out to

Table 2: Actual Number of Loans of the Project

(Unit: Number)

Area	Luzon		Visayas		Mindanao		Total	
Sub-Sector	Sub-Project	Sub-Loan	Sub-Project	Sub-Loan	Sub-Project	Sub-Loan	Sub-Project	Sub-Loan
Water Supply and Sanitation	9	9	5	7	3	3	17	19
New and Renewable Energy	9	9	3	3	3	3	15	15
Industrial Pollution Control	11	11	7	7	3	3	21	21
Solid/Health Care/Hazardous Waste Management	6	7	6	8	8	8	20	23
Total	35	36	21	25	17	17	73	78

Source: Document provided by executing agency

Note: The number of sub-projects and the number of sub-loans are different because a single sub-project may be financed using different financing schemes and for different target facilities and equipment.

Photo 1: Water Supply and Sanitation Sector Small-scale Dam (Cebu, Visayas Area)

Photo 2: New and Renewable Energy Sector Hydroelectric Power Station (Laguna, Luzon Area)

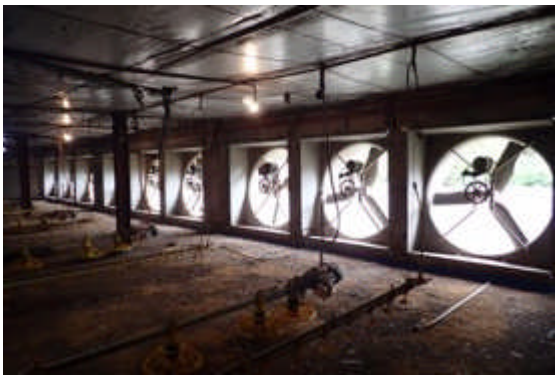


Photo 3: Industrial Pollution Control Sector Poultry Farm Exhaust System (Cebu, Visayas Area)

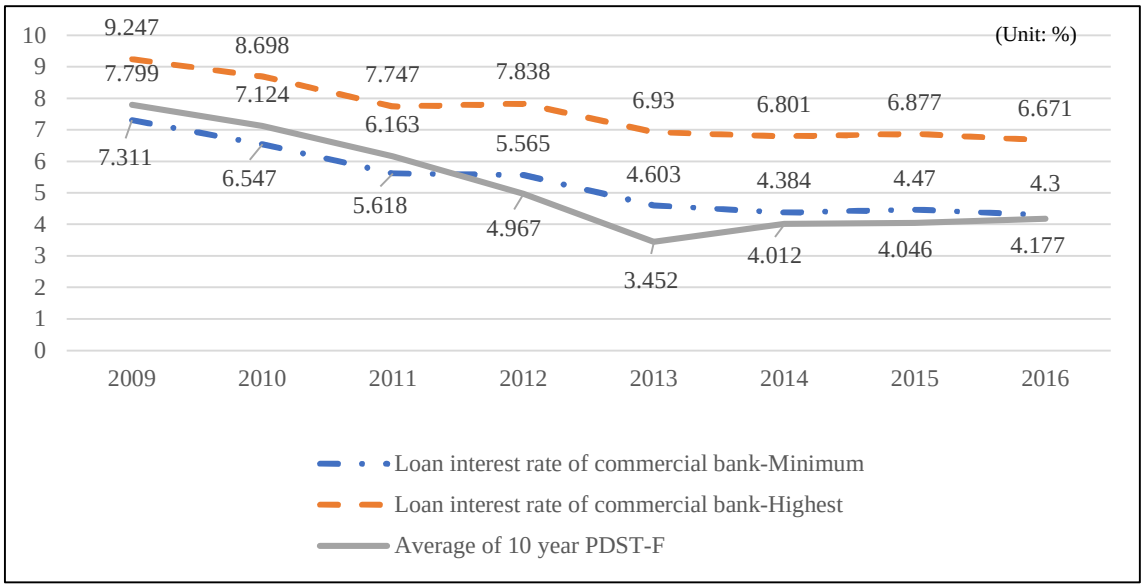
Photo 4: Waste Management Sector Biogas Production Facility using Waste (Cebu, Visayas Area)

representatives of LGUs, WDs, and local industry. As sub-project management support, in addition to revision of environmental guidelines, preparation of manuals on technical evaluation and monitoring for each sub-sector, holding of training seminars mainly for DBP head office staff, communication and exchange among the officers in the DBP head office, the sales officers and the consultants, circulation of materials to relevant departments, and study tours to environmental projects were held.

Points to note and changes, as well as reasons regarding the main outputs, are as follows:

1) Sub-Loan Interest Rate

During the implementation of this project, the Philippine government implemented economic policies such as active fiscal mobilization and interest rate cuts, and the commercial banks provided loans at the interest rates shown in Figure 4.



Source: Bangko Sentral ng Philipinas (Central Bank of Philippines)

Figure 4: Loan Interest Rates of Commercial Banks and Average 10-year PDST

During the project period (2008–2016), the average interest rate on sub-loans under the project was 7.93% (the loan interest rate distribution is 5.40% to 11.95%, median is 7.86%). In the year of appraisal (FY2008), the concessional aspects of the loan interest rate being almost equal to the interest rate of commercial banks and of the mid-to-long tenor repayment period of this project was competitive. In addition, this project had an advantage in providing loans to LGUs and WDs, which are hardly eligible for loans. However, during the implementation of the project, the advantage of the loan interest rate of the project diminished compared to the interest rate of commercial banks. The sub-loan amount per sub-project also decreased. Therefore, it is considered that the loan disbursement and loan applications of this project stagnated. To promote the financing of this project while ensuring the concessionability of its sub-loan without causing a loss, with respect to the sub-loan interest rate with spreads of DBP or PFIs, DBP has taken various measures (e.g., the spreads were made as low as possible within the range of terms of the

ODA Loan agreement to minimize the difference with the interest rates of commercial banks).

2) Sub-Loan Maximum Limit Ratio

As mentioned above, in response to a decrease in the market interest rates during the project period, DBP has agreed with JICA to change the loan cap ratio of sub-loans. During the implementation of the project, DBP removed the 10% equity requirement of the total cost of project of these end-users.[12] According to the officer in DBP's head office, it is heard that this change has allowed LGUs and WDs, etc., to implement flexible fundraising and easier loan applications. Half of the 68 end-users were LGUs, WDs, and electric cooperatives. Regarding the co-financing of the financing scheme (iii), PWRF, DBP has agreed that PFIs did not participate in five sub-loans of 50 million PhP or less and has provided 100% of the loan for this project. This is because the benefits of PFIs participating in co-financing have declined in response to the lower market interest rates. In addition, DBP has removed the loan cap ratio of 25% of the total amount of the loan from this project regarding the financing scheme (iii) for private corporations. Furthermore, DBP provided a mix (blending) of this project's loans and low-interest loan products of DBP's own cost to sub-projects. As a result, the participation of private corporations that implement capital-intensive projects and PPPs were promoted in this project. These flexible measures are considered to have enabled DBP to promote financing of this project even though the market interest rates declined during the project period.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost at the time of the appraisal was planned to be 27,480 million yen (of which 24,846 million yen was covered by the ODA Loan). The actual total project cost was 27,697 million yen (of which 24,814 million yen was covered by the ODA Loan), which was almost as planned (approx. 101% of the plan). The project cost on the DBP side increased slightly compared to the plan. According to the lending official at DBP's head office, "At the time of appraisal, there was no particular basis for calculating the cost on the DBP side, and it was set at about 10% of the ODA Loan amount." Some of the sub-projects targeted by this project loan have raised funds of the total project amount by blending their own funds with DBP's and PFIs' funds in addition to the loans provided by this project. If DBP did not take measures such as blending loans, then

[12] At the time of appraisal, in sectors other than water supply and sanitation, it was planned that "the loan cap ratio for LGUs, WDs and cooperatives/associations shall be determined according to individual projects."

it might be possible that the loan amount would not have increased.

Furthermore, as shown in Table 3, the breakdown of ODA Loan allocation by category was changed during the project implementation. The main reasons were that during the project implementation, (1) as mentioned above (Efficiency 3.2.1 Outputs), the financing was sluggish due to the lower interest rates of commercial banks, and (2) releasing the loans had been delayed because the acquisition of permits for the financing to LGUs and the environmental and energy development took time, and lending of Category B could not be executed as expected by the loan disbursement date. Regarding (2), after DBP decided upon financing based on the loan appraisals, the end-users had to obtain the necessary approvals for sub-loan borrowing and sub-project implementation by the loan disbursement deadline for this project. In particular, the borrowing of LGUs and WDs requires permission from the central bank's Monetary Board (hereafter referred to as "MB"), the borrowing of WDs requires the permission of the LWUA, and the installation of power generation facilities requires the approval of the Energy Regulatory Commission. DBP also provided support for the application, however, it took longer to obtain permits than expected at the time of planning. It is thought also to have affected the number of loans.[13] According to the sectoral officers in DBP's head office, "After the appraisal, the examination was stricter than before due to the government's instructions, and at the time of the appraisal, it could not be assumed that it would take time to obtain permission." Based on the above point and compared with the actual outputs, the project cost was slightly exceeded, but almost as planned, and it is considered that the changes of plan were appropriate.

[13] It is said that the sub-projects, which were not approved before the loan disbursement deadline and were excluded from the financing of this project, have been financed using DBP's own funds.

Table 3: Planned and Actual Project Cost[14]

(Unit: Million Yen)

Item	Plan		Actual	
	Total	Of which ODA Loan	Total	Of which ODA Loan
Sub-Loan, of which General Terms (Category A: Applicable Mainly for PWRF)	1,650	1,500	8,290	7,600
Sub-Loan, of which Preferential Terms (Category B: Except A)	25,410	23,100	19,073	17,000
Total of Sub-Loan	27,060	24,600	27,364	24,600
Consulting Service (Category C)	246	246	214	214
Commitment Charges	174	0	119	0
Total	27,480	24,846	27,697	24,814

Source: Document provided by JICA and answers to the questionnaire by executing agency

3.2.2.2 Project Period

At the time of the appraisal, the project period was planned from September 2008 (signing of loan agreement) to September 2015 (completion is defined as completion of loan disbursement) (85 months). The actual project period was the 98-month period from September 2008 (signing of loan agreement) to October 2016 (completion is defined as completion of loan disbursement), exceeding the plan (approx. 115% of the plan). Table 4 shows the project's planned and actual period for each output.

Table 4: Planned and Actual Project Period Output

	Plan at Appraisal	Actual at Ex-Post Evaluation
Whole Project	Sept 2008–Sept 2015 (85 months)	Sept 2008–Oct 2016 (98 months)
Selection of Consultant	No information	July 2009–June 2010 (12 months)
Consulting Services	Oct 2008–Sept 2015 (84 months)	July 2010–Dec 2016 (78 months)
Lending from DBP	Oct 2008–Sept 2015 (84 months)	Mar 2009–Oct 2016 (92 months)

Source: Document provided by JICA and answers to the questionnaire by executing agency

As mentioned above (3.2.2.1 Project Cost), the cause for exceeding the designed project period was due to delays encountered by several sub-projects in securing permits which in turn affected the project's disbursement performance. Supported by those approved sub-projects, DBP

[14] At the time of appraisal, the exchange rates were 1 dollar = 101 yen, 1 PhP = 2.46 yen, and 1 dollar = 40.9 PhP (April 2018), but actually 1 dollar = 97.52 yen, 1 PhP = 2.18 yen (International Monetary Fund international financial statistics data (IFS Data) (average during the period 2008–2016)).

established (and JICA agreed) that loan disbursement would be maximized if the project is extended. With respect to the consulting services, the extension was likewise necessary for continued support to those sub-projects' pre-release compliances for timely sub-loan releases and attainment of full disbursement of the project within the extended period.

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

This project involves a two-step loan, and sub-projects could not be identified in advance. Thus, the internal rate of return was not calculated at the time of the project's appraisal, and therefore it was not recalculated in this survey.

[Summary for Efficiency]

Partial changes were made to the outputs of the project due to stagnant lending demand. The project cost was almost the same as the planned amount. The project period exceeded the plan due to extension of the project implementation period to achieve the planned loan amount. In light of the above, while the project cost was almost according to plan, the project period exceeded the plan, and therefore efficiency of the project is fair.

3.3 Effectiveness and Impacts[15] (Rating: ②)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

Table 5 shows the target values of operation and effect indicators of the sub-loan planned at the time of appraisal and the actual values confirmed in this survey.

Table 5: Operation and Effect Indicators of the Sub-Loan

Indicator	Target Note 1	Actual (December 2019)
(1) Total Amount of Sub-Loan (million yen)	24,600	24,600
(2) Percentage of Amount of Overdue Unpaid Credit (%)	5.1 Note 2	4.1 Note 3
(3) Percentage of Number of Overdue Unpaid Credit (%)	8.3	4.4 Note 3

Source: Document provided by JICA and answers to the questionnaire by executing agency
Note 1: In this project, the target year was not shared with the executing agency. Indicator (1) is determined at the end of the project period, but regarding indicators (2) and (3), the target year is considered to be determined at the maturity of all sub-loans.
Note 2: At the time of appraisal, the target was set as "the standard value of the central bank of the Philippines during the loan disbursement period." At the time of the ex-post evaluation, the said value was not available, so the reference value (December 2007) provided by JICA is used.
Note 3: Actual value of 23 sub-loans out of 78 sub-loans that matured by December 2019.

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

At the time of the appraisal, indicator (1), the target value of the total sub-loans was set as the loan approval amount. The amount of approved loans includes loans utilizing revolving funds. The lending was ongoing at the time of the ex-post evaluation, and it is not possible to judge whether the loan approval amount has been achieved until the sub-loan maturity. Therefore, the planned and actual amount of the portion covered by the ODA Loan was confirmed, and it was achieved. The actual of indicator (2), percentage of the amount of overdue unpaid credit and, indicator (3), the percentage of the number of overdue unpaid credit at the time of the ex-post evaluation are as shown in Table 5. This project is a concessional loan with mid-to-long tenor. By the time of the ex-post evaluation (December 2019), 23 out of 78 sub-loans had matured. 22 of them (17.2% of the total amount of sub-loans) were paid off. In addition, 13 sub-loans (6.6% of the total amount of sub-loans) were paid off before the due date.[16] In other words, 42 out of 78 sub-loans are pre-maturity, and 76.2% is the outstanding amount. The latest maturity of the sub-loan is March 2035 (loan made in October 2016), which was not completed at the time of the ex-post evaluation. More than half of the sub-loans and the outstanding amount remain at the time of the ex-post evaluation, and thus it is considered difficult to make an evaluation judgment of the entire project based on the achievement of the indicators.

For each sub-sector, at the time of appraisal, it was decided to select appropriate indicators at the time of sub-loan appraisal and finalize their standard values at the time of approval.[17] Table 6 shows the baseline, target, and actual values of sub-sector operation and effect indicators confirmed at the time of the ex-post evaluation. The operation and effect indicators finalized at the time of sub-loan approval were based on the end-users' loan applications and support by the consulting service, which were supported by the DBP officers based on the operational policy guidelines (hereafter referred to as "OPG"). In addition to manuals, the OPG is the detailed rules for financing of this project. They also include indicators that end-users normally use to operate and maintain facilities and equipment. According to the officers in DBP's head office, the target values were "based on the estimated value of the design capacity of the constructed and installed

[16] According to the officers in the DBP's head office, the loans provided by the project tend to be repaid before maturity because the interest rate was higher than that of commercial banks. The number of completed cases includes three sub-projects handled by the DBP head office's Remedial Department due to project suspension, etc. (see footnote 25 for details).

[17] At the time of appraisal, typical examples of indicators were as follows. Water supply: population served (person), amount of water supply (m^3/day), water supply coverage (%). Sanitation: population treated (person), amount of wastewater treated (m^3/day), sewerage coverage (%). New and renewable energy: facility operation rate (%), maximum output (kW). Industrial pollution control: pollutant reduction rate. Waste management: solid waste treated (kg/day), hazardous waste treated (kg/day), waste collected (kg/day).

facilities of the sub-projects to be financed, with the loan maturity mainly as the target year."[18] Some indicators are the sum of multiple sub-projects. According to the officer in DBP's head office, "There are sub-projects whose indicators and target values have been finalized just before the completion of this project. DBP has not recalculated the target values when the construction details change (the OPG does not state that it needs to be revised each time)." In addition, if the facilities covered by this project are part of the entire project conducted by an end-user, then it may be difficult to separate the data for the facilities covered by this project from the entire project, so some data may be measured for the entire project. Therefore, there could be baseline values as of before the implementation of the sub-project.

Table 6: Operation and Effect Indicators of Sub-Sector (Baseline, Target, and Actual)

Indicator	Baseline (At the Time of Loan Approval)	Target	Actual[19] (December 2019)
① Water Supply and Sanitation (PWRF)			
1) Operation Indicators			
Increased water production (m^3/year)	36,995,438.00	247,014,810.00	108,595,970.79
Pipe network (meters)	1,580,889.00	1,932,945.00	2,459,801.00
2) Effect Indicators			
Increased service connection	135,544	409,473	284,778
Reduction of non-revenue water (hereafter referred to as "NRW") (%)	-	17	20.16
Water conserved from NRW (m^3) *	-	3,909,064.00	9,470,302.62
② New and Renewable Energy			
1) Operation Indicators			
Increased capacity in NRE (MW: megawatt)	0	21.73	7.47
Increased distribution capacity (MVA: mega volt-ampere)	0	61.90	36.90
Increase in transmission/distribution network (km)	0	39.28	23.85
2) Effect Indicators			
Reduction in fossil fuel (barrels/year) *	0	339,321	77,944
Increase in service connections	0	8,447	5,466
Reduced systems loss (KWH: kilowatt hour, for the period covered)	0	30,668	12,668
Greenhouse gas emission reduction (tons of CO_2) *	0	81,462	18,755

[18] At the time of setting and revising the indicators for the entire project, DBP had the documented concurrence of JICA. Following the recommendations of the JICA internal mid-term evaluation conducted in December 2015, indicators were added with the data availability of the indicators in mind.

[19] Same as Note 1 of indicators (2) and (3) in Table 5.

③ **Industrial Pollution Control**			
1) Operation Indicators			
No. of tunnel ventilated poultry buildings	8	34	34
Bird population	1,023,240	-	8,446,400
No. of LED streetlight systems installed	0	3,810	3,600
No. of drainage and vacuum cleaners operational	0	2	2
No. of analytical instruments of environment installed	1	-	9
No. of boilers using bagasse installed[20]	4 (Old)	1 (New)	1(New)
Bag filters/cyclones installed[21]	0	9	9
Total length of gabions & riprap installed (LM: Linear Meter)	0	750	750
Total length/area of ripraps constructed (m^2)	0	10,510	10,510
Paper making/mill machine parts installed (set)	1	1	1
2) Effect Indicators			
Reduced mortality at poultry firm (%)	<10	<5	3.5
No. of reared birds saved	-	-	253,500
Savings in poultry (in million PhP)	-	-	19
Reduced energy consumption (kwh/hr)	324,000	47,498	47,448
Savings by reduced energy consumption (million PhP)	-	4.768	4.764
Volume of sludge removed (m^3/month)	2,880	-	4,752
No. of environmental samples analyzed	2,000	6,000	10,470
Replaced bunker fuel per crop year with bagasse per year (l/year)	0	-	Bunker fuel 8000,000 L to Bagasse 210,000 L
Savings by replaced fuel (million PhP/crop year)	-	14.4	0.288
Avoided CO_2 emission from 800,000 L bunker fuel (MT CO_2/year) *	0	2,382	2,382
Area of land erosion avoided (m^2)	0	-	18,010
Value of property savings (by reducing soil erosion) (million PhP)	-	-	36.02
Raw materials collected from dust collectors[22] (TPD)	0	-	869
Value of raw materials saved (million PhP)	-	-	4.3
Recycled waste paper (MT) *	41,400	48,300	48,777
Recycled water (m^3) *	247,104	247,104	289,440

[20] Bagasse is the residue of sugarcane juice and raw material for non-wood paper and fuel. A boiler is a device that generates heat in the form of steam, hot water, etc., which has a combustion chamber (firebox) that burns fuel and a heat-exchange device that transfers the heat obtained from the combustion to water and converts it into steam or hot water.

[21] The cyclone type is a powder separation system that separates air and powder.

[22] A device that separates and collects dust, etc., from processing gases such as combustion exhaust gas.

④ **Solid Waste Management**			
1) Operation Indicators			
Landfill design capacity (m^3)	0	9,058,279.00	6,986,185.97
Total truck volume capacity (m^3)	61.49	38.60	738.50
Equipment (No., type, & capacity)	33	28	30
Total bin capacity (m^3)	-	-	3,275.00
Temporary storage capacity of material recycling facility (m^3)	20,669.95	213,130.80	424,144.55
Processing capacity of composting component (m^3/batch)[23]	0	130,746.65	757,524.65
Feather meal processing capacity by rendering[24] (kgs produced/day)	0	3,000	2,400
2) Effect Indicators			
Volume of waste landfill (m^3)	0	9,567,446.05	2,246,981.12
Volume of waste collected/transported (m^3/day)	-	124,100.00	216,725.36
Operating hours for solid waste management (hours)	-	-	7d/w + 84h/w
Volume of waste stored/collected (m^3/day)	-	2,065	2,065
Volume of waste recycled (m^3) *	-	9,818.50	529,321.13
Volume of waste composted (m^3)	0	25,838.35	266,959.88
Volume of poultry feather waste processed (m^3)	0	-	19,668.50

Source: Document provided by JICA and answers to the questionnaire by executing agency
Note: 7 indicators with "*" are also considered environmental protection indicators, and they are used to judge the impact.

Regarding the actual value from the start of the sub-project operation to the time of the ex-post evaluation, data of indicators that enable evaluation judgement were not available for some sub-projects of which the construction and installation of the facilities targeted by this project have not been completed, have been completed but are still in the trial operation period, or have just started operation. According to the officer in DBP's head office, "The facilities targeted by the project are parts of the end-users' entire projects some of which may not be completed." In addition, depending on the indicators, the total value or average value of multiple sub-projects is set as the actual value of the indicator, so the achievement status will be affected by the operational status of each sub-project.[25] Furthermore, depending on the indicator, the information reported

[23] Compost is processed into organic fertilizer, etc., to reuse waste generated from daily life and economic activities.
[24] Rendering is the production of animal fats and oils, powdered fertilizers, and feed that is used as raw materials for detergents by high heat treatment of fats, bones, and inedible parts of the internal organs, which are generated when slaughtering livestock such as cows, pigs, and chickens.
[25] Regarding the "NRW rate" in the water supply and sanitation sector, looking at individual sub-projects, most of the sub-projects have reached the target value of the indicator. However, in one sub-project by WD A, the NRW ratio deteriorated because of equipment damage due to a natural disaster compared to before the project. As a result, the target value of the indicator was not reached because the average actual value of the NRW ratio for all of the target sub-projects was pushed up. In WD A, after that, the facility renovation project is being implemented with a loan provided by DBP's own budget.

by the end-users was incorrect or missing, so that the information for all sub-projects cannot be aggregated, and the baseline value, target value, and actual value are not stated. Among the sub-sectors, particularly for industrial pollution control and solid waste management, the contents of sub-projects are so diverse that it was not possible for DBP to reflect the indicators when changing the construction components at the time of construction and to confirm the lack of indicator data reported by end-users depending on the sub-project. Based on the above, if there is no target value, then judgement is attempted by comparison with the baseline value. If neither the baseline value nor the target value is stated, then the judgment is made according to the content of the indicator.

The achievements of each sub-sector are as follows. Regarding (1), water supply and sanitation (PWRF) sector, at the time of the ex-post evaluation, the officer in DBP's head office stated that "the target year was set to the maturity of the loan." The maturities of 19 sub-loans are 2022–2033. The actual values of "increased water production" and "increased service connection" that do not meet the target values are operation results according to the demand at the time of measurement regardless of the design capacity. In addition, although all sub-projects have been completed by the time of the ex-post evaluation, as mentioned above, they may be parts of large-scale projects by end-users. According to the officer in DBP's head office, "Regarding NRW ratio and volume, there is a possibility that the target value could not be achieved only with the facilities targeted by this project." Based on the above, it is considered that the water production of this sub-sector is capable of meeting demand, but it is difficult to judge whether the indicator for NRW is achieved. Regarding (2), new and renewable energy sector, actual values have not met the target values for all indicators. According to the officer in DBP's head office, as for "service connection," it is "because the actual construction content was changed from the design based on the demand for electricity." As for other indicators, at the time of the ex-post evaluation, eight out of 14 sub-projects[26] were under construction, installation, or trial operation. Therefore, it is considered premature for the evaluation judgement of this sub-sector. Regarding (3), industrial pollution control sector, at the time of the ex-post evaluation, most of the actual values of the indicators have achieved the target values or have improved from the baseline. It was confirmed that there were savings for each indicator related to the savings although there was no baseline value nor target value. The actual number of "LED streetlight systems installed" was slightly below the target value because the number of installations was reduced based on a survey after the project

[26] One of the 15 sub-projects in this sector was found to have expanded the scale of the project described in the permit required for project implementation (see "Impacts on the Natural Environment" below) without permission. Authorization was revoked while the project was in progress and the project was suspended. By the time of the ex-post evaluation, the sub-loans had been paid off.

started. Regarding (4), solid waste management sector, at the time of the ex-post evaluation, most of the indicators had achieved their target values.[27] Regarding "feather meal processing capacity by rendering," the decrease in the input amount of feathers affects the amount of output. According to the officer in DBP's head office, the actual value of "volume of waste landfill" is lower than the target value because "there is a possibility that the predicted target value has not been reached because the end-user decides when to use the facility and has not yet utilized it." On the other hand, "temporary storage capacity of material recycling facility," as an indicator that the actual value greatly exceeds the target value, increased because the design was changed at the actual construction stage as the amount of waste for recycling was expected to increase in the survey before construction during the construction of the facility. As for "volume of waste recycled" and "volume of waste composted," according to the DBP lending center officer and the end-user, "The project has expanded after the completion of this project. It is a total value because it is not possible to grasp the actual value separately for the facilities targeted by this project and other facilities."

3.3.1.2 Qualitative Effects (Other Effects)

The qualitative effects were predicted as "environmental improvement" and "improvement of the ability of DBP, PFIs and MFIs to review and operate." Interviews were conducted with the officers, including the lending officials and each sectoral official in the DBP head office, the local lending center officers[28] who are responsible for the loans, and the end-users of each sector[29] that received the loans from the project. The following information has been confirmed. Regarding "environmental improvement," improvement of environment compared to before the project implementation was reported in all sub-sectors. The main comments included the following: "the amount of sanitary water supply has increased and covers a larger area," "installation of LED streetlights has reduced power consumption in the target cities (324,000 kWh/month to 97,200

[27] Private corporation B in the Luzon area, LGU A in the Mindanao area, LGU B (composting facility) in the Visayas area, and LGU C in the Luzon area have canceled sub-projects (sub-loan for LGU B) because of changes in local government policy, increased waste collection costs and decreased waste, lack of design support for natural disasters, and overdue payment of installment repayments, etc. The DBP head office's Remedial Department is following up as the loan repayment contact.

[28] The target was 13 officers in the DBP head office, including loan officials and sectoral officials, and a total of 11 officers at five lending centers (in total, five men and 19 women).

[29] The 11 end-users of the sub-projects visited and interviewed are as follows: Water supply and sanitation (three projects): two private corporations in the Visayas area and one WD in the Mindanao area; new and renewable energy (two projects): one private corporation in the Luzon area and one private corporation in the Visayas area; industrial pollution control (three projects): one private corporation in the Luzon area and two private corporations in the Visayas area (one interview only); solid/medical/hazardous waste management (three projects): two LGUs in the Visayas area and one private corporation.

kWh/month) and greenhouse gas emissions by approximately 63%," and "efficient collection has been promoted by promotion of sanitary landfills and waste segregation management and increase in collection vehicles, and waste in town has been deposed." Cases of environmental improvements resulting from implementation of sub-projects in multiple sectors (water supply and sanitation and solid waste management) in neighboring areas were also reported. For example, on the island of one of the leading tourist destinations in the Philippines in the Visayas area, Private Corporation A is implementing water supply and sewage treatment through the financing of this project. In addition, all solid wastes in the target area of that sub-project are transported and processed at the sanitary landfill disposal site operated by the LGU due to the loan from this project. In some areas of other islands in the Visayas area, Private Corporation B is collecting solid waste through the financing of this project. Private Corporation C is implementing a water supply project for the WD that controls the target area of that sub-project with the loan provided by this project.

With regard to "DBP, PFIs and MFIs' improvement of the ability to review and operate," as mentioned above (3.2 Efficiency, 3.2.1 Output), DBP's examination and operation capacity was strengthened mainly through consulting services. In addition, USAID conducted training, including to PFIs. The following comments were heard: "Especially becoming familiar with environmental laws, the awareness towards the sustainable financing with environmental and social perspectives has been raised," "it became possible to have knowledge including project monitoring and evaluation," and "PFIs also received technical training from USAID and learned how to finance in this project." Based on the comments received, through the loans and consulting services of this project, it is considered that the officers in the DBP head office and lending centers have improved their operational capacities, including screening, monitoring, and evaluating new stakeholders in financing such as PFIs and private corporations, mainly for the environmental sector. PFIs are considered to have improved their lending methods, including revolving funds. In addition, DBP has received various awards related to the environment and sustainable financing for its loan.[30]

[30] By the Association of Development Financing Institutions in Asia and the Pacific (ADFIP) awarded the water supply and sanitation project (2012), the waste recycling project (Merit Award; 2017) and the LED streetlight project (Winner; 2018) in the environmental development category. ADFIP also awarded the water treatment plant project (2015) and the new and renewable energy project (2016) in the local economic development category. Furthermore, in the awards of the international financial industry, financing for the water treatment plant project (2015) and the waste recycling project (2017) were awarded for outstanding sustainable project financing, benefits to local communities, and environmental protection.

3.3.2 Impacts

3.3.2.1 Intended Impacts

1) Environmental Protection

In this study, some indicators of the effectiveness are judged to be related to "environmental protection," as shown in the note of Table 6. The following were used as quantitative impact indicators: "water conserved from NRW," "reduction in fossil fuel," "greenhouse gas emission reduction," "avoided CO_2 emission from bunker fuel," "recycled waste paper," "recycled water," and "volume of waste recycled." A certain degree of judgment is made based on their actual values at the time of the ex-post evaluation. Based on these indicators, the sub-projects carried out by financing, including this project, have resulted in resource savings, waste reduction, and energy consumption reduction. Therefore, this project is considered to have contributed to environmental protection in the target area.

2) Improvement of Living Environment

According to interviews with each sectoral officer in DBP's head office, the lending center officers, and the end-users of the project, the main comments are as follows.[31] In Aklan Province in the Visayas area, "there is no need to go to get well water. The residents now have stable access to safe water. Water shortages in densely populated areas have been alleviated. The number of complaints about water leakage at the water supply corporations has decreased." In Laguna Province in the Luzon area, "in some areas, new hydropower plants were opened to have enabled stable power supply to 45,500 households. Access to electricity has been improved for the target population and economic activities increased." In Metro Manila, "the sewage treatment has improved health hazards of residents such as skin disease and diarrhea caused by sewage." In Layte Province in the Visayas area, "the nighttime security has been improved with the installation of economically efficient and bright LED street lighting. The traffic safety of vehicles and pedestrians is thought to have improved and economic activity has become more active." In addition, "The early restoration of street lighting during the disaster of typhoon Yolanda (2014) is believed to have contributed to the normalization of disaster victims' lives by strengthening community safety more quickly." In Cebu Province in the Visayas area, "the waste collection and establishment of sanitary disposal sites have reduced uncollected waste and illegal dumping,

[31] This project covers 73 sub-projects of various scales nationwide. There are also sub-projects that have not been completed, and it is difficult to verify the causal relationship and correlation with this project based on quantitative data on the living environment. Therefore, qualitative information is used to confirm.

hygienic public spaces where jobs, commerce and leisure are promoted increased, and thus safe and comfortable areas increased." In addition, "LGUs and residents who had been uncooperative to segregate waste before the project implemented experienced these improvement and became cooperative." In light of the above, the project is believed to have contributed to the improvement of the living environment of the local residents in all sub-sectors.

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Natural Environment

This project was to finance sub-projects involving environmental protection and pollution control. Based on the *JBIC Guidelines for Confirmation of Environmental and Social Considerations* (April 2002) and the DBP's environmental guideline, the *Environmental Due Diligence Manual*, in line with Philippine environmental laws, the project was implemented according to the category classification of individual sub-projects and necessary countermeasures. In accordance with the Philippines' domestic environmental laws, the loan conditions required all sub-projects to obtain an Environmental Compliance Certificate (hereafter referred to as "ECC") or a Certificate of Non-Coverage (hereafter referred to as "CNC") from the EMB. At the time of the ex-post evaluation, it was confirmed that there was no Category A in the loan target sub-projects, and all sub-projects had acquired ECCs or CNCs. At the time of the loan appraisal, DBP conducted the environmental and social impact assessment for all sub-projects in accordance with the bank's environmental guidelines and prepared the Project Evaluation Endorsement Reports. The end-users are to submit quarterly self-monitoring reports on the environment to EMB. During the loan repayment period of this project, the monitoring reports are to be submitted to DBP once a year. At the time of the ex-post evaluation, DBP has obtained annual monitoring reports from all sub-projects. At the time of this study, at the lending centers where the interviews were conducted, the monitoring reports of the sub-projects in charge were confirmed. The officers in the DBP head office and lending centers share the reports and visit the sites to monitor as needed. According to the officers at DBP's head office who are responsible for all of the projects, if concerns about water quality, air quality, etc., arise, then they would be handled in cooperation with related organizations. However, no such environmental problems as air/water pollution, noise/vibrations, and effects on ecosystems have occurred during the project implementation and after project completion.

2) Resettlement and Land Acquisition

This project was implemented according to various guidelines as mentioned above. Moreover, it was confirmed that there was no resettlement in this project. Through interviews with DBP officers regarding the sub-projects for which lands were acquired, it was confirmed that government and private lands and vacant lots were acquired, no resettlement occurred, and thus no particular problems or complaints were raised.

3) Other Positive and Negative Impacts

Cooperation with other JICA projects was confirmed. A sanitary landfill was constructed with the loan from this project at the target area of "Establishment of Ecological Solid Waste Management in three cities."[32] The revolving fund from the "Environmental Infrastructure Support Credit Program Phase (I) (II)" was utilized by DBP as its own fund for the blending loan to the sewage treatment project. The master plan by the "Master Plan on Solid Waste Management for Boracay Island and Municipality of Malay in the Philippines" was utilized for the construction plan of a sanitary landfill site financed by this project. This loan was introduced by that project's personnel. Moreover, cooperation with other organizations was also confirmed. In the small-scale hydropower sub-project in the new and renewable energy sector, there was a project where the main facility had been improved by the loan of this project, and then equipment within the same facility was financed by the World Bank. On the other hand, there was a project[33] in which the loan provided by this project was used for the expansion of facilities constructed by a World Bank loan. In the industrial pollution control sector, there was a project that utilized the loan of this project as a financing source for the following phase of the project financed by the World Bank and the Land Bank of the Philippines.

[Summary of Effectiveness and Impacts]

As for the quantitative effect indicators envisaged in this project, at the time of the ex-post evaluation, many sub-loans were before maturity in terms of the number and the amount. In addition, there were some sub-projects whose construction and installation of the target facilities were not completed or were under the trial period. Thus, for the new and renewable energy sector,

[32] Because the loan approval process was delayed due to the delay in obtaining the environmental permit, the construction of the sanitary landfill was not in time for the project completion, and thus the level of achievement indicators of the project purpose was affected. At the time of the ex-post evaluation, according to the officer in DBP's head office, "the sanitary landfill site is in operation."

[33] Each project's title could not be confirmed.

it was too early to obtain the actual values of all indicators. Furthermore, the target year of the indicators was not clear, and there were some indicators whose target values were not necessarily generated only by the sub-projects targeted by this project. Moreover, the overall project effect could not be analyzed because the baseline value was not known at the time of sub-loan approval, and there were indicators that it was difficult to judge whether or not the target was achieved because there was no target value set. However, with regard to the indicators confirmed at the time of the ex-post evaluation, it has been confirmed that the targets have been generally achieved or that the improvement of situation has been confirmed to have a certain effect. On the other hand, through interviews and other surveys, qualitative aspects were confirmed to have contributed to both effectiveness and impact. In light of the above, a certain degree of effect by the implementation of this project is observed, although it is a judgment based on the indicators that can be obtained at the time of the ex-post evaluation, and its effectiveness and impact are considered to be fair.

3.4 Sustainability (Rating: ③)

3.4.1 Institutional/Organizational Aspect of Operation and Maintenance

DBP is the executing agency of this project. At the time of the ex-post evaluation, 43 out of 78 sub-loans were before maturity. The officers in DBP head office (Fund Sourcing Group and Project Development and Management Department; a total of 220 staff in related departments) and officers (tens of people) in charge of this project at lending centers located at 22 main branches throughout the nation continue to manage receivables and revolving funds, check environmental monitoring reports, and respond to end-users. The account officers of the lending centers are in direct contact with the end-users of this project and check the progress of sub-loans and sub-projects and receive annual environmental monitoring reports. The officers in charge of each environmental sector are assigned to the Project Development and Management Department of the head office. Those officers receive reports from and consult with the account officers of the lending centers, and they coordinate the progress of sub-loans and sub-projects. Depending on the size of the loan, there are sub-projects under the direct control of officers of the Project Development and Management Department of the head office. Even during the ex-post evaluation survey, it was confirmed that inquiries regarding each project were smoothly addressed and that a contact system between the head office and the lending center was established. It is said that the current number of staff can manage. Regarding this project's OPG, it has played a role in maintaining a common understanding of how the officers in the head office and the lending

centers operate the project. Some officers commented that it plays “a role like a bible.” It has also been in use at the time of the ex-post evaluation. Therefore, it is determined that a system according to the organization and business scale has been established.

In light of the above, the operation and maintenance system is believed to have no particular problem.

3.4.2 Technical Aspect of Operation and Maintenance

DBP is a governmental financial institution established to finance development projects and has ample experience, including financing to LGUs. Prior to this project, a two-step loan project was implemented.[34] When the market interest rates fell during the implementation of this project, the financing was promoted by various methods. At the time of the ex-post evaluation, DBP has managed the receivables. Regarding financing in the environmental sector, appraisal, monitoring, and evaluation methods have been acquired through the experience of this project. Of the officers who had worked during the project period, many of those in the head office have continued to manage the sub-loans during the repayment period. Eight sectoral officers in the head office have obtained the national Environmental Planners qualification and are regarded as experts in environmental issues. At the time of the ex-post evaluation, the OPG and various manuals were still being utilized. Periodic training is provided, mainly for general banking work (management of loans and receivables) for the staff, and training for new employees is required three times a year. The on-the-job training is being carried out by existing staff for newly appointed staff. Moreover, during the implementation period of this project, the project evaluation and endorsement report form to be filled by the DBP officers and the environmental performance/project performance report forms to be filled by the end-user for monitoring were created, while receiving support from the consulting services, project inspection, monitoring, and evaluation were managed. As mentioned above, JICA’s concurrence was taken when setting the indicators. The indicators’ values were set at the time of project approval. At the time of the ex-post evaluation, it was confirmed that there were some missing information on the sub-project indicators from some end-users, but DBP was not able to keep up with the information. The main reason for this problem is considered to be that some of the indicators set in this project were difficult for end-users to report.

[34] DBP received a Good Practice Award for strategies to achieve outcomes from the Philippine National Economic Development Authority (NEDA) in 2017 for its institutionalization of environmental, social, and climate change considerations in project evaluation and monitoring in the credit process.

In light of the above, the technical aspect of the project's operation and maintenance is believed to have no particular problem.

Box: Roles and Contributions of Cooperation by USAID and JICA

This project was planned to utilize the PWRF established by USAID, DBP, and JICA to finance projects in the water supply and sanitation sector based on the *US-Japan Clean Water for People Initiative* (2002). Prior to the commencement of this project (October 2004), a memorandum of understanding was signed among the three parties. Through basic research, USAID prepared for co-financing with PFIs (mainly using PWRF) and promotion of private sector participation. During the implementation stage, USAID provided technical assistance training to the DBP and PFIs, issued credit guarantees, and promoted PFIs' participation in co-financing. Furthermore, USAID and JICA collaborated in negotiations with LWUA, which was urged to speed up issuing loan approvals to WDs. Another collaboration was made at the Philippine Development Forum (hereafter referred to as "PDF").[35] At that time, USAID and JICA were co-chairs of the Water Resources Sub-Working Group, which aimed at improving access to safe water and sanitation, and at which the issues of this project were also shared. The sub-working group dealt with the permissions from the MB and LWUA for this project's loans and with the improvement of application procedures for the MB. Moreover, four loans were introduced to the PWRF of this project. In this way, it is believed that both USAID and JICA also made use of the existing framework outside of this project to promote PWRF and contributed to the promotion of financing by this project.

3.4.3 Financial Aspect of Operation and Maintenance

Table 7 shows the indicators of the business status of the DBP.

[35] Led by the Philippine government and the World Bank, the objective is to promote cooperation between international organizations and bilateral donors and to promote economic cooperation with the involvement of the Philippine government on important policy issues. Discussions are held with wide participation from the business community, academic societies, NGOs, civil society, and others. The Water Resources Sub-Working Group is within the Infrastructure Working Group, which is one of ten working groups.

Table 7: Financial Status of the Entire DBP

Year	2015	2016	2017	2018
Total Asset Balance (billion PhP)	504.05	536.28	592.36	669.58
Net Income (billion PhP)	4.71	4.44	5.49	5.72
Return on Equity (%)	11.67	10.72	11.78	11.44
Equity Ratio (%)	7.52	8.37	8.15	7.72
Percentage of Amount of Overdue Unpaid Credit (%)	3.25	1.99	2.01	1.95

Source: Answers to the questionnaire by executing agency

According to the questionnaire and interviews with the DBP, the total asset increased by approximately 166 billion PhP (32.84%; average 55 billion PhP [9.96%] annually) between 2015 and 2018. As shown in Table 7, the net income also increased by an average of 7.39% per year. The equity ratio averaged 7.94%. According to the officers in the DBP head office, "The reason the equity ratio fell in 2018 was a large increase in total assets." Although it is slightly lower than the capital adequacy ratio standard (8% or more) of the Bank for International Settlements (BIS), the factors are clear and it is considered that no major problems exist with the business foundation. Moreover, during the same period, the percentage of the amount of overdue unpaid credit has been on a downward trend. At the time of the ex-post evaluation, the officer in DBP head office commented that "as of October 2019, the total assets are 730 billion PhP, and the business condition is progressing smoothly toward the corporate vision of becoming a 1 trillion yen bank in 2022."

In light of the above, no particular issues were found in the DBP's financial aspect, and no major problems were observed regarding the financial aspects of the project's operation and maintenance.

3.4.4 Status of Operation and Maintenance

Tables 8 and 9 show the management status of revolving funds up to December 2018.

Table 8: PWRF (Water Supply and Sanitation) Special Account

Year	2016	2017	2018
Number of Loans	6	1	1
Loan Amount (million PhP)	86	28	183
Ending Balance (million PhP)	26	190	133

Source: Answers to the questionnaire and document provided by executing agency

Table 9: Revolving Fund other than PWRF (Water Supply and Sanitation)

Year	2016	2017	2018
Number of Loans	20	18	13
Loan Amount (million PhP)	1,387	360	1,016
Ending Balance (million PhP)	1,218	1,106	464

Source: Answers to the questionnaire by executing agency

DBP has set up and operated two revolving funds for the water supply and sanitation (PWRF) and for the rest of the sectors, and it has facilitated these operations. DBP has submitted annual audit reports to JICA as agreed at the time of appraisal. At the time of the ex-post evaluation, the percentage of the amount of overdue unpaid credit was 4.1%, as described above (Effectiveness 3.3.1.1 Quantitative Effect). According to the DBP head office, "The recovery prospects are not particularly deteriorating based on the repayment status of each sub-loan."

In light of the above, it is judged that there is no particular problem with the state of the project's operation and maintenance.

In light of the above, no major problems have been observed in the project's institutional/organizational, technical, financial aspects and current status of the operation and maintenance system. Therefore, sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was implemented with the goal of reducing emissions of environmental pollutants by providing LGUs, private corporations, and GOCCs, etc. with mid-to-long tenor loans for capital investment in the environmental sector throughout the Philippines through the DBP, thereby contributing to environmental protection and the improvement of living conditions. The relevance of this project is high given that the provision of concessional mid-to-long tenor funds in the environmental sector and environmental improvement and protection are consistent with the country's development policy, development needs, and Japan's ODA policy, which prioritizes support for environmental protection measures. The project cost was almost as planned, although a part of the loan conditions and DBP's co-payments were changed to meet the demand for lending. The project period exceeded the planned timeframe because it took more time than expected for various licensing procedures, so it was extended to disburse loans as much as possible; thus, the efficiency of the project is fair. At the time of the ex-post evaluation, many of the sub-loans had not matured. As for the quantitative effect indicators for the sub-projects, those

indicators that achieved the target values were confirmed, but the target year setting was unclear, and there were projects where the construction and installation of the target facilities were incomplete. On the other hand, this project was recognized for its contribution to environmental improvement and protection as well as improvement of the living environment. At the time of ex-post evaluation, although it is difficult to evaluate the entire project, the project's effectiveness and impact is judged to be fair based on the actual values of the indicators at the time of the ex-post evaluation. The sustainability of the project's operation and maintenance is high because there are no particular problems with the structural, technical, financial, and operation and maintenance conditions of the organization.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

This project provided concessional loans with mid-to-long tenor loan periods. At the time of the ex-post evaluation, there is a sub-loan that leaves 15 years until maturity, and loan management and debt collection operations have been ongoing. In the future, it is expected that the officers in charge of this project in the executing agency might be transferred or retired in the executing agency. It is desirable to maintain the coordination among the officers involved and to monitor the project, including obtaining actual values of indicators and carrying out debt collection of the target sub-loans and sub-projects while thoroughly taking over the works and conducting training at the time when officers are transferred or retire.

4.2.2 Recommendation to JICA

This ex-post evaluation was conducted 2 years after the completion of the project (loan disbursement due date). However, at the time of ex-post evaluation, there were 43 loans (76.2% in face value) before the maturity of the sub-loans. By the time of the ex-post evaluation, some construction and installation of the facilities and equipment targeted by the loans were not yet completed or were in the trial operation period. In addition, although the loan of this project was intended to target facilities and equipment that are a part of the project implemented by the end-users, indicators for the entire project were set in some projects. Therefore, at the time of the ex-post evaluation, evaluation judgment was made using only the indicators and information obtained at that time. However, it is not the time when a substantive evaluation judgment of the entire project can be made. It is appropriate for the executing agency and JICA to mutually

confirm the progress to ascertain the status of sub-loans and sub-projects and to discuss correspondence, including the possibility of continuous verification of the status of effect development of this project.

4.3 Lesson Learned

Setting Appropriate Indicators, Target Year, and Timing of Ex-Post Evaluation for the Evaluation Judgment in a Two-Step Loan Project

In this project, the target year was set to be 2 years after the completion of the project in the JICA documents. However, the document common to the executing agency and JICA regarding the target year and the timing of the ex-post evaluation could not be confirmed. The executing agency recognized that the target year was the loan maturity year. At the time of the ex-post evaluation, because more than half of all sub-loans were before the maturity date, the actual results of the indicators concerning loans (percentage of amount/number of overdue unpaid credit) for the overall performance of the project could not be grasped. Regarding sub-projects, some were undergoing construction or trial operation of facilities, and actual results could not be calculated at the time of the ex-post evaluation. In addition, there were some sub-projects for which indicators were set for the entire large-scale project other than the facilities and equipment covered by this project loan, and it was difficult to achieve the operation and effect indicators using only the target facilities and equipment. Furthermore, there were some sub-projects in which the executing agency did not change the target value of indicators even if the design scope had been changed after the executing agency's loan appraisal and during the project implementation. In addition, the data for indicators are reported by the end-users, and even if the content of a report is missing, DBP was not be able to keep up with the information. Therefore, at the time of the ex-post evaluation, it was not possible to confirm the baseline and target value, it was difficult to obtain the actual values, or it was difficult to make an evaluation judgment of the entire project based on the actual values of the obtained indicators. Originally, to more accurately understand the project's effects and impacts, conducting an ex-post evaluation after the maturity of all sub-loans had been desired, but it is not realistic if the loan is mid-to-long tenor, as in this project.

Based on this background, for a two-step loan project, it is recommended that in the future the executing agency and JICA concur on the indicators and their target years at the time of appraisal or at a predetermined time, and during the project implementation and after completion, they should set realistic indicators that can be obtained by the executing agency and confirmed by JICA. In addition, if setting the target year at the time of appraisal, then indicators that are

available at the target year and that can be measured by end-users (e.g., the actual loan amount and the percentage of the amount/number of overdue unpaid credit which meet maturity by 2 years after project completion, which is usually the timing of JICA's ex-post evaluation) are considered. Moreover, it is desirable to set indicators concerning the direct effects of sub-projects as much as possible. Furthermore, it is desirable to clarify the completion year and target year of sub-loans and sub-projects as much as possible when all sub-loans are decided and to clarify the timing of ex-post evaluation accordingly.

Setting Project Costs for a Two-Step Loan Project

In this project, the project cost of the executing agency exceeded the plan. During the implementation of this project, the market interest rates became lower and the loan interest rates of this project became higher than those of commercial banks. The executing agency promoted financing of this project by taking measures such as blending its own funds of lower interest rates and providing loans other than this project to the end-users' equity part. If all of these are considered as project cost, then it was possible that the project exceeded cost.

In light of this situation, regarding the setting of the project cost of a two-step loan, at the time of appraisal, it is worth considering for an executing agency and JICA not to include the executing agency's loan amount for the sub-project in the ex-post evaluation. Alternatively, it is worth considering the flexibility to clarify the eligible items of the project cost borne by the executing agency or to set the project cost borne by the executing agency during project implementation.

Flexible Changes and Responses in Lending Terms by the Executing Agency and JICA

During the project period, the advantage of sub-loans of this project declined due to the lower market interest rates. In addition, there was a delay in obtaining the permissions from related organizations for sub-loan lending and sub-project implementation. However, the loan amount of this project was almost as planned. During the implementation of the project, the executing agency, with the concurrence of JICA, implemented measures such as revising the sub-loan cap ratio, removing the terms of equity, and relaxing co-financing terms in revolving funds. In addition, the executing agency provided a blending of this project's loans and low-interest loan products at DBP's own cost to sub-projects. It is considered that these changes and responses facilitated the end-users' loan applications and loans to private corporations even in a situation where the loan demand for this project declined. In other words, the executing agency and JICA flexibly changed the sub-loan lending terms and responded according to the lending situation, which made it

possible to promote financing for this project. As a result, it is considered that PPP was also promoted.

In the future, in the case of a two-step loan project in which market interest rates might change due to the economic situation and many target sectors and related organizations are involved, it is considered necessary for the executing agency and JICA to keep track of the lending status and to take flexible measures even during the project implementation.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	a. Two-Step Loan 1) Eligible sector Water supply and sanitation, new and renewable energy, industrial pollution control, solid/health care/hazardous waste management	a. Two-Step Loan 1) Eligible sector As planned
	2) Eligible usage of the sub-loan -Establishment and improvement of water supply and sewage facilities -Development of new and renewable energy (geothermal power, wind power, hydraulic power, biomass, and solar energy) and installation of power generation facilities, installation of transmission and distribution lines that contribute to energy and energy resource conservation, and transaction costs for CDM application procedures -Installation and improvement of facilities that will prevent or reduce industrial pollution -Establishment and improvement of solid/health care/hazardous waste management facilities -Initial working capital pertaining to the above -Interest during construction	2) Eligible usage of the sub-loan -Mostly as planned -CDM application procedures cancelled due to lower credit (emission allowance) prices
	3) Eligible end-users -Water supply & sanitation: LGUs, WDs, and private corporations -Other sectors: private corporations (with at least 70% of capital owned by the citizens of the Philippines), LGUs, GOCCs, and cooperatives/associations	3) Eligible end-users -Water supply & sanitation: almost as planned -Other sectors: there was no participation from GOCCs
	4) Financing scheme (i) Wholesale lending via PFIs or MFIs (ii) Retail lending from DBP (iii) Co-financing by DBP and PFIs through PWRF (only for the water supply and sanitation sub-projects)	4) Financing scheme -Almost as planned. -(i) There was no participation from MFIs
	5) Sub-loan interest (i) Wholesale lending: Philippine Dealing System Treasury Reference Rate 1 (PDST-R1) for 10-year benchmark + spread 1–4% (the spread is determined by PFIs or MFIs based on credit risk of the end user) (ii) Retail lending: PDST-R1 for 10-	5) Sub-loan interest -Almost as planned -Both (i) & (ii) used PDST-F

	year benchmark + spread 1–3% (the spread is determined by DBP based on credit risk of the end user) (iii) PWRF: The loan conditions are the same as those of sub-project in other sectors	
	6) Repayment period of sub-loans (i) (ii): 3 to 15 years (within 20 years depending on cash flow of project funds; grace period: up to 5 years) (iii): Up to 20 years (grace period: up to 3 years)	6) Repayment period of sub-loans As planned
	7) Sub-loan limit ratio -Private: 80% of total project cost -LGUs, GOCCs, WDs, and cooperatives/associations: 90% of total project cost (iii): DBP can eliminate the 10% capital quota of LGUs and WDs as necessary -(iii) Co-financing facility (total project cost excluding the above end-user's equity) • 50–75% loan cap of total project cost from DBP and 25–50% loan cap of total project cost from PFIs/MFIs (100% from DBP for fund under PWRF is not eligible) • 25% loan cap of the total amount of (iii) to private corporations	7) Sub-loan limit ratio -LGUs, GOCCs, WDs, and cooperatives/associations: 90% cap of total project cost (10% equity requirement was waived with JICA's concurrence) -(iii) Co-financing facility (total project cost excluding the above end-users' equity) • Except for five loans of less than 50 million PhP (10 in the process of appraisal), DBP funded 100% of the loan with JICA's concurrence • 25% loan cap of total amount of (iii) to private corporations was waived with JICA's concurrence
	8) Currency of sub-loans Philippine peso	8) Currency of sub-loans As planned
	b. Consulting Service 1) Assistance in promotion, dissemination, and marketing of the project 2) Assistance in formulation of sub-projects 3) Assistance in the management of sub-projects (appraisal, implementation, monitoring, and evaluation) 4) Assistance in coordination with concerned government agencies and other stakeholders 5) Training for DBP, PFIs, MFIs, and end-users	b. Consulting Service -Almost as planned -Training for MFIs was not implemented because they did not participate
2. Project Period	September 2008– September 2015 (85 months)	September 2008–October 2016 (98 months)
3. Project Cost Amount Paid in Foreign Currency	3,188 Million Yen	2,883 Million Yen

Amount Paid in Local Currency	24,292 Million Yen	24,814 Million Yen
	(59,758 Million Philippine Peso)	(54,094 Million Philippine Peso)
Total	27,480 Million Yen	27,697 Million Yen
ODA Loan Portion	24,846 Million Yen	24,814 Million Yen
Exchange Rate	1 Philippine Peso = 2.46 Yen 1 USD = 101 Yen (As of April 2008)	1 Philippine Peso = 2.18 Yen 1 USD = 97.52 Yen (Average between 2008 and 2016) (Source: International Financial Statistics Data (IFS data) of IMF)
4. Final Disbursement	October 2016	

Republic of the Philippines

FY2019 Ex-Post Evaluation of Japanese Grant Aid Project

"Project for Improvement of Water Supply System in Metro Cebu Water District"

External Evaluator: Masumi Shimamura, Mitsubishi UFJ Research and Consulting Co., Ltd.

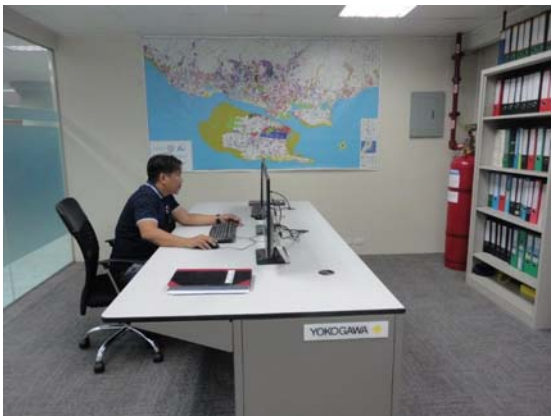
0. Summary

This project introduced the Supervisory Control And Data Acquisition (hereinafter referred to as "SCADA") system to monitor the water supply condition accurately almost in real time and to establish an appropriate operation management system for water supply facilities in the Metropolitan Cebu Water District (hereinafter referred to as "MCWD") water supply service area, thereby contributing to the improvement of water supply in the target area. This project, which aims to reduce water leakage, monitor operating status of pumps, and improve shortage of water volume and pressure from water taps, is consistent with the Philippines' development policy, development needs and Japan's assistance policy at the time of planning and the ex-post evaluation. Therefore, the relevance of the project is high. In terms of project implementation, although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair. As for project effects, actual figures of operation indicators set at the time of planning are on the decline and are below the targets. Although the introduction of the SCADA system is improving the work and efficiency of daily operations of the staff in charge of operation and maintenance in the field, and that this project has produced certain effects, effectiveness and impacts of the project is fair when comprehensively judged based on the results of interviews with local residents and the content of complaints received by the MCWD. No negative impacts on natural environment and resettlement have been reported. Regarding operation and maintenance, some problems have been observed in terms of the current status. Therefore, sustainability of the project effects is fair.

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

1. Project Description

Project Location



SCADA Room inside the MCWD Main Office

1.1 Background

Metropolitan Cebu, located in the central part of the Philippines, is the second largest metropolitan area in the Philippines comprising 7 cities including Cebu City and 6 municipalities in the province of Cebu. With a rapid rise in population and urbanization, Metro Cebu has faced a number of urban problems. Basic urban infrastructure facilities for providing water, sewage drainage, waste, transportation, energy and other such services have been weak, and as such have become major impediments to economic and urban development in Metro Cebu. In Metro Cebu, the MCWD, which is a public water utility, is responsible for water supply service in 4 cities and 4 municipalities, which is the largest water supply service area in the Philippines. But the MCWD has faced challenges – 24-hour water supply was not achieved in some areas, and problems such as inadequate water pressure and high non-revenue water rate of 27.6%[1] as of 2012 were the issues to be tackled. In addition, although the MCWD has been considering expanding the water supply service area and increasing the water volume to meet the needs of the recent population increase and to develop Metro Cebu as a regional economic base, the groundwater resources that provide 96%[2] of water sources were nearly completely utilized, considering the amount of groundwater recharge and the risk of salination. So, efficient water supply was necessary. Therefore, there was an urgent need to improve the MCWD's water supply service.

[1] Information from the materials provided by JICA.
[2] Ibid.

1.2 Project Outline

The objective of this project is to develop a system to monitor the water supply condition accurately almost in real time and to establish an appropriate operation management system for water supply facilities by introducing the SCADA system in the MCWD water supply service area, thereby contributing to the improvement of water supply situation in the target area.

Grant Limit / Actual Grant Amount	1,165 million yen / 1,020 million yen
Exchange of Notes Date / Grant Agreement Date	March 2014 / April 2014
Executing Agency	Metropolitan Cebu Water District: MCWD
Project Completion	September 2016
Target Area	Water supply service area by the MCWD (700 km^2)
Main Contractors	Hitachi, Ltd. / Yokogawa Solution Service Corporation (JV)
Main Consultants	NJS Consultants Co., Ltd. / Yokohama Water Co., Ltd. (JV)
Preparatory Survey	June 2013 – March 2014
Related Projects	- Development survey "The Study for Improvement of Water Supply and Sanitation in Metro Cebu" (January 2019 – August 2010) - Technical Assistance Program Related to ODA loan "Technical Assistance Project on Water Supply Operation and Management for Metro Cebu Water District" (March 2012 – March 2013)

2. Outline of the Evaluation Study

2.1 External Evaluator

Masumi Shimamura, Mitsubishi UFJ Research and Consulting Co., Ltd.

2.2 Duration of Evaluation Study

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

Duration of the Study: August 2019 – September 2020

Duration of the Field Study: November 2 – 16, 2019, February 16 – 22, 2020

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

3.1 Relevance (Rating: ③[4])

3.1.1 Consistency with the Development Plan of the Philippines

At the time of planning, the Philippine government's *Philippine Development Plan (2011-2016)* emphasized as priority to strengthen the capacity of central and local governments to supply water and to utilize sustainable water resources, and to carry out initiatives for equitable water supply at economic growth areas. In addition, local capacity building for reliable water supply was stated as a priority program in *the Philippine Water Supply Sector Road Map (2008)*. Furthermore, the MCWD has set goals of achieving 24-hour water supply in all water supply service areas, reducing non-revenue water rates, and improving water supply pressure and water quality in *the 2020 Plan* (prepared in 2011).

At the time of the ex-post evaluation, the Philippine government's *Philippine Development Plan (2017-2022)* promotes investment to reform institutions related to water supply. In addition, enhancement of water supply capacity and expansion of safe water supply areas are regarded as urgent projects in *the Metro Cebu Vision 2050*. The MCWD's *2020 Plan* (revised in 2018), has not changed its corporate direction. Thus, the implementation of the project is consistent with the development policy of the Philippines at the time of the ex-post evaluation as well.

3.1.2 Consistency with the Development Needs of the Philippines

At the time of planning, 24-hour water supply was not realized in some area of the MCWD's water supply service area, and insufficient water pressure and high non-revenue water rates were the issues to be tackled. Also, it was necessary to improve the MCWD's water supply services, including enhancement of efficient water supply.

At the time of the ex-post evaluation, stable supply of water by the MCWD is still in high demand for socio-economic activities of residents. However, 24-hour water supply has not been realized, and insufficient water pressure has been pointed out. Also, as shown in Table 1, population in the MCWD water supply service area is increasing by an average of about 2% per year, but the MCWD's water supplied population ratio[5] in its service area is about 40% of the population. Furthermore, as shown in Table 2, the ratio of the MCWD's billed water volume[6] to the average daily water demand[7] in the MCWD water supply service area is less

[3] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[4] ③: High, ②: Fair, ①: Low
[5] The MCWD's water supplied population ratio is the ratio of the population served by the MCWD to the population of the MCWD water supply service area.
[6] Billed water volume is the total amount of metered water.
[7] Average daily water demand is an estimated volume calculated by the MCWD based on the demand forecast.

than 40%. Although water shortages are covered by private water distribution companies[8], private wells, water tank trucks, and use of rivers, the MCWD is expected to expand its water supply as demand continues to grow. From the above, development needs for the project is still maintained at the time of the ex-post evaluation.

Table 1: Population, Water Supplied Population and Water Supplied Population Ratio in the MCWD Water Supply Service Area

	2014	2015	2016	2017	2018
Population in the MCWD water supply service area (person) Note1)	2,232,892	2,278,913	2,328,032	2,377,126	2,426,148
The MCWD's water supplied population (person) Note 2)	859,345	904,156	934,381	975,058	1,002,318
The MCWD's water supplied population ratio in its service area (%) Note 3)	38%	40%	40%	41%	41%

Source: Results from questionnaire survey of the MCWD

Note 1) The MCWD's water supply service area covers 4 cities and 4 municipalities – Cebu City, Lapu Lapu City, Mandaue City, Talisay City, Municipality of Compostela, Municipality of Consolacion, Municipality of Cordova and Municipality of Liloan.

Note 2) In addition to the MCWD, private water distribution companies supply water to the MCWD water supply service area.

Note 3) The MCWD's water supplied population ratio in its service area = MCWD's water supplied population / Population in the MCWD water supply service area.

[8] 5 private companies (ABEJO, Mactan Rock, FOREMOST, BC HOMES, PWRI) are undertaking water supply business. These companies are operating in areas where the MCWD water supply and distribution network is not in place, such as in the mountains and sloping areas, because of the costs involved in developing the MCWD water source and connecting water pipes.

Table 2: The MCWD's Daily Average Water Supply Volume and Average Daily Water Demand in the MCWD Water Supply Service Area

	2014	2015	2016	2017	2018
The MCWD's daily average water supply volume (m^3/day)	201,267	212,722	214,095	223,806	232,971
Of which, billed volume (m^3/day)	157,118	162,627	164,525	166,766	173,951
Average daily water demand in the MCWD water supply service area (m^3/day)	407,263	414,845	422,344	429,906	437,529
Ratio of billed water volume to the average daily water demand in the MCWD water supply service area Note 1)	38.6%	39.2%	39.0%	38.8%	39.8%

Source: Results from questionnaire survey of the MCWD

Note 1) Billed Volume / Average daily water demand in the MCWD water supply service area.

3.1.3 Consistency with Japan's ODA Policy

At the time of project planning, Japan's *Country Assistance Program for the Philippines (April 2012)* placed "sustainable economic growth through investment promotion" as the important development goal and indicated its support for the development of infrastructure such as the water environment for the enhancement of regional bases as "infrastructure development program for local base development." The purpose of the project is to improve water supply situation in the water supply service area by the MCWD, which is consistent with the above policy.

3.1.4 Appropriateness of the Project Plan and Approach

As mentioned later in "3.3 Effectiveness and Impacts," actual figures of operation indicators set at the time of planning are on the decline and are below the targets. The reasons behind this can be regarded that unexpected situation caused malfunction of the facilities and equipment developed by the project. Specifically, unstable power supply by the local power company, internet connection problems in some areas, and water quality problems in some wells are pointed out. However, surveys were conducted on electricity, communication and water quality situations, and no problems were expected at the time of planning.

According to the survey at the time of planning, regarding the electric power situation in Metro Cebu, the voltage fluctuation was within ±10%. Based on the past power outage time of the MCWD, the survey results concluded that there was no problem with voltage changes

that occur during off peak usage. As described later in "3.3.1.1 Quantitative Effects (Operation and Effect Indicators)," given that the DC/AC inverters (electric power converters) themselves, which were procured as an additional scope during the project after the individual commissioning of well pump stations, began to malfunction before project completion, it can be considered that this was an unexpected problem. Regarding communication situation, at the time of the survey, interviews with two mobile phone companies available in Metro Cebu were conducted. Although the internet environment expected at the time of planning was 3G, the survey report did not mention that internet environment in some areas (mountainous areas) in Compostela was 2G. However, it was limited to 2 (2% of the total) of the whole (126 distribution monitoring points). The MCWD negotiated with the mobile phone company when it found problems with the internet connection. Regarding water quality, the main aquifers in the areas around Cebu were confirmed during the survey, and 1 Talamban well where a defect occurred was less than 1% of the total (126) wells.

In addition, after the project, problems with water volume and water pressure from the taps are continuing at the time of the ex-post evaluation. This is due to lack of rainfall as an effect of the El Niño phenomenon that occurred in the fourth quarter of 2018. Specifically, while the demand for tap water is increasing, the MCWD's water production volume is decreasing due to decreased water volume in water sources and shortages of water sources. It can be considered that the effects of such serious water shortages were not expected at the time of planning.

This project has been highly relevant to the country's development plan and development needs, as well as Japan's ODA policy. In addition, there were no major problems regarding appropriateness of the project plan and approach. Therefore, its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

This project introduced the SCADA system in the MCWD water supply service area to develop a system to monitor the water supply condition accurately almost in real time and to establish an appropriate operation management system for water supply facilities. Table 3 compares the planned and actual outputs of major outputs.

Table 3: Comparison of Planned and Actual Outputs

Facility Construction and Procurement of Equipment Note 1)		
Plan		Actual / Comparison
Item	Quantity	
Central monitoring system (MCWD Main Office)	1 set	As planned
SCADA Client (Talamban Satellite Office)	1 set	As planned
Tisa Reservoir monitor (Flow)	1	As planned
Talamban Reservoir monitor (Flow)	1	As planned
Casili Reservoir monitor (Flow)	1	As planned
B.C. Homes Reservoir monitor (Level)	1	As planned
Lagtang Reservoir monitor (Flow)	1	As planned
Liloan Reservoir monitor (Flow)	1	As planned
Compostela Reservoir monitor (Level)	1	As planned
Well pump station monitor (Flow)	53	As planned
DMA (District Metered Area) monitor (Flow)	55	As planned
Low pressure point monitor	15	As planned
Transmission line monitor (New Bridge Line)	1	As planned
Transmission line monitor (Old Bridge Line)	1	As planned
Buhisan dam monitor (Level)	1	As planned
Purchased water monitor (Flow)	10	As planned
Consulting Services		
Item		Actual / Comparison
Detailed design, tendering assistance, construction supervision		As planned
Capacity building program (soft component): transfer of technology on operation management system to SCADA system administrators		As planned

Source: Results from questionnaire survey of the MCWD

Note 1) The initial operation instructions (technology transfer regarding how to use the equipment – during normal operations and how to deal with errors etc.) were carried out by the contractor as planned.

The initially planned facility construction, installation of equipment (including instructions for initial operation of equipment) and consulting services (including capacity building program [soft component]) were implemented as planned, and there were no particular changes.

As the outputs that were not expected at the time of planning, additional 60 units of DC/AC inverters (electric power converters) were procured and installed. This was conducted as a

countermeasure against equipment damages that occurred during the commissioning. It was due to the unstable power supply (voltage fluctuation etc.) by the local power company, and it was a necessary measure to prevent further damage to the equipment.

Design changes took place from the time of the outline design – change of diameter of flow meters, change and addition of non-suspension construction, change of connection piping inside facilities, change of installation location of flow meters, and change of water level gauge model, etc. They were necessary changes because adjustments were made at the time of the detailed design, taking into account the connection with existing pipes and the actual conditions at the site.

As a result of interviews with the MCWD and the project consultants, all the tasks to be undertaken by the Philippines side on matters necessary for the project implementation, such as designation of the department in charge of the SCADA operation, securing of appropriate personnel, advance notice of construction and implementation and public relations activities, have been duly implemented without any problems.

SCADA Client in Talamban Satellite Office

Well Pump Station Electro-Magnetic Flow Meter, PLC Board

Reservoir

Flow Meter

3.2.2 Project Inputs

3.2.2.1 Project Cost

While the total project cost was initially planned to be 1,310 million yen, the actual cost was 1,123 million yen, which is within the plan (86% of the planned amount). This includes the cost of 60 units of additional output of DC/AC inverters (power converters). Of the total project cost, the government of the Philippines disbursed 103 million yen which is within the plan (140 million yen).

Pressure Sensor at Water Pressure Monitoring Point

3.2.2.2 Project Period

While the overall project period was planned as 24 months – from April 2014 (signing of Grant Agreement) to March 2016 (completion of construction), the actual period was 30 months – from April 2014 (signing of Grant Agreement) to September 2016 (completion of construction), which is longer than planned (125% of the initial plan). Table 4 summarizes the comparison of planned and actual project period.

Table 4: Comparison of Planned and Actual Project Period

Plan	Actual
April 2014 – March 2016 (24 months)	April 2014 – September 2016 (30 months)
Breakdown: Detailed Design and Tendering Period	
October 2014 – April 2015 (7 months)	July 2014 – May 2015 (11 months)
Breakdown: Construction	
May 2015 – March 2016 (11 months)	July 2015 – September 2016 (15 months)

Source: Information provided by JICA and results from questionnaire survey of the MCWD

Note 1) The definition of project completion is at the time of completion of construction. Project period does not include warranty period for both plan and actual.

Main reasons for project delay were (1) delay in detailed design, etc. and (2) delay in construction work. Regarding (1), project was delayed because of design changes which took time to modify the bid documents. As a result, start of bid was delayed. Regarding (2), in addition to the time required for the transportation of additional non-suspension construction materials from Japan and customs clearance at the port, additional time for procurement and installation of DC/AC inverters which were not originally planned delayed the project.

Although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair.

3.3 Effectiveness and Impacts[9] (Rating: ②)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

At the time of planning, "increase in real-time monitoring points (for water flow and pressure)", "number of remote controlled well pump stations" and "improvement in monitoring frequency (flow)" were set as quantitative effects of the project. Table 5 summarizes baseline, target and actual figures between 2017 and 2019 for each indicator. As the project completion is September 2016, the target year to be compared is 2019, 3 years after completion.

Table 5: Quantitative Effects of the Project

Indicators	Baseline	Target	Actual		
	2013	2019 3 Years After Completion	2017 1 Year After Completion	2018 2 Years After Completion	2019 3 Years After Completion
Operation Indicators					
Increase in real-time monitoring points (for water flow and pressure)	0 point	Flow: 126 points Pressure: 125 points	Flow:123 points Pressure:122 points	Flow: 114 points Pressure: 108 points	Flow: 107 points Pressure: 95 points
Number of remote controlled well pump stations	0 station	53 stations	50 stations	41 stations	34 stations
Effect Indicator					
Improvement in monitoring frequency (flow)	Once every month	Once every hour	- Well pump stations: Once every hour - DMA inflow points: Once a day		
Additional Indicator (Reference Figures)					
Non-Revenue Water Rate	—	—	25.49%	25.33%	23.85%

Source: Information provided by JICA and results from questionnaire survey of the MCWD

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

As regards the operation indicator "increase in real-time monitoring points (for water flow and pressure)", figures have been decreasing year by year after the completion of the project, and the actual figures in 2019 are below the targets at 107 points (flow) and 95 points (pressure). (Achievement rates are 85% and 76% of the targets, respectively.) According to the MCWD, the reason why both flow points and pressure points have already fallen below the 2019 targets (126 points, 125 points) by 3 points each in 2017 is that as described previously in "3.1.4 Appropriateness of the Project Plan and Approach", there was a weak internet connection at 2 monitoring points in Compostela and the shutdown of 1 well in Talamban due to water quality problem rendered the equipment unoperational.

The number of "remote controlled well pump stations", which is an operation indicator, has been decreasing year after year since the project was completed, and the actual figure in 2019 is 34 stations, which is below the target. (Achievement rate is 64% of the target.) The reason why the number of remote controlled well pump stations has fallen below the 2019 target (53 stations) by 3 stations in 2017 is due to the premature malfunctioning of the devices which was not expected.

The fact that the actual figures of the above-mentioned operation indicators are on the decline and below the target values is due to the occurrence of defects of the facilities and equipment developed by the project. Specifically, there are the problems shown in Table 6.

Table 6: Background of Unachieved Targets for the Operation Indicators

Indicators	Problems
Decrease in monitoring points (flow)	Due to defective flow meter and water level gauge sensors, power supply unit and DC/AC inverters.
Decrease in remote controlled well pump stations	
Decrease in monitoring points (pressure)	Due to defective pressure gauges.

Source: Results from questionnaire survey of the MCWD

The causes of equipment malfunctions are listed in Table 7 below. As described above in "3.2.1 Project Outputs," DC/AC inverters were procured and installed as additional outputs to prevent damage to equipment that occurred during the commissioning, however they also caused defects. The MCWD has pointed out that unstable local power supply may have shortened the life of the equipment.

Table 7: Reasons for Defective Equipment

Defects	Reasons
Defective flow meter and water level gauge sensors	Malfunctioned equipment due to the effect of water quality (high content of minerals).
Defective power supply unit and DC/AC inverters	Problems due to unstable power supply (voltage fluctuation, etc.) from the local power company.
Defective pressure gauges	Stolen pressure sensor in Talamban.

Source: Results from questionnaire survey of the MCWD

The effect indicator "monitoring frequency (flow)" has maintained hourly monitoring frequency at well pump stations and once a day at the DMA inflow points for each year from 2017 to 2019. Although it was not possible to confirm from the existing information and interviews with the MCWD, which point was assumed at the time of planning, the target has been achieved if it was assumed to be the well pump stations.

As an additional indicator, "non-revenue water rate" was set at the time of the ex-post evaluation, and analysis was made as reference figures. The "non-revenue water rates" obtained from the MCWD have been declining year by year, and the actual figure in 2019 is 23.85%. In its corporate plan, the MCWD has set the goal of reducing non-revenue water rate to 23% by 2020. As described below in "(3) Contribution to the MCWD management improvement by reducing non-revenue water rate" in "3.3.1.2 Qualitative Effects (Other Effects)," the MCWD aims to further reduce the figures by developing a system to monitor water supply condition almost in real time and to establish an appropriate operation management system.

3.3.1.2 Qualitative Effects (Other Effects)

As qualitative effects of the project, it was expected that (1) improvement of water volume and water pressure shortage from the taps, (2) decrease in the number of complaints, and (3) contribution to the MCWD management improvement by reducing non-revenue water rate would be realized.

(1) Improvement of water volume and water pressure shortage from the taps

An interview survey was conducted with 15 local residents[10] during the project site survey. There were various responses, and 6 out of 15 residents (40%) responded that they

[10] The interviewees consisted of 5 men (2 in 30s, 2 in 50s, and 1 in 60s) and 10 women (2 in 30s, 2 in 40s, 2 in 50s, and 4 in 60s), with the total of 15 people. Locations were: 12 people in Cebu City (including 2 people in the mountains and slope areas), 2 in Compostela Municipality, and 1 in Liloan City. Occupations include store owners (selling miscellaneous goods and groceries), restaurant owners, water station owner, driver, livestock farmer (pig raising), housewives, etc.

were satisfied with the water supply service of the MCWD. Of the 15 local residents, 4 has been receiving water supply from the MCWD since before the project, and of which 3 had no problem with water volume and water pressure in the past but pointed out that they encounter problems now. There were 11 residents[11] who had used well water before the project, but now receiving water supply from the MCWD. Of these, only 3 residents responded that there was no problem in both water volume and water pressure and the remaining 8 replied that there are problems. (2 out of 8 residents are living in the mountains and sloping area where water pressure was low before the project.) Since the sample size of the interviewees is extremely limited, it is not appropriate to generalize, but what could be understood within the range of the interview is that residents other than those (2 people) living in the mountains and sloping areas, which are considered to have trouble with water supply due to water pressure problem, are also complaining. In other words, complaints were heard from residents regardless of where they live.

(2) Decrease in the number of complaints

Table 8 shows the number of complaints (cumulative total number) received by the MCWD. For reference, the number of the MCWD customers (number of water supply service contracts) is shown in Table 9. The number of complaints in 2019 is much higher than that in 2017 and 2018. According to the MCWD, due to the El Niño phenomenon that occurred in the fourth quarter of 2018, the amount of rainfall decreased, and water shortage became serious in 2019, and it turned out that the number of complaints in 2019 was larger than the previous year. According to the MCWD, major complaints were shortage of water supply volume and insufficient water pressure[12], all of which are consistent with the findings obtained from the interviews with local residents.

[11] Note that these residents did not decide to get water service from the MCWD as a result of the project.

[12] The contents and ratio of the top 5 complaints in each year are as follows. (Source: Materials provided by the MCWD)

- 2017: 1. Water leakage in water supply and distribution pipes (23.54%), 2. Water meter failure (22.30%), 3. Trace up high* (17.94%), 4. Trace up low * (11.48%), 5. Insufficient water pressure/water volume (5.55%)
- 2018: 1. Water leakage in water supply and distribution pipes (24.76%), 2. Trace up high (20.45%), 3. Water meter failure (20.15%), 4. Trace up low (7.27%), 5. Insufficient water pressure/water volume (5.33%)
- 2019: 1. Trace up low (29.83%), 2. Water leakage in water supply and distribution pipes (16.83%), 3. Water meter failure (15.43%), 4. Trace up high (13.13%), 5. Insufficient water pressure/water volume (5.43%)

*Trace up high: When the actual usage is high due to water leakage between the water meter and the tap.
Trace up low: When the actual water usage is low due to a water meter failure or water theft in the water distribution pipe.

For each year, number of complaints regarding insufficient water pressure/water volume is the fifth, with the number of complaints being 2,658 (2017), 2,552 (2018) and 3,735 (2019). (The figure for 2018 is rounded, so the number does not match.)

Table 8: Number of Complaints (Cumulative Total Number) (Breakdown by Districts)

	2017	2018	2019
Cebu City	25,173	25,329	35,662
Lapu Lapu City	4,818	4,793	7,062
Mandaue City	8,205	7,967	11,946
Talisay City	3,119	3,304	4,279
Municipality of Compostela	349	325	380
Municipality of Consolacion	2,684	2,769	4,076
Municipality of Cordova	906	763	1,202
Municipality of Liloan	2,646	2,599	4,182
Total	47,900	47,849	68,789

Source: Information provided by the MCWD.

Note 1) Since the number of complaints is the total number, even if the same person makes several complaints, the number of complaints is counted.

Table 9: Number of MCWD Customers (Number of Water Supply Service Contracts)

2017	2018	2019
185,801	193,239	198,157

Source: Information provided by the MCWD.

Note 1) The number of customers as of December in each year.

According to the MCWD, behind the severe water supply situation are, in addition to water shortage due to decrease in rainfall as an effect of El Niño phenomenon, salination of groundwater, decrease in groundwater recharge, and decrease in water production due to deterioration of water quality of water sources as a result of population increase. It is necessary to develop new water sources to solve the fundamental problem, and the MCWD has a plan to develop new groundwater sources mainly in the mountainous area where water pressure is low in Cebu City, where water supply population is the largest.

(3) Contribution to the MCWD management improvement by reducing non-revenue water rate

As shown as a reference information in Table 5, non-revenue water rates are declining year by year, and the actual figure for 2019 is 23.85%. The MCWD is working to reduce non-revenue water rate by using the SCADA system, and the MCWD has pointed out that after the introduction of the SCADA, remote monitoring of water volume and water pressure was realized, and it became possible to shorten the response time when problems

occurred. Specifically, regarding water flow, before the introduction of the SCADA, it was necessary for the staff in charge of operation and maintenance to directly check on-site in order to grasp the operation status of the well pumps. Since they are scattered in 8 local governments (LGUs), it took time and labor to move to the site and confirm the situation. However, after the introduction of the SCADA, it became possible to identify problems in well pumps remotely from the SCADA room inside the MCWD main office in almost real time. For this reason, the MCWD uses the SCADA system to optimize water production volume of each well. For example, when water flow is decreasing, the staff in charge of operation and maintenance can be promptly dispatched to the well with problems to check the conditions of the pump and do the repair. Regarding water pressure, low pressure points and the DMA inflow points are monitored once a day using the SCADA system, and based on the data from the SCADA system, water pressure and water volume at the DMA inflow points are adjusted and optimized. For example, if there is a considerable water pressure in a certain area, the SCADA system is used to control water pressure by diverting extra water volume to other low-pressure areas through manual manipulation in the field. In this way, introduction of the SCADA has significantly reduced the response time and work load of the staff in charge of operation and maintenance when problems occur, and made their work more efficient, which also contributes to the reduction of non-revenue water rate. The MCWD plans to 1) develop a system that can monitor, control, and analyze the SCADA operations 24 hours a day, 2) increase the number of staff in the Non Revenue Water Management Division (a plan to increase 12 staff), 3) introduce the SCADA system to all water distribution networks in the next 4 years (2020-2023), and 4) develop a new software system[13] linked with the SCADA system to identify leak, etc. in order to develop a system to reduce non-revenue water rate, and aims to further improve management and water supply service.

According to the MCWD, the SCADA system introduced by the project covers the water supply service area of the MCWD and 35.57%[14] of production facilities. As

[13] According to the MCWD, the SCADA system introduced by the project must be working properly for the new software system to function.

[14] According to the MCWD, calculation basis for the SCADA system coverage is as follows. (Calculation is made based on the number of flow monitors installed in the well pumps.)

- Number of the MCWD's inhouse wells: 132.
- Number of wells for bulk water from private companies from which the MCWD receives water: 17
- From the above, the number of wells in the water supply service area by the MCWD is 132+17=149.
- Thus, the SCADA coverage is 53/149=35.57%.

※ There are 53 well pumps with flow monitors installed by the project.

However, since the produced water volume varies depending on the wells, it is more appropriate to calculate the coverage by the ratio of the flow volume of wells in which the SCADA is introduced, which is 22.98%. (Flow volume of wells where the SCADA is installed is 51,696m^3, and the total flow volume is 225,000m^3, thus 51,696/225,000=22.98%.) Although the SCADA system not only monitors flow volume but also water pressure, etc., the coverage shown here is calculated by the flow volume for convenience.

described above, it can be considered that the frequent occurrence of malfunctions of facilities and equipment due to unstable power supply and shortage of water sources are hampering the effects of the project.

From the above, when taking into consideration the actual figures of operation indicators are on the decline and are below the targets, as well as considering the results of interviews with local residents around the project sites, the contents of complaints received by the MCWD, and improvement of efficiency of daily operations of staff in charge of operation and maintenance in the field by introducing the SCADA, it is considered that the effects of the project have been achieved to a certain degree when comprehensively judged.

3.3.2 Impacts

3.3.2.1 Intended Impacts

Although "the improvement of water supply in the target area" was indicated as the project impact, it was unclear by what exactly this should be achieved. For this reason, at the time of the ex-post evaluation, the impact indicator (underlined part) was set with the following logic [15], after consultation and agreement with the MCWD, taking into consideration of the "qualitative effect" in the effectiveness.

"By monitoring flow volume and water pressure with the SCADA system introduced by the project, the MCWD can detect interruptions and leakages of water supply and shorten the reaction time when problems occur. In addition, the MCWD can turn on pumps remotely utilizing the SCADA system. As such, the MCWD can improve its operation and maintenance work. As a result, the MCWD can maintain appropriate water volume and

On the other hand, JICA has a different view from the MCWD. JICA considers that "the SCADA system covers almost all water supply service area of the MCWD." According to JICA, it is not necessary to install flow meters in all wells in order to grasp flow volume. JICA pointed out that flow volume covered by the SCADA system can be grasped if flow meters are installed at the water inflow point of the DMAs, confirming that there is no water inflow from other areas. JICA indicated that among all 58 DMAs under the control of the MCWD, inflow monitors have been installed at 55 points by the project, thus the SCADA system covers almost the entire water supply service area of the MCWD.
Based on the views of JICA, reconfirmation to the MCWD was made. According to the MCWD, inflow monitors installed to the DMAs by the project is utilized to monitor night flow, determine possible leaks and any irregular pressure. The MCWD responded that data of water flow at the inflow points of the DMAs cannot be provided. Moreover, the MCWD explained that on top of 55 DMA inflow monitors installed by the project, it aims to install additional 214 DMA monitors in the next 10 years. The MCWD pointed out that these additional DMA monitors would give them the capability to monitor flow and pressure all throughout the MCWD water supply service area. Based on the above explanations by both the MCWD and JICA, theoretically, as pointed out by JICA, the SCADA system covers almost all the water supply service areas of the MCWD, however, in actual operation by the MCWD, it seems that this is not the case. In other words, it can be considered that it is not possible to monitor water volume and water pressure of the entire water supply service area of the MCWD by the 53 well pump station flow monitors and the 55 DMA inflow monitors installed by the project.

[15] The effects shown in the logic do not cover all the effects of the SCADA. Since the impact indicators were set at the time of the ex-post evaluation retroactively, the effects highlight the current undertakings of the MCWD, which is not completely in conformity with JICA's recognition.

water pressure for 53 SCADA operated well pumps[16] in the MCWD water supply service area."

Table 10 summarizes the data of the MCWD organizational targets and actual figures of flow volume and water pressure in the MCWD water supply service area. Although flow volume achieved more than 90% of the MCWD organizational targets after the completion of the project since 2017, because they are figures at the water source level, they are not appropriate to be considered from the perspective of improvement of water supply situation in the target area. Therefore, the figures are provided as available references.[17]

Table 10: Organizational Targets and Actual Figures of Flow Volume and Water Pressure in the MCWD Water Supply Service Area

	2016		2017		2018		2019 Note 2)	
The MCWD organizational target and actual figures	Target	Actual	Target	Actual	Target	Actual	Target	Actual
The MCWD's daily average water supply volume (m^3/day) Note 3)	236,261	214,095 (91%)	237,005	223,806 (94%)	235,074	232,971 (99%)	235,172	223,841 (95%)
Production volume of the MCWD inhouse wells (m^3/day) Note 4)	170,891	149,334 (87%)	168,260	156,290 (93%)	167,941	161,195 (96%)	156,632	155,241 (99%)
Amount of water received (m^3/day) Note 5)	-	64,761	-	67,516	-	71,776	-	68,600
Average pressure (psi) Note 6)	10	11.59 (116%)	10	12.95 (130%)	10	12.97 (130%)	10	10 (100%)

Source: Data provided by the MCWD.

[16] As explained in footnote 14, the MCWD considers that the SCADA system introduced by the project covers a part of the water supply service area of the MCWD. The MCWD considers the SCADA coverage ratio is calculated by the number of flow monitors installed in the well pumps. Thus, flow volume and water pressure of 53 well pumps where the SCADA system has been installed (not the MCWD's entire water supply area) are targeted.

[17] The Preparatory Survey Report states that "the total supply amount per each DMA will be more accurately measured by adding up the outlet flow of the reservoirs and the intake of the well pumps that are directly connected to the system."

Note 1) Figures in parentheses in the table are achievement rates.

Note 2) According to the MCWD, the actual figures of the MCWD's daily average water supply volume, production volume of the MCWD inhouse wells, and average pressure in the MCWD water supply service area in 2019 are below the previous year's figures, respectively due to the El Niño phenomenon that occurred in the fourth quarter of 2018.

Note 3) The MCWD's daily average water supply volume = Production volume of the MCWD inhouse wells + Bulk water supply

Note 4) According to the MCWD, it is not possible to separate the data of 53 wells with the SCADA system out of 132 inhouse wells. Therefore, for the flow volume, targets and actual figures for 132 MCWD inhouse wells (which can be regarded as the most approximate figure in the available data) were compared.

Note 5) Number of wells for bulk water that the MCWD receives from private companies are 17 in total. No SCADA system has been installed in any of them.

Note 6) The unit is psi. (pounds per square inch). According to the MCWD, it is not possible to separate the average water pressure data only for areas where the SCADA system is installed. Therefore, targets and actual figures of average pressure in the entire the MCWD water supply service area were compared.

From the viewpoint of improving water supply situation in the target area, the average water pressure, which is an indicator that can be used for evaluation, has reached the organizational target, and it is considered that the SCADA system has had a certain contribution. On the other hand, considering the results of interviews with local residents and the contents of complaints described in "3.3.1.2 Qualitative Effects" above, on the water users' side, unlike the results (achievement status) of the MCWD's organizational targets, they take slightly stricter views. This is due to the fact that the effect of the El Niño phenomenon that occurred in the fourth quarter of 2018 (occurrence of serious water shortage due to decrease in rainfall) has continued up to the time of the ex-post evaluation, and it can be considered that the positive effects of the introduction of the SCADA system have been reduced by such effects. However, it is difficult to objectively verify to what extent these risk factors have negative impacts on the realization of the project effects.

3.3.2.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

This project was classified as Category C because it was determined in the *JICA Guidelines for Confirmation of Environmental and Social Considerations* (promulgated in April 2010) that undesirable impacts on the environment was minimal. Preparation of an Environmental Impact Assessment for the project was not required by the DENR (Department of Environment and Natural Resources). The MCWD has obtained prior permission from each related local governments (LGUs) for the construction. In addition, the MCWD has made prior notification and explained to the local residents that it will avoid

the burden on the environment during construction as much as possible.

According to the MCWD and project consultants, environmental monitoring (noise, vibration, soil and waste) during the project implementation has been carried out by visual observation, etc. In addition, as environmental mitigation measures, nighttime construction around residential areas were avoided, and noise-suppressing equipment was used, or manual excavation was carried out. As for the nighttime construction in front of stores, coordination with the stores was made in advance. Attention was made to minimize the use of transportation of construction materials (use of large trucks). As a result, no negative impact on the natural environment has been reported and no complaints have been received from the residents. Based on the interviews with the MCWD and local residents during project site survey, as well as the result of site inspection, it is considered that there is no major problem with the natural environment.

(2) Resettlement and Land Acquisition

Land acquisition and resettlement did not take place for the project. Regarding the construction site, it was found that part of the initially planned land was private lands, so the target site was changed to a public road.

(3) Other Impacts

The operation manuals developed under the soft component of the project were prepared through repeated discussions between Yokohama Water Co., Ltd.[18], the project consultant, and the MCWD in accordance with the "Water Safety Plan." The "*Water Safety Plan*" is a water quality management methodology advocated by the World Health Organization (WHO) and originally comes from the HACCP (Hazard Analysis and Critical Control Point) guidelines for food safety and hygiene management. The MCWD initially tried to refer to the guidelines of Yokohama City, but because it was complicated and did not match the actual situations of the MCWD, it decided to refer to the guidelines of international organizations while incorporating the knowledge of Yokohama City Waterworks Bureau. The completed guidelines are referred to and utilized in the daily work of the MCWD's SCADA monitoring, as described below in "3.4.2 Technical Aspect of Operation and Maintenance."

This project has achieved its objectives to some extent. Therefore, effectiveness and impacts of the project are fair.

[18] Yokohama Water Co., Ltd. is fully invested by Yokohama City Waterworks Bureau.

【BOX: Utilization and dissemination of know-how and technology possessed by Yokohama City/ Yokohama Water Co., Ltd.】

This project is a grant aid project in collaboration with Yokohama City, through the participation of Yokohama Water Co., Ltd., the project consultant in charge of capacity building program (soft component), and know-how and technology of the City's water supply service were utilized and disseminated.

Based on the comprehensive cooperation agreement signed with Yokohama City in 2011, JICA, with the cooperation of Yokohama City, conducted "*Survey on Information Collection and Confirmation for Sustainable Urban Development in Metro Cebu*" (2013). Prior to that, Yokohama Water Co., Ltd., wholly-owned by Yokohama City Waterworks Bureau, conducted "*Metro Cebu Water District Water Utility Current Status Confirmation Survey*" from February to March 2011. In addition to participating in the training in Japan conducted by JICA Yokohama, Yokohama Water Co., Ltd. has also supported the formulation of "*Mega Cebu Vision 2050,*" which is the medium to long-term vision of Cebu. Furthermore, the company has conducted "*Technical Assistance Project on Water Supply Operation and Management for Metro Cebu Water District*" (2012-2013: Technical Assistance Project Related to ODA Loan) for the MCWD to contribute to realize reducing the MCWD's non-revenue water rate and to provide 24-hour water supply. In other words, Yokohama City / Yokohama Water Co., Ltd. have already established good relationship with the MCWD through various supports before the implementation of the project, and the project was carried out building onto that good relationship. According to the interviews with the MCWD and Yokohama Water Co., Ltd., there was a feeling of camaraderie and things that could be shared with each other as the same water utility company, and there was always a partnership spirit of "let's work together" by understanding each other well. They've pointed out that there was a sense of harmony, and sometimes tensions were diminished, but that was also the flip side of the relationship of trust. In addition, the MCWD pointed out that there was a consciousness to actively learn and incorporate to the MCWD what is effective and functioning in the water supply service in Yokohama City. The MCWD also mentioned that sharing of knowledge about the water supply service in Yokohama City and learning about their best practices was very inspiring. For Yokohama Water Co., Ltd., it was pointed out that a series of cooperation with Cebu has contributed to the transfer of its know-how and technology backed by many years of experience and achievements and further deepening of trusting relationships, which is a very significant initiative.

3.4 Sustainability (Rating: ②)

3.4.1 Institutional / Organizational Aspect of Operation and Maintenance

Regarding the operational structure of the SCADA system, operation and maintenance of the facilities and equipment developed by the project is carried out by the MCWD's Production

Department and ICT Department. Production Department, which is the department with the primary responsibility, monitors and controls the flow volume and the pressure data sent from the field to the SCADA room, and when problems occur, the relevant division within Production Department cooperate and cooperate to conduct repairs in the field. When problems occur in the SCADA system, Production Department works with ICT Department to check and repair the system. The MCWD does not have a team dedicated to the SCADA, and as shown in Table 11, staff members who are also responsible for the SCADA operation and maintenance work are assigned to the existing departments and divisions.

Table 11: Staff Members in Charge of Operation and Maintenance of the SCADA System in the MCWD

The MCWD (Number of total staff members at the time of ex-post evaluation: 831)		
Production Department (Staff members who are also in charge of the SCADA are assigned in each Division)	Water Production Division	Of the 35 staff members, 4 members conduct the SCADA monitoring in the SCADA room, and 30 members undertake operation and maintenance of equipment in the field.
	Electro Mechanical Division	Of the 26 staff members, 12 members are in charge of maintenance of electrical equipment including the SCADA in the field.
	Water Distribution Division	Of the 47 staff members, 3 members conduct the SCADA monitoring in the SCADA room.
	Water Meter Maintenance Division	Of the 32 staff members, 4 members provide support for the SCADA system.
ICT Department (Responsible for both hardware and software maintenance of the SCADA)	System Application Division	Of the 7 staff members, 3 members are in charge of the SCADA system maintenance.
	System Development Division	Of the 8 staff members, 1 member is in charge of the SCADA system maintenance.

Source: Prepared based on the information provided by the MCWD.

Regarding the operation system of the SCADA room, the SCADA room (central monitoring system) is in the 4th floor of the MCWD main office. In addition, there is the SCADA Client (district monitoring system) in the Talamban satellite office. In the SCADA

room in the main office, daily monitoring and control are carried out in 2 shifts from 6 am to 10 pm. No staff is stationed in the SCADA room from 10 pm to 6 am and no night-time monitoring is conducted, but there is a system in place that the staff in charge will stand by at home and can promptly go to the SCADA room to respond to complaints, etc. from water users.

At the time of the ex-post evaluation, 7 staff members are taking turns and undertaking monitoring work while concurrently carrying out other work. The MCWD has a plan to increase the number of technical staff members in the future and will allocate 4 SCADA dedicated staff in 3 shifts to develop a system that can monitor, control and analyze 24 hours a day, including nighttime monitoring and flow analysis.

According to the MCWD, there are no particular problems with the current system, including the number of staff members, decision-making, and cooperation/coordination system of related departments/divisions. The MCWD organizational restructuring has been underway since 2019, and the organizational structure will be partially reorganized according to the guidance from the Local Water Utilities Administration (LWUA), but this will not affect the operation and maintenance system of the SCADA.

Regarding development of a system for decreasing non-revenue water rate, it is as described in "(3) Contribution to the MCWD management improvement by reducing non-revenue water rate" in "3.3.1.2 Qualitative Effects (Other Effects)" above.

From the above, no particular problem has been identified regarding the institutional/organizational aspect of operation and maintenance.

3.4.2 Technical Aspect of Operation and Maintenance

The staff in charge of operation and maintenance are those who have completed bachelor's degrees in civil engineering, mechanical engineering, electronic engineering, etc. or graduates of vocational schools. Staff members with highly specialized knowledge such as electricians, civil engineers, and electronics engineers certified by the Professional Regulation Commission, which is the government's quality assurance agency are deployed. All of them are technical staff who have accumulated sufficient technology and experience and are at a level sufficient to carry out ordinary operation and maintenance work.

The contractor of the project provided operation instruction on how to use the equipment. In addition, technical guidance on system operation management was provided in the capacity building program (soft component) of the project. (A total of 127 staff members took 365 hours of training between September 2015 and January 2019.) The contents of the training and guidance have been shared and utilized by other MCWD staff including the staff in charge of operation and maintenance in the field. In addition, the operation manuals prepared under the

soft component is always kept on the bookshelf in the SCADA room, and are referred and utilized for their daily work. According to the MCWD, it is not necessary to review and revise the operation manuals at the present moment. After the training, there were no new recruits in charge of the SCADA monitoring, and the trainees have been in charge of the monitoring work.

The staff in charge of operation and maintenance have deepened their understanding of the SCADA system since they attended the training. They are making efforts to improve efficiency of daily work and to respond promptly when problems occur through utilizing the SCADA system to improve water service and to reduce non-revenue water rate as described above in "(3) Contribution to the MCWD management improvement by reducing non-revenue water rate" in "3.3.1.2 Qualitative Effects (Other Effects)."

Therefore, the technical capacity of the staff seems to be sufficient to carry out usual operation and maintenance work, and no particular problem has been identified regarding the technical aspects of operation and maintenance.

3.4.3 Financial Aspect of Operation and Maintenance

The operation and maintenance costs of the SCADA system needs to be estimated by Financial Group of the MCWD and consulted with the Board to obtain approval. Table 12 shows budget (requested amount), actual allocation and actual expenditure of operation and maintenance cost of the SCADA system. The necessary amount of operation and maintenance cost has been secured, and no problem is observed at the time of the ex-post evaluation.

Table 12: Operation and Maintenance Cost of the SCADA System

(Unit: Thousand PHP)

	2016	2017	2018	2019
Budget (requested amount)	1,411.2	1,411.2	1,411.2	2,050.0
Actual allocation	1,411.2	1,411.2	1,411.2	2,050.0
Actual expenditure	0	1,200.0	1,440.0	2,050.0

Source: Results from questionnaire survey of the MCWD

Note 1) Operation and maintenance cost consists of mobile network, DSL subscription (internet connection), and system maintenance (updates of programs).

Note 2) There is no record of spending in 2016 because the SCADA utilized the MCWD's existing internet connection. However, the MCWD applied for separate internet connection specially for the SCADA from 2017 onwards, since internet connection for other MCWD operations were affected.

Note 3) Budget for the system has been increased in 2019 because 3 years have passed since the project was completed.

Table 13 shows the MCWD's water tariff revenue. From a comparison with the actual operation and maintenance expenditures in Table 12 above, the operation and maintenance costs of the SCADA system are fully covered by the water tariff revenue.

Table 13: MCWD's Water Tariff Revenue

(Unit: Thousand PHP)

2016	2017	2018	2019
1,666,960,851	1,711,501,260	1,810,933,063	1,819,752,633

Source: Results from questionnaire survey of the MCWD

According to the MCWD, as of December 2019, the number of the MCWD customers (number of water supply contracts) was 198,157 (see Table 9), and the tariff collection rate was high at 93-94%. Payment of water tariff can be made by cash or credit cards at shopping malls, convenience stores, post offices, etc., in addition to the payment counter established in the first floor of the MCWD main office. Since there are many choices of payment place and method, it is considered that the convenience is high for water users.

Water tariff is set for each category (household, commercial, government/public facilities, subdivision, and condominium) according to the size of diameter of the water pipe. For household use, the first 10m^3 (monthly) usage tariff is shown in Table 14. The water tariff is scheduled to be revised in 2020 and is expected to increase. The charge setup complies with the regulations of the Local Water Utilities Administration (LWUA) and is decided after conducting public hearings (meetings to explain to local residents, etc.) and the approval of the LWUA.

Table 14: Monthly Water Tariff for Households

Diameter of water pipe (inch)	Monthly Tariff (PHP)
1/2"	152.00
3/4"	243.20
1"	486.40
1～1/2"	1,216.00
2"	3,040.00
3"	5,472.00
4"	10,944.00
6"	18,240.00
8"	29,184.00
10"	41,952.00

Source: Information provided by the MCWD.

Table 15 shows the financial data of the MCWD. The MCWD does not receive subsidies from the central government or related local governments and operates the water utility with financially independent system. Looking at the financial data, both total income and total expenses are growing steadily, and the institution continues to be profitable.

Table 15: Financial Data of MCWD

(Unit: PHP)

	2016	2017	2018	2019
Service and Business Income (including Waterworks System Fee)	1,701,507,722	1,755,942,585	1,865,547,778	1,893,726,265
Other Income	19,461,570	22,211,181	98,342,994	81,920,682
Total Income	**1,720,969,292**	**1,778,153,766**	**1,963,890,772**	**1,975,646,946**
Personnel Services	521,569,443	529,786,335	569,094,603	580,110,688
Maintenance and Other Operating Expenses	747,231,532	816,952,494	832,125,620	914,613,741
Financial Expenses	36,384,924	30,525,481	37,773,744	29,877,343
Non-Cash Expenses	140,943,087	107,991,007	197,758,018	226,011,895
Total Expenses	**1,446,128,986**	**1,485,255,317**	**1,636,751,986**	**1,750,613,666**
Income before Tax	**274,840,306**	**292,898,449**	**327,138,786**	**225,033,280**
Income Tax Expenses	1,141,347	747,430	1,104,750	1,849,464
Income after Tax	**273,698,959**	**292,151,019**	**326,034,037**	**223,183,816**
Net Subsidy etc.	11,813,382	11,706,319	12,552,313	11,832,353
Net Income for the Period	**261,885,577**	**280,444,700**	**313,481,724**	**211,351,463**

Source: Prepared based on the MCWD Annual Report and the information provided by the MCWD.

Note 1) Partial inconsistency of figures exists due to rounding the number to the nearest integer.

Note 2) Non-Cash Expenses include depreciation expenses, etc.

From the above, no particular problem has been identified regarding the financial aspect of operation and maintenance.

3.4.4 Status of Operation and Maintenance

Table 16 shows the operating status of the facilities and equipment developed by the project. Many facilities and equipment are defective. Those that are operating as introduced are central monitoring system (SCADA room in the MCWD main office), SCADA client (in Talamban

satellite office), B.C. Homes reservoir monitor (level), Compostela reservoir monitor (level) and Buhisan dam monitor (level), and the others are not working, partially not working, or out of order. Purchased water monitors (flow) from water suppliers (10 sets) were procured collectively as planned in the project, but the input/output ports could not be installed since the existing device has already been used for connecting to other device, and there was no input/output port slots available for this equipment, and thus they have not been working since the completion of the project.

Table 16: Operating Status of Facilities and Equipment

Facilities and Equipment	Quantity	Operating Status
Central monitoring system (MCWD Main Office)	1 set	Working
SCADA Client (Talamban Satellite Office)	1 set	Working
Tisa Reservoir monitor (Flow)	1	Not working due to defective flow meter and water level sensor
Talamban Reservoir monitor (Flow)	1	Not working due to defective flow meter and water level sensor
Casili Reservoir monitor (Flow)	1	Not working due to defective flow meter and water level sensor
B.C. Homes Reservoir monitor (Level)	1	Working but reservoir cannot be filled because demand in the service area exceeds supply
Lagtang Reservoir monitor (Flow)	1	Not working due to defective flow meter and water level sensor
Liloan Reservoir monitor (Flow)	1	Not working due to defective flow meter and water level sensor
Compostela Reservoir monitor (Level)	1	Working
Well pump station monitor (Flow)	53	34 working
DMA monitor (Flow)	55	51 working
Low pressure point monitor	15	12 working (Problems are theft and destruction of water pressure related equipment, and damage due to typhoon)
Transmission line monitor (New Bridge Line)	1	Working but defective flow meter sensor
Transmission line monitor (Old Bridge Line)	1	Working but defective pressure sensor

Buhisan dam monitor (Level)	1	Working
Purchased water monitor (Flow)	10	None of them have been working since the completion of the project (while they were compatible with the SCADA system existing device, they could not be installed due to limited slots of the input/output ports)

Source: Results from questionnaire survey of the MCWD

Regarding the procurement of flow meter and water level sensors, power supply units, DC/AC inverters, etc., which are defective, it became clear at the time of the ex-post evaluation that prospect of their procurement was uncertain or that it would take a long time before it could be obtained, when inquired the MCWD[19]. (See also Table 7 for the cause of defects.) The MCWD has a stock of old mechanical (dial type) flow meters, and as a second-best measure (alternative means), the MCWD has replaced the defective meters with the mechanical ones to get flow data of the well pump station. Even if remote or real-time monitoring is not possible, the MCWD is checking water supply status manually or through field visits. However, the MCWD admitted that it is inevitable that the actual figures of the

[19] According to the MCWD, status of procurement for each equipment is as follows. Before the issues of undecided Board members occurred (*), it took time for the MCWD to check the equipment that was not working due to defects and detect the cause of failure, and to prepare budget plan necessary for procurement, and thus it was not possible to respond flexibly.

- Flow meter and water level sensors and flow meters: Both can be procured domestically. The MCWD's Board of Directors' approval is required because the procurement cost is 1 million PHP or above. However, there are a mountain of issues to be approved by the Board of Directors other than this, and no specific approval is expected at the time of the ex-post evaluation. (*) Following the change of the Mayor of Cebu City on June 30, 2019, the members of the Board of Directors have not been decided for a long time, and the procurement procedure was suspended. According to the MCWD, the Board members are decided through the Mayor's appointment, but due to various political backgrounds, the appointment was delayed, and 5 Board members were finally officially decided on February 17, 2020, which is about 8 months later.
- Power supply units: Domestic procurement is possible, and Board approval is not required. After the approval by the MCWD Finance Group, it will take 3-6 months to start procurement, and then the bidding process will take 3-5 months. Therefore, it will take about 1 year before the power supply unit can be obtained.
- DC/AC inverters: Board approval is not required. Since they cannot be procured domestically, the MCWD needs to place orders with a Japanese vendor and is looking for a domestic supplier that can mediate. The MCWD will be able to get a support from a candidate supplier to intermediate as a result of the fact that the JICA Philippines Office requested that supplier to intermediate the purchase of the DC/AC inverters, after the ex-post evaluation mission reported to the Office regarding the issue. However, procurement has not progressed due to the subsequent spread of the new Coronavirus worldwide, and there is no concrete prospect of procurement at the time of the ex-post evaluation.
- Data loggers: They can be procured domestically, and the MCWD has already purchased 50 sets, but they were not completely compatible with the SCADA system and could not be used as they are. As a result of the mission's report to the JICA Philippines Office at the time of the field survey of the ex-post evaluation, the Office contacted the contractor of the project, and the contractor mediated to support the SCADA system modification.
- Batteries: Board approval is not required. Since they cannot be procured domestically, the MCWD needs to find a domestic supplier who can mediate. If a supplier is found, it will take 5-6 months for the bidding process, and about 3 months for subsequent procedures and transportation.
- Pressure sensors: Domestic procurement is possible. The MCWD has one spare unit but needs to purchase 2 more units. After placing order, it will take 8-9 months to obtain.

quantitative effects of the project (actual figures in the future, after 2020) will tend to decrease while acquisition of equipment etc. is pending.

According to the MCWD, maintenance of facilities and equipment is mainly focused on maintenance when problems occur, and preventive maintenance is not carried out. As described above in "(3) Contribution to the MCWD management improvement by reducing non-revenue water rate" in "3.3.1.2 Qualitative Effects (Other Effects)," utilization of the SCADA system has facilitated leak detection and leak repair activities, and made it possible to deal with problems, but appropriate measures of facilities/equipment against theft/destroy and typhoons have not quite taken place.

From the above, it is considered that there are problems that cannot be overlooked regarding operation and maintenance situation at the time of the ex-post evaluation.

Some minor problems have been observed in terms of the current status. Therefore, sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project introduced the SCADA system to monitor the water supply condition accurately almost in real time and to establish an appropriate operation management system for water supply facilities in the MCWD water supply service area, thereby contributing to the improvement of water supply in the target area. This project, which aims to reduce water leakage, monitor operating status of pumps, and improve shortage of water volume and pressure from water taps, is consistent with the Philippines' development policy, development needs and Japan's assistance policy at the time of planning and the ex-post evaluation. Therefore, the relevance of the project is high. In terms of project implementation, although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair. As for project effects, actual figures of operation indicators set at the time of planning are on the decline and are below the targets. Although the introduction of the SCADA system is improving the work and efficiency of daily operations of the staff in charge of operation and maintenance in the field, and that this project has produced certain effects, effectiveness and impacts of the project is fair when comprehensively judged based on the results of interviews with local residents and the content of complaints received by the MCWD. No negative impacts on natural environment and resettlement have been reported. Regarding operation and maintenance, some problems have been observed in terms of the current status. Therefore, sustainability of the project effects is fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Importance of facilitating measures to restore the function of the SCADA system

The MCWD is preparing for the procurement of spare parts that need to be replaced due to problems with the facilities and equipment developed by the project. However, due to various reasons, there is no prospect of procurement or there are several spare parts that require a long time to obtain them at the time of the ex-post evaluation. Therefore, it is important for the MCWD to promptly proceed with the internal approval process and negotiation/coordination with other related organizations to recover the function of the SCADA system. In addition, as mentioned above, considering the frequent occurrence of equipment defects and the need for much time and workload to procure new equipment, it is proposed that the MCWD carries out (1) preventive maintenance with a focus on monitoring equipment or (2) hold a certain amount of inventory mainly for long-delivery items.

Newly establishing a division specialized for the SCADA system

The MCWD does not have a division dedicated to the SCADA and deploys staff in the existing departments and divisions who are also in charge of operation and maintenance of the SCADA. However, it was raised by several MCWD staff members that under the current system, it is inconvenient to secure unifying force and momentum and to take agile response in order to proceed with internal approval procedures, and to negotiate and coordinate with other related organizations for the procurement of spare parts related to the SCADA. Thus, it is recommended that the MCWD considers establishing a dedicated SCADA team as part of the institutional development to reduce non-revenue water rate in the future.

Importance of securing continuous cooperation with the power company and the telecommunications company, and to prevent theft and destruction in order to avoid further defects and to restore functions of the facilities and equipment developed by the project

It is important that the MCWD continues to work with the local electric power company and the telecommunications company and continue to seek ways to deal with the unstable power supply problems and the internet connection problems pointed out in this project. In addition, as part of the maintenance work, it is critical to recover stolen and damaged facilities and equipment and take measures against theft, to prepare for typhoons, and to promptly replace batteries for equipment with dead batteries.

4.2.2 Recommendations to JICA

Need for follow-up survey to improve sustainability of the project

In the process of the ex-post evaluation, it became clear that there were differences of views about the SCADA system coverage between the MCWD and JICA. However, it is not possible to accurately measure the MCWD's utilization status of the SCADA system through indicators on quantitative and qualitative effects in the ex-post evaluation. For this reason, it is desirable for JICA to reconfirm the operation and maintenance status and provide guidance to the MCWD once the spare parts have been procured to a certain extent and the system become fully operational.

4.3 Lessons Learned

For system development projects, it is important to carry out more careful and cautious survey of the status of basic infrastructure development, such as electric power situation and communication environment.

Main causes of defective facilities and equipment developed by the project include unstable power supply by the local power company, problems with internet connection in some areas, and problems with water quality in some wells. At the time of planning, surveys on power situation, internet environment and water quality were conducted, and problems were not foreseen. However, in reality, problems beyond expectations at the time of planning have occurred, causing malfunctions and negatively affecting the realization of the project effects. Therefore, for system development projects, such as this project, it is important to carry out more careful and cautious survey of the status of basic infrastructure development, which is a major precondition. For example, it is important to ensure continuous communication with local power company and telecommunications company so that they can understand the SCADA system, improve the compatibility of connections with each infrastructure, and reduce possible risk factors. It is also important to consider countermeasures and backup system, anticipating the occurrence of problems. To this end, it is desirable that JICA assigns experts in more subdivided field of electric power, telecommunications, and water quality compared to the ordinary preparatory surveys, and to conduct more thorough survey analysis.

When implementing the SCADA system development project, it is important to examine specifications of monitoring equipment in more detail during the design stage.

In this project, many equipment that constitute the SCADA system have become defective between after the commissioning and the ex-post evaluation. As mentioned above, considering that it will take a lot of time and work load to procure new equipment, it is important to examine specifications of monitoring equipment in more detail during the design stage when implementing

the SCADA system development projects in the future. Specifically, it is important to examine specifications of monitoring equipment by thoroughly considering the effects of the water quality of the target area on the procured equipment, power supply situation, and security measures to prevent theft of the target equipment.

At the time of planning, it is important to set indicators which measure impacts and to confirm the logic leading to the effects.

Concrete indicators for measuring impacts were not set at the time of planning for this project. For this reason, the logic leading to the effects and the specific indicators to measure impacts were set in consultation and agreement with the MCWD at the time of the ex-post evaluation. However, as symbolized by the manifestation of difference of views between the MCWD and JICA regarding the coverage of the SCADA system, it became clear that the interpretation of the logic leading to the effects and the indicators are different between them at the time of the ex-post evaluation of the project. Under such circumstances, problems of perception gap between them will occur and impacts cannot be measured accurately. Therefore, it is important for JICA to set concrete indicators to measure impacts at the time of the preparatory survey and confirm the logic leading to the effects. It is also essential that these indicators and logic be specified in the ex-ante evaluation report and that they be appropriately shared with the executing agency and related organizations from the planning stage.