The Democratic Republic of Timor-Leste

FY2020 Ex-Post Evaluation of

Japanese Grant Aid Project

"Project for Rehabilitation and Improvement of Buluto Irrigation Scheme"

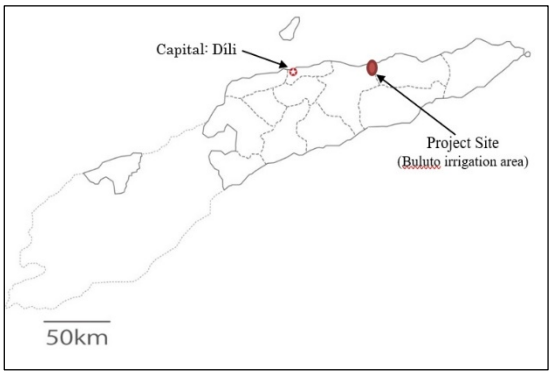
External Evaluator: Kenichi Inazawa, Octavia Japan, Co., Ltd.

0. Summary

This project aimed to increase rice production through stable supply of agricultural water, by constructing modern intake facilities and irrigation canals, etc. in the Buluto irrigation area where traditional irrigation methods had been used, thereby improving the food self-sufficiency rate of Timor-Leste. The *National Priority Program* and the *Ministry of Agriculture and Fisheries Strategic Plan*, formulated by the government of Timor-Leste advocate improving rice productivity and food self-sufficiency, and there is a need to improve agricultural productivity and support farmers' livelihoods in rural areas nationwide, including the Buluto irrigation area. As it is also consistent with Japan's ODA policy, relevance of this project is high. With regard to efficiency, the outputs were almost as planned, and the project cost was within the plan. However, the project period slightly exceeded the plan, mainly because it took time to acquire land around the project site and to process tax exemptions when clearing materials and equipment through customs; thus, efficiency is fair. Regarding effectiveness/quantitative effect indicators, 1) the yield of rice exceeded the target. While the actual 2) planted area and 3) irrigable area exceeded the targets in the rainy season, they did not reach the targets in the dry season. The total values for the rainy and dry seasons combined, were generally close to the targets. In addition, it was confirmed through interviews that this project contributed to the motivation of farmers to produce rice, an increase in production and a reduction in labor required for the maintenance of irrigation canals. Furthermore, synergistic effects with JICA's technical cooperation project, aimed at improving rice productivity and farmers' livelihoods can be expected in the future. Therefore, the effectiveness/impact is high. As for sustainability, there are no particular concerns regarding the institutional/organizational or technical aspects of the executing agency of this project, Direção Nacional de Irrigação e Gestão da Utilização de Água (hereinafter referred to as "DINIGUA") or the water users' association. While there are no particular problems with the operation and maintenance status of the developed irrigation facilities, a budget has not been allocated in recent years for the regular repairs, repairs relating to damages or large-scale repairs of intake weirs, intake gates, sand basins and waterways, which needs to be addressed. Therefore, the sustainability of the effects generated by this project is fair.

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

1. Project Description



Project location

Irrigation facility developed by this project

1.1 Background

Prior to the start of this project, Timor-Leste's agriculture was characterized by extensive farming and low rice productivity. In order to realize food security and economic development in the country, it was necessary to expand rice production. The Buluto irrigation area, which is the target area of this project, is located on the national highway connecting the capital, Dili and the second city, Baucau[1], and had potential in terms of access to markets, namely, the sales channels. It was also one of nine priority irrigation districts identified by the government in association with measures to expand rice production; in addition the farmers' motivation for production was higher in this area than in the other irrigation districts. However, the area where rice could be cultivated was limited, due to the unstable water intake, caused by traditional irrigation methods. Therefore, there were expectations that rice productivity would be improved by developing and renovating the irrigation facilities in this area.

1.2 Project Outline

The objective of this project is to increase rice production through stable supply of agricultural water by constructing modern water intake facilities and irrigation canals, etc. in the Buluto irrigation area where traditional irrigation methods had been used, thereby contributing to the improvement in the food self-sufficiency rate of Timor-Leste.

[1] The Buluto irrigation area is approximately 80 km from the capital, Dili.

Grant Limit / Actual Grant Amount		1,499 million / 1,385 million
Exchange of Notes Date / Grant Agreement Date		December 2013 / December 2013 (initial), December 2015 (revised[2])
Executing Agency(ies)		Direção Nacional de Irrigação e Gestão da Utilização de Água (DINIGUA), Ministry of Agriculture and Fisheries
Project Completion		January 2017
Target Area		Buluto irrigation area, Manatuto and Baucau Districts
	Main Contractor	Hazama Ando Corporation
	Main Consultant	NTC International Co., Ltd
	Procurement Agency	None
Basic Design		October 2012–October 2013
Related Projects		- "Irrigation and Rice Cultivation Project in Manatuto" (FY2005–FY2009) - "Irrigation and Rice Cultivation Project in Manatuto Phase 2" (FY2010–FY2014) - "Project for Increasing Farmers Households' Income through Strengthening Domestic Rice Production in Timor-Leste[3]" (FY2016–FY2023)

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: December 2020–December 2021

Duration of the Field Study: No international trips were made. It was conducted remotely with a field survey assistant.

[2] It will be discussed later in "3.2.2.2 Project Period" under efficiency.

[3] The project's objective is to improve each process (production, processing, distribution, sales/consumption) of the rice value chain and increase farmer households' rice sales income. In the future, it aims to improve livelihoods of farmer households in irrigation districts nationwide, including the Buluto irrigation area. The project activities include dispatching of Japanese experts, accepting trainees from Timor-Leste, providing agricultural machinery, repairing warehouse, and providing equipment for irrigation facility repairs

2.3 Constraints during the Evaluation Study

(Conducting a Remote Field Survey with a Field Survey Assistant)

Due to the spread of COVID-19, the external evaluator did not travel internationally. With the field survey assistant, the external evaluator carried out the site visits, collected information and data and conducted interviews with the relevant individuals remotely. The external evaluator analyzed the information collated, so as to carry out an evaluation and make judgements. An interview surveys with residents was planned to conduct in the Buluto irrigation area, but due to the spread of infection in Timor-Leste, it was prevented from visiting over a long period due to restrictions on movement. Therefore, alternatively, a survey was conducted by interviewing staff within the DINIGUA Headquarters, the agricultural offices of the Manatuto and Baucau districts and the water users' association in this irrigation area.

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

3.1 Relevance (Rating: ③[5])

3.1.1 Consistency with the Development Plan of Timor-Leste

Prior to the start of this project, the government of Timor-Leste formulated the *National Priority Program* in 2008 and listed "food security through improving productivity," as one of the issues to tackle. With the aim of increasing and diversifying food production and increasing farm income, the following was emphasized: (1) improving food security and nutritional status, (2) providing farmers with a means to increase incomes. In 2011, the government formulated the *Strategic Development Plan* (2011–2030), which positioned agriculture as a strategic sector alongside oil and tourism.

At the time of the ex-post evaluation, the aforementioned *Strategic Development Plan* (2011–2030) continues to be effective, and the improvement of agricultural productivity and food self-sufficiency is emphasized. In addition, the Ministry of Agriculture and Fisheries has formulated the *Ministry of Agriculture and Fisheries Strategic Plan* (2014–2020), an agricultural sector development plan, in which domestic rice production is promoted as a priority issue, with the aim of improving food self-sufficiency.

Based on the above, food production and the improvement of the food self-sufficiency rate were considered important before this project began, as well as at the time of the ex-post evaluation. Therefore, this project is consistent with the policy.

[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 Timor-Leste

Prior to the start of this project, Timor-Leste's agriculture was characterized by extensive farming and low productivity. In order to realize food security and economic development in the country, it was necessary to expand rice production. The Buluto irrigation area was one of nine priority irrigation areas identified by the government in association with measures to expand rice production. It was close to the national highway connecting the capital, Dili and the second city of Baucau, and had potential in terms of market access or sales channels. The farmers' motivation to produce was also higher than in other irrigation areas, but the area where rice could be cultivated was limited, due to the unstable water intake, caused by traditional irrigation methods. Productivity was as low as 2.0 tons/ha in the rainy season and 1.8 tons/ha in the dry season. Thus, improving productivity was an urgent issue.

At the time of the ex-post evaluation, the government of Timor-Leste is implementing 8 small and medium-sized irrigation programs and 2 larger irrigation programs; the budget for the development and restoration of irrigation facilities is under consideration (as of the first half of 2021). While the Ministry of Agriculture and Fisheries aims to increase the food self-sufficiency rate to 70% by 2023, the food self-sufficiency rate is as low as approximately 20%[6] at the time of the ex-post evaluation. The government is continuing its investment in the agricultural sector, such as the development of irrigation facilities, with the aim of improving rice productivity and the food self-sufficiency rate. However, as will be explained under 3.3.2.1 Intended Impacts (Table 4), the country's rice harvest area and production have not increased steadily over the last six or seven years. According to DINIGUA, farmers have not necessarily generated much cash income from rice production, as it is not highly profitable, which tends to reduce their willingness to farm. DINIGUA suggests that, in order to resolve this situation, there is an urgent need to increase rice productivity by improving farming techniques and the management of irrigation facilities, and to support farmers' livelihoods by increasing the profitability of rice. Therefore, it can be stated that the need to improve agricultural productivity and support farmers' livelihoods in the area remains high at the time of the ex-post evaluation.

Based on the above, emphasis had been placed on investment in the agricultural sector, the improvement of agricultural productivity and supporting farmers' livelihoods before this project began, as well as at the time of the ex-post evaluation. Therefore, it can be said that this project is

[6] The source is DINIGUA (2021 data). According to DINIGUA, this is a preliminary figure for the first half of 2021 (rainy season: January to June) and does not include the second half of the year (dry season: July to October, rainy season: November to December). Although the figure is expected to increase when the latter period is included, it is estimated to be around 30% at most.

consistent with the development needs.

3.1.3 Consistency with Japan's ODA Policy

Prior to the start of this project, Japan focused on the following four areas in its cooperation with Timor-Leste: 1) human resource development, improvement of administrative capacity for democratic governance, 2) development of economic and social infrastructures and improvement of maintenance capabilities, 3) improvement of agricultural productivity and market access, 4) improvement of security and law enforcement capabilities.

Considering that this project was designed to contribute to the improvement in agricultural productivity by developing irrigation facilities in Timor-Leste, it can be said that this project is consistent with the aforementioned "3) improvement of agricultural productivity and market access" and thus with Japan's assistance policy.

This project has been highly relevant to Timor-Leste'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

Table 1 shows the output plan and the actual results of this project.

Table 1: Output Plan and Actual Results of This Project

At the Time of the Plan (2013)	Actual (2020)
[Planned Inputs from the Japanese Side] 1) Civil work and equipment procurement: intake facilities (fixed weir 200 m, scouring sluice, sand basins, headrace, revetment, dike, gate control room, materials and equipment warehouse), irrigation canals (main canal: 12.3 km, secondary canals: 15.4 km), drainage channel (4.6 km), riverbank protection, water users' association's meeting house, ground leveling for the demonstration farm, etc. 2) Consulting service / soft component: establishment of water users' association, guidance on water management technology, technical guidance on operation and maintenance of the irrigation facilities	[Actual Inputs from the Japanese Side] 1) Civil work and equipment procurement: intake facilities (fixed type weir 200 m, scouring sluice, sand basins, headrace, revetment, dike, gate control room, materials and equipment warehouse), irrigation canals (main canal: 12.015 km, secondary canals: 15.521 km), drainage channel (4.67 km), riverbank protection, water users' association's meeting house, ground leveling for the demonstration farm, etc.: Implemented almost as planned 2) Consulting service / soft component: Implemented almost as planned

[Planned Inputs from the Timor-Leste Side]	[Actual Inputs from the Timor-Leste Side]
1) Securing land for construction 2) Provision of space for construction, provision of leased land free of charge for the construction work 3) Repairing access roads to the construction sites and informing surrounding residents of the use of the existing roads 4) Obtaining permissions to cut down trees and collect sand and stones from the river, and processing the disclaimer on mining rights (royalty) 5) Informing the relevant parties through public briefings and other methods, if the irrigation water supply is interrupted during construction and ensuring there is a consensus 6) Completing the extension of the electricity feeding cable to the site management office, prior to the initiation of the construction work 7) Obtaining construction permits from the relevant agencies	Implemented almost as planned

Source: Documents provided by JICA, answers to the questionnaire

In this project the outputs were implemented mostly as planned[7]. The differences between the plan and the actual outputs are as follows. With respect to the outputs from the Japanese side, 1) construction-wise, the location of the main canal was changed after construction started, based on the request of a landowner. As a result, the length of the canal was reduced (by approximately 300 m). The length of the secondary canals increased, due to a location change following negotiations and an adjustment with a land provider after the start of the construction (approximately 100 m increase). A meeting house for the water users' association was originally planned to be constructed in the Laleia area, located within the Buluto irrigation area. However, one landowner refused to provide his land, which affected the site of the meeting house and an associated access road[8]. The actual outputs by Timor-Leste were also implemented mostly as planned.

[7] As supplementary information, JICA repaired revetment retaining walls, installed floor protection works and repaired waterways, etc. at the time of ex-post evaluation, as a follow-up to this project.

[8] Instead, the meeting house was constructed in Vemasse area. The situation related to land acquisition will be explained under 2) Resettlement and Land Acquisition in 3.3.2.2 Other Positive and Negative Impacts.

Photo 1: Irrigation facility developed by this project (Main canal) (1)

Photo 2: Irrigation facility developed by this project (Main canal) (2)

Photo 3: Irrigation facility developed by this project (Weir)

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost was planned to be 1,788 million yen (of which 1,499 million yen was intended to come from the Japanese side and approximately 289 million yen from the Timor-Leste side). Although the total amount spent on the project is unknown, as details on the actual amount

contributed by the Timor-Leste side were not recorded, the Japanese side's actual contribution was approximately 1,385 million yen. As discussed above, the planned outputs of the Timor-Leste side were mostly implemented as per the initial plan, and the planned amount (approximately 289 million yen) was approximately 16% of the total project cost, which is insignificant. Thus, it was assumed that the missing data would not affect the comparison of the planned and actual project costs, and hence, the project cost efficiency analysis was made, based on the comparison of the planned and actual amounts of the Japanese side. The project cost was planned to be 1,499 million yen, while in reality, the actual project cost was 1,385 million yen, which was within the planned amount (approximately 92% of the planned amount). The main reason for the difference between the planned and actual amounts was the efficient bidding for the construction works.

3.2.2.2 Project Period

This project was planned to be implemented from December 2013 to February 2016 (27 months). In reality the project was implemented from December 2013 to December 2016 (37 months), which was slightly longer than planned (approximately 137% of the plan). The main reasons for the delay are as follows: (1) a law within Timor-Leste changed after the start of the construction work, and it took time for construction workers from other countries (mainly Indonesians) to obtain business visas (approximately three weeks); (2) difficulty in land acquisition led to the interruption of the building construction (temporary suspension of approximately four months); (3) the process of custom clearance for the materials and equipment required time (approximately two months); (4) regarding the production of aggregates for concrete, although a night-time operation of the plant was under consideration, the government of Timor-Leste advised against late night operations. Therefore, the aggregate production could not catch up with the concrete production (delay of approximately one month). These issues ultimately affected the construction period, causing the delay. As a result, the grant agreement (G/A) was extended until December 2015.

As discussed above, the outputs of this project were mostly as planned. Although the project cost was within the plan, the project period exceeded the plan. Therefore, the efficiency of the project is fair.

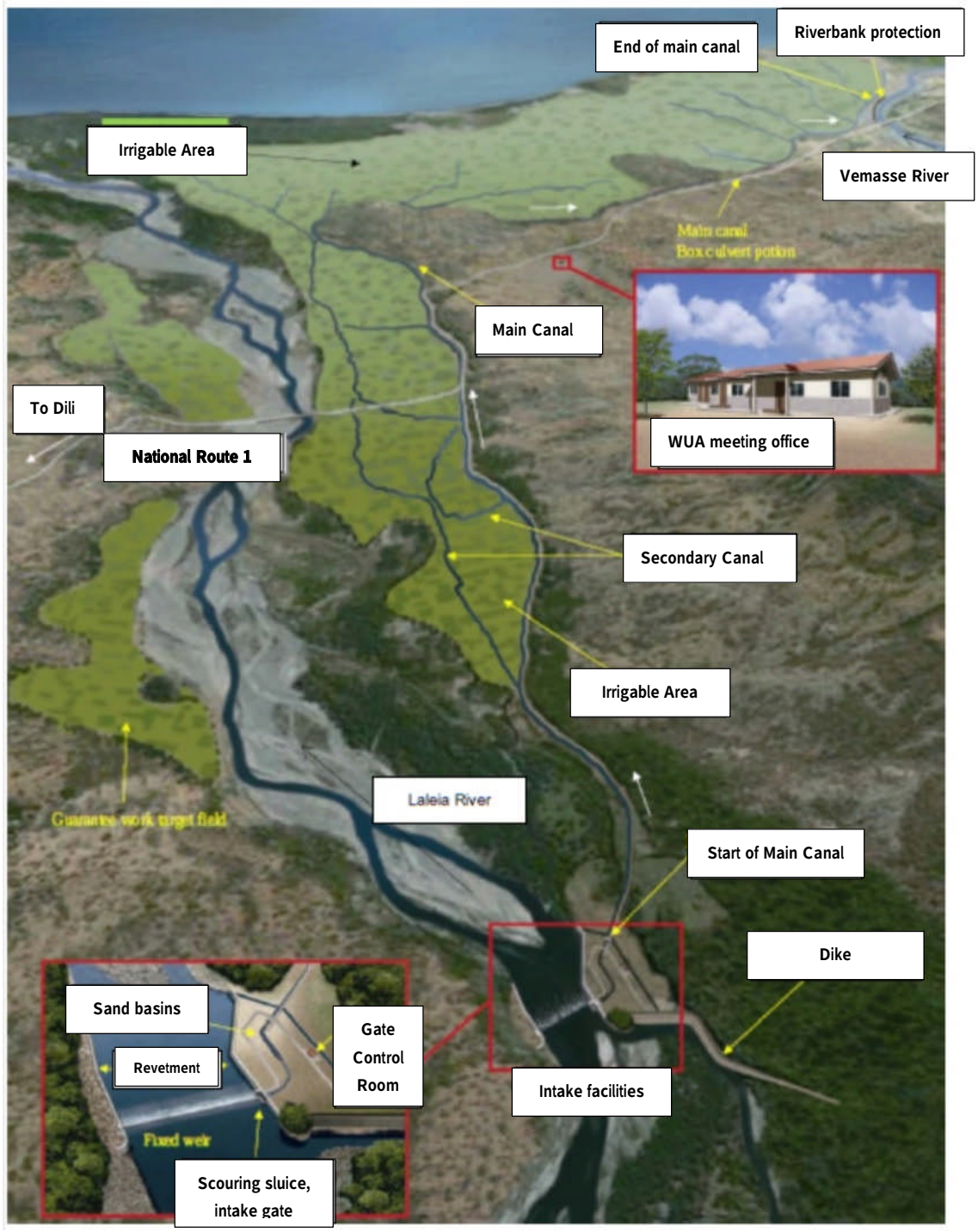


Figure 1: Locations of the project sites (Buluto irrigation area)[9]

[9] Quoted from JICA document (Preparatory Survey Report)

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

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

Table 2 shows the quantitative effect indicators (baseline, target, actual) related to the Buluto irrigation area.

Table 2: Quantitative Effect Indicators of This Project (Baseline, Target, Actual)

Indicator	Baseline (2012)	Target (2019) 3 Years After Completion	Actual		
			2018	2019	2020 3 Years After Completion
1) Yield of rice	1.87 ton/ha	2.50 ton/ha	2.50 ton/ha	2.50 ton/ha	3.3 ton/ha
2) Planted area of rice *Note 1	473 ha (rainy season), 61 ha (dry season) *Note 2	540 ha (rainy season), 270 ha (dry season)	531.6 ha (rainy season), 0.5 ha (dry season)	426.4 ha (rainy season), 10.5 ha (dry season)	770 ha (rainy season), 33 ha (dry season)
3) Irrigable area *Note 1	331 ha (rainy season), 61 ha (dry season)	540 ha (rainy season), 270 ha (dry season)	531.6 ha (rainy season), 0.5 ha (dry season)	426.4 ha (rainy season), 10.5 ha (dry season)	780 ha (rainy season), 100 ha (dry season)

Source: Document provided by JICA (baseline, target), answers to the questionnaire and responses of JICA's long-term experts (actual)

*Note 1: The planted area refers to the area where the crop is actually planted. The irrigable area refers to the area where irrigation is possible, by distributing water to agricultural land via the stable intake at the weir and the water intake gate of the Laleia River, the water source. No crop other than rice is produced in the Buluto irrigation area.

*Note 2: The rainy season is typically November–June and the dry season is July–October in Timor-Leste.

By developing and repairing the irrigation facilities in the Buluto irrigation area, this project planned to increase the following: 1) yield of rice, 2) planted area of rice, 3) irrigable area. At the time of planning, the target to be achieved was set at three years after completion, which is 2020. Therefore, the target values will be compared with the actual data of 2020 in principle, in order to make a judgement on quantitative effects.

1) The actual yield of rice exceeded the target. One reason is that the irrigation facilities were developed through this project, as a result of which use of irrigation water by farmers increased in the Buluto irrigation area. Another reason is that the damaging impact of drought was reduced during the harvest season as a result of the development of the irrigation facilities. In addition, it was confirmed via the questionnaire and interviews with DINIGUA that, under the guidance of

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

JICA's "Project for Increasing Farmers Households' Income through Strengthening Domestic Rice Production" (hereinafter referred to as "JICA's technical cooperation project"), cultivation techniques have been improved, including weeding management, nursery improvement, transplantation improvement, fertilization and timely cutting, which is another factor affecting the increase in yield. According to DINIGUA, the national yield in 2019 ranged from 2.5 to 4.0 ton/ha, and the Buluto irrigation area is an irrigated area with an increasing trend (3.3 ton/ha in 2020).

2) The planted area refers to the area where the crop is actually planted. 3) The irrigable area refers to the area where irrigation is possible, by distributing water to agricultural land via the stable intake at the weir and the water intake gate of the Laleia River, the water source within the Buluto irrigation area. The planted area and the irrigable area exceed the targets during the rainy season (usually from November to June). According to DINIGUA, one of the factors is that the development of the irrigation facilities has progressed in this area[11]. On the other hand, the actual results have not reached the targets during the dry season (usually from July to October). Timor-Leste is an island country, and small rivers flow north and south through the land. Water sources mainly depend on rainwater that accumulates in the mountainous areas during the rainy season. In the dry season, many rivers are dry, as is the Laleia. The reason why the targets have not been reached is due to water shortages. In the last year or two, there was less water than initially expected. According to DINIGUA, "the planted area and irrigable area in the dry season are increasing, although they are not as originally expected. In addition to this project, there is support such as development of a farmers' market with the support of JICA's technical cooperation project, and the local farmers' interest in and motivation for rice production are increasing more than before. However, it is not easy to address the water problem during the dry season." On the other hand, the project expert commented, "Irrigation water is not available in some parts of the Buluto irrigation area. In the past, water was taken directly from the Laleia River for each branch of the irrigation canal, and water was abundant. With the irrigation facilities, only the required volume of water based on the calculation is distributed. In some areas, farmers who cultivate upstream of the secondary canal are better off, while those who cultivate downstream do not get water[12]. That can be one of the reasons why the planted area has not increased as much. Apart from that, to increase the planted area, improvements in farming activities, such as improving cultivation

[11] The actual values did not increase much until 2019, as the years prior to this were inferred to be the period required for the effects of the irrigation facility development to become evident (build-up period).
[12] This occurs mostly in the dry season.

history[13], can be considered[14].” While there is an issue of water shortages in the dry season, to improve the situation, a systematic flow management and review as needed and continue technical support so a designated irrigation period is followed are believed to be significant.

Subsequently, for reference, Table 3 shows the agricultural production volume (actual value) of the Buluto irrigation area over the last three years. Both the agricultural production volume and the collection rate of water usage fees have increased significantly in 2020, the third year after the project’s completion. 1) The agricultural production volume (ton) is calculated by “multiplying the yield by the planted area” shown in Table 2. The production in 2020 greatly increased from the previous year, based upon which it may be claimed that rice production has increased.

(Reference) Table 3: Agricultural Production Volume (Actual) in Buluto Irrigation Area

(Unit: ton)

2018	2019	2020 3 Years After Completion
1,331	1,092	2,650

Source: Answers to the questionnaire, responses from DINIGUA and long-term experts of JICA’s technical cooperation project. The agricultural production (ton) was calculated by the external evaluator, based on the yield per ha, multiplied by the planted area from Table 2.

3.3.1.2 Qualitative Effects (Other Effects)

In this evaluation study, we conducted an interview survey[15] with staff from the DINIGUA Headquarters, the agricultural offices of the Manatuto and Baucau districts and the water users’ association. The answers were as follows:

A representative from the DINIGUA Headquarters commented on the interviews, “because the development of infrastructure facilities, such as irrigation canals, weirs and intake weirs in this project are visible and a stable supply of agricultural water is expected, farmers in the Buluto irrigation area are more motivated to produce rice than previously. They are also expecting the sales of rice to increase at the markets.” “Due to the improvement of the main canal as a result of

[13] The growth of rice and the cultivation method are recorded over time. Agricultural activity fact data (practice record data).

[14] It was pointed out that planting may increase by properly managing and adhering to the irrigation period and the ripening days of the recommended varieties.

[15] A total of seven people were selected, who could judge the situation before and after the project. The questions were as follows, “Do you think agricultural production volume and income are improving? Do you feel that your standard of living has increased?” “Is there enough water in the dry season? Did that help you secure sufficient yield?” “Is the sales channel expanding for agricultural products?” “To what extent have labor efficiency and agricultural productivity improved as a result of the concrete lining of main canal?” “Did the development of maintenance road of this project make it easier for agricultural machinery and vehicles to pass through?” “How much progress has been made in improving labor efficiency and agricultural productivity through the development of management roads?” “Are there any secondary impacts (e.g., leisure, schooling opportunities)?” “Is there any change in your motivation to engage in agriculture due to this project and why?”

this project, there is less retention of water flow, which has reduced the labor required for soil canal repairs." "Maintenance roads along the irrigation canals facilitate the transportation of agricultural machinery and vehicles and are contributing to the increase in efficiency of rice production." In addition, the staff of the agricultural offices of the Manatuto and Baucau districts, who are responsible for the maintenance of the irrigation facilities, as well as the water users' association staff, who are closer to the farmers and are responsible for the cleaning and small-scale repairs of the irrigation facilities, commented on the interviews: "This project has greatly benefited the entire irrigation area. Rice productivity is improving." "Before the start of this project, rice was cultivated by traditional methods and productivity was low, but after the completion of this project, water from the Laleia River is taken in from the intake facility and water is systematically distributed to each irrigation area. Farming has become efficient." "Farmers usually earn 0.4 USD per kg of rice (cash income). However, recently, due to the influence of COVID-19, a shortage of imported rice is expected, so some farmers decided not to sell rice for a while, either for self-consumption or in anticipation that prices may increase." On the other hand, there were also comments such as: "During the dry season, the volume of water intake becomes less and we get little water from the developed irrigation canal, which greatly limits the area where we can plant." "Water is not distributed to areas far from the irrigation canal (e.g., the Garemarak area)."

Based on the above, it is presumed that this project has contributed to the increase in motivation for rice production, an increase in rice production volume, the reduction of labor required for the irrigation canal maintenance, improvement of rice production efficiency by developing the maintenance roads, and particularly the increase of farmers' willingness to produce rice in the dry season. However, apart from the fact that water was not distributed from the irrigation canal during the dry season due to the water usage problems among local farmers, it was also found that water was not distributed as planned[16] in some areas. As previously mentioned, it can be said that a systematic management and review of the upstream and downstream flows in the entire irrigation area is an issue.

[16] It has also been reported that there are cases of illegal water intake from some areas that do not belong to the designated irrigation area. At the time of the ex-post evaluation, all of these issues are being addressed by JICA's technical cooperation project.

Photo 4: Buluto irrigation area (Dry season)

3.3.2 Impacts

3.3.2.1 Intended Impacts

(Contribution to Improving Food Self-Sufficiency in Timor-Leste)

At the time of planning, the "contribution to improving the food self-sufficiency rate in Timor-Leste" was considered as an impact of this project. Regarding this point, as shown in Table 4, this evaluation study obtained agricultural statistical data, upon which the observations of rice production and food self-sufficiency after the start of this project are based; the way in which these are related to this project is described below.

Table 4: Changes in Rice Harvest Area, Unit Yield, Domestic Production and Imported Rice After the Start of This Project[17]

Indicator	2014	2015	2016	2017	2018	2019 2 Years After Completion
(1) Harvest Area (unit: ha)	28,483	18,281	10,745	11,861	18,047	22,328
(2) Unit Yield (unit: ton/ha)	3.12	3.30	3.34	3.12	3.37	3.57
(3) Domestic Production (unit: ton)	88,822	60,361	35,361	36,982	57,418	79,703
(4) Imported rice (unit: ton)	222,274	300,000	115,786	143,344	135,847	81,049
(5) Domestic Supply (3) + (4) (unit: ton)	311,096	360,361	151,147	180,326	193,265	160,752

Source: Data of the National Directorate of Agriculture and Horticulture, Ministry of Agriculture and Fishery of Timor-Leste (Global Trade Atlas, Aportil, IP.)
Remark: 2020 data could not be obtained.

[17] 2020 data could not be obtained.

Before the start of this project (2013), the need to increase rice production in order to realize food security and economic development was recognized in Timor-Leste. Under such circumstances, it was expected that this project would contribute to improving the farming environment of farmers, increasing the rice harvest and eventually strengthening the food self-sufficiency system of the country as a whole. Regarding the trend of data shown in Table 4, no specific factor analysis has been conducted in the country. However, through the communication with the representative in charge of DINIGUA and the long-term experts of JICA's technical cooperation project, the following was confirmed. Before and after the start of this project, the international price of rice started decreasing which, in turn, increased the volume of cheap imported rice in the country. As a result, the rice farmers' motivation to produce started to decline. This trend continued until the period 2014–2015. In 2016, although the amount of imported rice decreased as a result of a surplus supply of rice accumulated through the previous year, the harvest area and domestic production did not increase to a great extent, as the farmers' motivation to produce remained low. Since 2017, there has been a reaction. Although the following cannot be deemed to be solid facts, the information obtained was confirmed via the interviews: stable production mainly during the rainy season has become possible, as irrigation facilities are developed throughout the country; planting has increased due to the increase in rice farmers' interests in learning cultivation techniques; there is a trend to use fertilizer for paddy rice which used to be grown without fertilization, leading to an increase in yield. It is thought that the (1) harvest area and the (3) domestic production in Table 4 are gradually increasing for these reasons. As shown in Table 3 above, the production volume of the Buluto irrigation area is 1,052 ton, which is a small proportion of the domestic production (total) of 79,703 ton. Considering this, its contribution is not large. However, through the development of irrigation facilities as a result of this project, the production volume in the area is on the rise after 2020. In addition, an increase in unit yield is expected due to the synergistic effect with JICA's technical cooperation project[18]. An increase in rice production within the Buluto irrigation area is expected to play a role in the country's rice production system as a whole and is thought to contribute to improving the rice self-sufficiency rate in the future.

[18] Various activities are being carried out to improve the rice value chain process (capacity building), and it has been concluded that the degree of correlation and collaboration with this project is high. In November 2020, a discussion was held between JICA and Timor-Leste, and yield in this area was targeted to reach 4.5 ton/ha through this project by 2023 (reference: 3.3 ton/ha in 2020). Expectations for improving rice productivity are thought to increase in the future, which will lead to a stable supply of rice and an improvement in the food self-sufficiency rate.

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Natural Environment

According to the *Japan International Cooperation Agency Guidelines for Environmental and Social Considerations* (promulgated in April 2010), this project was classified as Category B, as the undesired impact on the environment would not be significant. In addition, under the domestic law of Timor-Leste, the initial environmental survey was prepared by DINIGUA and approved by the Ministry of Commerce, Industry and Environment in October 2013.

It was confirmed by the questionnaire and interviews that there were no negative impacts on the natural environment (e.g., air pollution, vibration, noise, ecosystem, etc.) around the developed irrigation facilities during and after the project was completed. The impact on the natural environment around the irrigation facilities was visually checked in this evaluation study, and no particular problems were found.

The environmental division within the Ministry of Economy of Timor-Leste is responsible for the environmental monitoring of infrastructure facilities, including the ones developed in this project. To date, no monitoring activities or measures have been implemented in particular, as no major negative impact on the environment has occurred. Should any negative environmental impact be observed in or around the Buluto irrigation area, resulting from the developed irrigation facilities, a system is in place to deal with the issue, based on consultation with the relevant parties, including the environmental division.

2) Resettlement and Land Acquisition

It was confirmed that no involuntary resettlement occurred concerning this project. As land acquisition was required for the water intake facility and the widening/expansion of part of the main and secondary canals (approximately 19 ha), with the consent of the landowners (around 320 people), land acquisition was conducted, based on voluntary provision.

Usually, when land is acquired for public infrastructure projects, it will follow the *Japan International Cooperation Agency Guidelines for Environmental and Social Considerations* and the domestic law of the recipient country, according to which compensation is paid. However, in Timor-Leste, it was difficult to identify accurate land information, as land registries and cadastral maps were lost during the independence conflict around the year 2000. In addition, customary land users are, in fact, recognized by the local community especially in rural areas. Furthermore, regarding land acquisition related to the implementation of public work projects with a relatively minor impact, the government or the project-implementing body typically enters into a discussion

with the residents to donate the land in accordance with the rules of the local community. Given this custom, the project considered a process in which the Timor-Leste side, i.e., the project-implementing body, explained to the relevant people about providing the land voluntarily, based on the discussions and rules of the local community. According to the World Bank, the voluntary provision of land constitutes a transfer without exercising any power such as land acquisition rights. As a general rule, this would only apply if it involved the "right to choose[19]" and "informed consent" at the stage when the planned project implementation site is not clear. In this project, several public hearings were held between the Timor-Leste side and local residents regarding the "right to choose" at the time of planning. As a result, agreements were reached on a partial provision of the agricultural land. At that time, one landowner refused to provide the land, and part of the plan was altered. This indicates that the "right to choose" was granted to the people affected by the implementation of this project. In addition, informed consent was implemented without major deviation from the standards set in the World Bank's sourcebook. Furthermore, there was an understanding on the part of the landowners that rice productivity would increase from the development of irrigation facilities and rice production would increase due to the increase in the planted area, which would greatly exceed the decrease in production due to the reduction of land (agricultural land). This promoted the affected population's understanding of the project. As a result, land was voluntarily provided by the landowners, and no monetary compensation was provided by the project implementer[20]. From that point of view, this process cannot be recognized as land acquisition in a strict sense, according to DINIGUA.

There had been no complaints regarding land acquisition until the time of the ex-post evaluation. In addition, as previously discussed, one landowner refused to provide his land, and as a result, the meeting house of the water users' association and its access road, which had been planned to be developed in Laleia within the Buluto irrigation area, were affected. Alternatively, they were constructed in the sub-district of Vemasse.

[Summary of Effectiveness and Impact]

1) The rice yield, an effectiveness/quantitative effect indicator, exceeded the target. Regarding the 2) planted area of rice and the 3) irrigable area, the actual values exceeded the targets in the rainy season but were below the targets in the dry season; the total values of the rainy season and

[19] This means that the person has an opinion for or against the land acquisition, without being pressured by the state or government.
[20] This means that they did not need to handle the matter according to the compensation payment rule, based on national law.

the dry season were generally close to the target. It was observed from the interviews with DINIGUA that this project is positively impacting the farmers' motivation for rice production, the increase in production volume and the reduction in labor required to maintain the irrigation canals, thereby contributing to the efficiency of rice production. In addition, from the interviews with representatives from the agricultural offices of the Manatuto and Baucau districts, responsible for the maintenance of irrigation facilities, and the water users' association staff, who are closer to the farmers and are in charge of cleaning and small-scale repairs of the irrigation facilities, it was observed that this project is contributing to the motivation for rice production. An increase in production volume, the reduction of labor required for irrigation canal maintenance and the improvement of rice production efficiency by developing the maintenance roads were also observed by the interviews. Regarding the project's impact, while it cannot be concluded that the role of this project is extensive in terms of increasing the country's domestic supply of rice and improving the food self-sufficiency rate in Timor-Leste as a whole, it can be said that this project plays a role in the rice production system of the country. In addition, with JICA's technical cooperation project, the aim of which is to improve rice productivity and farmers' livelihoods, synergistic effects are expected in the future. Considering the above, effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ②)

3.4.1 Institutional/Organizational Aspect of Operation and Maintenance

The executing agency of this project is DINIGUA, a department within the Ministry of Agriculture and Fisheries. While DINIGUA is responsible for the overall management of this project, the agricultural offices of the Manatuto and Baucau districts, namely, the local branches of the ministry, are responsible for the operation and maintenance of the developed irrigation facilities[21]. Taking the command system from DINIGUA to local and field levels as an example, DINIGUA gives instructions to the regional agricultural office (local organization of the Ministry of Agriculture and Fisheries) that cover the two districts. The regional agricultural office then coordinates with the district agricultural offices. The roles of the regional agricultural office are: 1) coordination, 2) supervision, 3) evaluation and 4) reporting to the central headquarters (DINIGUA). The regional agricultural office supervises the operation and maintenance at site level, while the district agricultural offices are responsible for the actual operation and

[21] Decentralization progressed in Timor-Leste after the start of this project and since FY2017, both district agricultural offices have been organized into sub-organizations at district level.

maintenance of the irrigation facilities, including the intakes and the main canal. It was confirmed via the questionnaire and interviews that the two district agricultural offices and the regional agricultural offices have mutually cooperative relationships under DINIGUA's management. In addition, the water users' association, which has been established with the support of this project, is responsible for the maintenance of secondary and tertiary canals[22]. Farmers who belong to the water users' association conduct sand removal, cleaning such as weeding and small-scale repairs of secondary and tertiary canals.

There are seven staff at the aforementioned regional agricultural office, 118 at the Manatuto district agricultural office (among whom are two gatekeepers, who manage the water gates and covers the Buluto irrigation area), 105 at Baucau district agricultural office (among whom are two gatekeepers with similar responsibilities) and eight at the water users' association within the Buluto irrigation area. When we interviewed each organization, comments such as, "we are allocating the appropriate number of on-site staff as required" were received. Therefore, it is believed that there is no shortage of staff.

Based on the above, it was concluded that there are no particular problems with the institutional/organizational aspect of the operation and maintenance of this project.

3.4.2 Technical Aspect of Operation and Maintenance

At the time of the ex-post evaluation, the agricultural offices of the Manatuto and Baucau districts and the water users' association have staff with abundant work experience. On the other hand, DINIGUA points out the need to improve knowledge by attending regular training. In this project, training, as part of its soft component, was provided to DINIGUA, to the gatekeepers of the district agricultural offices and to people associated with the water users' association, based on three concepts: support for the establishment of the water users' association, the operation and maintenance of irrigation facilities and guidance on water management[23]. When the training was conducted, for example, a questionnaire was distributed and participants were asked to submit their answers at the end of the gate maintenance operation training for the weirs and main canal, so as to enhance participants' understanding regarding the functions and operation methods of

[22] At the time of the ex-post evaluation, the head of the water users' association is from the Manatuto district (Laleia sub-district) and the deputy is from the Baucau district (Vemasse sub-district), indicating the intent to prevent bias.
[23] This was approximately one year from 2015 to 2016. The training was conducted because the water users' association needed to play a role in the operation and maintenance work after the facility was completed, thus it was also necessary to strengthen its organizational management capabilities. In addition, it was important to provide technical guidance on the operation of the irrigation facilities to be developed and to prepare water management guidelines, in order to ensure appropriate operation and maintenance.

each facility. The participants, who had no prior basic knowledge, deepened their knowledge by receiving the training for the first time.

Specific “On the job training (OJT)” has not been conducted so far, however, according to DINIGUA, training and workshops have been held as required since 2016, with the support of the aforementioned JICA’s technical cooperation project, and the staff of each organization involved in this project, including the water users’ association, are maintaining their technical level.

The aforementioned gatekeepers are utilizing manuals for the operation of the main facilities around the weir, such as the intake and scouring sluice, and the main canal’s diversion facilities as required.

Based on the above, it was concluded that there are no particular problems with the technical aspect of the operation and maintenance of this project.

3.4.3 Financial Aspect of Operation and Maintenance

Although DINIGUA submitted budget requests to the central government for the maintenance of the developed irrigation facilities, there has been no allocation of funds since 2015[24]. For this reason, in the Buluto irrigation district, regular repairs, repairs relating to damages and large-scale repairs have not been carried out in relation to the weirs, intakes, sand basins and main canal; the maintenance has been limited to small-scale repairs and cleaning. Under such circumstances, the agricultural offices of the Manatuto and Baucau districts are striving to handle the budget shortage situation by trying to maintain irrigation facilities with their own heavy machinery[25], so as to ensure ease of water use during the cultivation season. DINIGUA has indicated that a high-level policy decision will determine whether or not the central government can provide a budget. The salaries of maintenance staff and the costs of owning heavy machinery are provided by the agricultural offices of both districts, and the water users’ association uses the collected irrigation water fees[26] for cleaning and for small-scale repairs of the irrigation facilities. Nevertheless, it is a concern that the government has not allocated any budget for periodic and large-scale repairs (e.g., repairs required in the event of damage). (The irrigation water fee collection rate will be

[24] The operation and maintenance budget which was requested recently for 2020 was not approved. According to DINIGUA, not only the facilities covered by this project but also irrigation facilities in other areas (state-owned irrigation projects) are facing the same issue.
[25] The salaries of the maintenance staff (four gatekeepers in total) are also paid by the agricultural offices of both districts.
[26] According to DINIGUA, the collected irrigation water fees for the latest year, 2020, equated to approximately 1,056 USD (in reality, 12 barrels of harvested rice were given to the water users’ association by 220 farmers).

explained below.) The financial resources of the central government are by no means abundant, and from these limited financial resources, budgets are allocated to each ministry/agency. With the limited funds, each ministry/agency budgets for its operation and infrastructure development. This is likely to be the reason why DINIGUA is not allocated a sufficient budget for the maintenance of the irrigation facilities.

Based on the above, it has been concluded that there are concerns regarding the financial aspect of the operation and maintenance of this project.

For reference, Table 5 shows the water users' fee collection rates (actual) within the Buluto irrigation area over the last three years. Until 2019, irrigation water fees were not collected due to the time spent on the voluntary enactment of the irrigation association rules. The water users' association was organized at the end of 2019, and in 2020, full-scale activities began with the support and guidance of JICA's technical cooperation project. Through the support of this project, a traditional irrigation manager, by the name of Kabwee, has been given responsibility for collecting irrigation water fees, which has helped achieve high collection rates[27]. It also helped that local government offices had issued documents to farmers concerning the payment of irrigation water fees. According to DINIGUA, "local farmers are more motivated to cultivate and have a better understanding of the irrigation project. It is expected that the payment of irrigation water fees will continue in the future." Since the collected irrigation water fees are used for maintenance, such as cleaning and the repair of irrigation canals, the awareness of voluntary management on the part of the water users' association is expected to improve.

(Reference) Table 5: Irrigation Water Fee Collection Rate in the Buluto Irrigation Area (Actual)

2018	2019	2020 3 Years After Project Completion
0%	0%	81.6%

Source: Answers to the questionnaire, responses of DINIGUA and long-term experts within JICA's technical cooperation project

3.4.4 Status of Operation and Maintenance

The operation and maintenance of the irrigation facilities in the Buluto irrigation area is routinely handled by the gatekeepers, dispatched from the agricultural offices of the Manatuto and Baucau districts. Specifically, the district agricultural offices are in a position to supervise the

[27] However, the irrigation water fee is only collected in the rainy season.

weirs, intakes, sand basins, main canals, etc., and the gatekeepers operate and maintain the irrigation facilities at the request of the water users' association and the local farmers. The water users' association staff and the member farmers are engaged in cleaning (sand removal, weeding, etc.) and small-scale repairs[28].

Regarding spare parts for the irrigation facilities, the sites are provided with some spare parts, even though the expenses from DINIGUA is small every year. However, as mentioned above, no budget has been allocated in recent years, and it cannot be said that the budget has been sufficiently secured. Spare parts are imported from neighboring Indonesia[29].

Based on the above, some minor problems have been observed in terms of the financial aspect. Therefore, sustainability of the project effects is fair.

Photo 5: Water Users' Association (WUA) meeting house developed by this project

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed to increase rice production through stable supply of agricultural water, by constructing modern intake facilities and irrigation canals, etc. in the Buluto irrigation area where traditional irrigation methods had been used, thereby improving the food self-sufficiency rate of Timor-Leste. The *National Priority Program* and the *Ministry of Agriculture and Fisheries Strategic Plan*, formulated by the government of Timor-Leste advocate improving rice productivity and food self-sufficiency, and there is a need to improve agricultural productivity

[28] As a follow-up to this project, JICA repaired revetment retaining walls, installed floor protection works and repaired waterways, etc. at the time of ex-post evaluation.
[29] DINIGUA states that it is desirable to import and procure large-scale parts related to intake weirs and intake gates from Japan, from the viewpoint of ensuring quality.

and support farmers' livelihoods in rural areas nationwide, including the Buluto irrigation area. As it is also consistent with Japan's ODA policy, relevance of this project is high. With regard to efficiency, the outputs were almost as planned, and the project cost was within the plan. However, the project period slightly exceeded the plan, mainly because it took time to acquire land around the project site and to process tax exemptions when clearing materials and equipment through customs; thus, efficiency is fair. Regarding effectiveness/quantitative effect indicators, 1) the yield of rice exceeded the target. While the actual 2) planted area and 3) irrigable area exceeded the targets in the rainy season, they did not reach the targets in the dry season. The total values for the rainy and dry seasons combined, were generally close to the targets. In addition, it was confirmed through interviews that this project contributed to the motivation of farmers to produce rice, an increase in production and a reduction in labor required for the maintenance of irrigation canals. Furthermore, synergistic effects with JICA's technical cooperation project, aimed at improving rice productivity and farmers' livelihoods can be expected in the future. Therefore, the effectiveness/impact is high. As for sustainability, there are no particular concerns regarding the institutional/organizational or technical aspects of the executing agency of this project, DINIGUA, or the water users' association. While there are no particular problems with the operation and maintenance status of the developed irrigation facilities, a budget has not been allocated in recent years for the regular repairs, repairs relating to damages or large-scale repairs of intake weirs, intake gates, sand basins and waterways, which needs to be addressed. Therefore, the sustainability of the effects generated by this project is fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

- Regarding the planted area and irrigable area, which are quantitative effect indicators, the actual values in the dry season have not reached the set targets. Since 2016, through JICA's technical cooperation project, activities such as weeding management, nursery improvement, transplantation improvement, fertilization and timely harvesting have been taking place for the purpose of improving the cultivation techniques of the farmers in the Buluto irrigation area. On the other hand, one significant factor is the water shortage in the Laleia River, as this is the source of water intake in the area. Irrigation water is not available in certain parts of the area. In some cases, farmers upstream of the secondary canal benefit from the irrigation, however, the water does not reach the farmers downstream. For this reason, it is desirable to carry out systematic

management and a review of the upstream and downstream flows across the entire irrigation area as required.

- Although DINIGUA submitted budget requests to the central government for the maintenance of the developed irrigation facilities (mainly intake weirs, intake gates, sand basins and main canals), there has been no allocation in recent years. The agricultural offices of the Manatuto and Baucau districts use their own heavy machinery to carry out maintenance, while the water users' association and its member farmers are conducting the cleaning and the small-scale repairs. Nevertheless, it is concerning the government does not allocate any budget for regular repairs and large-scale repairs (e.g., repairs needed in case of damage), which can hinder future maintenance. On the other hand, the financial resources of the central government are by no means abundant, and from these limited financial resources, budgets are allocated to each ministry/agency. With the limited funds, each ministry/agency budgets for its operation and infrastructure development. This is likely to be the reason why DINIGUA has not been allocated a sufficient budget for the maintenance of the irrigation facilities they manage. When preparing budgets, it is recommended that the government duly considers the importance of the agricultural sector and irrigation projects, recognizes the feasibility of securing a system for food security and organizes and allocates a budget to the agricultural sector.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

<u>Importance of Steady Allocation of Operation and Maintenance Budget</u>

- Pertaining to the fact that a maintenance budget is not allocated to the developed irrigation facilities, the plan prior to the start of this project was that the central government would support and bear the cost of maintenance for the developed irrigation facilities, given the scale and importance of these facilities. However, at the time of the ex-post evaluation, the government does not necessarily have sufficient financial resources, and the budget allocated to each sector is limited. It is difficult to say that the system of support and cost bearing on the part of the Timor-Leste government, which was planned before the start of this project, is functioning at the time of the ex-post evaluation. The assistant provider and the recipient country should have put some measures in place, such as discussing the maintenance budgets required after the completion in detail and exchanging of documents before the start of the project and during its implementation, so that the required maintenance budget is

allocated. For similar projects in the future, it is preferable for both the assistance provider and the recipient country to work together at the earliest possible stage, in order to secure the maintenance budget required after the project completion.