Ex-Post Project Evaluation 2019 : Package Ⅱ - 5

(Samoa, Solomon Islands, Oceania)

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JAPAN INTERNATIONAL COOPERATION AGENCY

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Independent State of Samoa

FY2019 Ex-Post Evaluation of Japanese Grant Aid Project

"The Project for Improvement of Urban Untreated Water Supply Schemes"

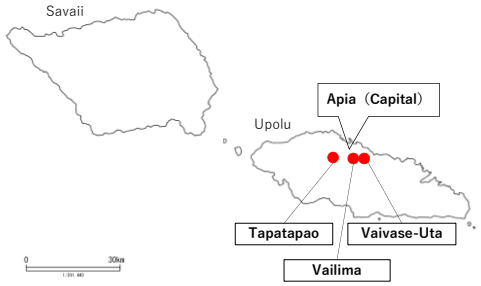
External Evaluator: Keisuke Nishikawa / Juri Ishimoto, Japan Economic Research Institute Inc.

0. Summary

The objective of this project was to contribute to the improvement of sanitary conditions in three water supply districts in Apia, the capital city of Samoa, by ensuring a stable supply of purified and treated safe water; and in the project, water intake facilities were improved and water treatment plants, water transmission and distribution facilities, etc. were constructed. The project was consistent with Samoa's development policy and development needs from the time of the project planning to the time of the ex-post evaluation, as well as with Japan's assistance policy at the time of the project planning, and the relevance was high. As for the implementation of the project, the facilities were constructed as planned and the project cost was within the plan, but as the project period exceeded the plan, the efficiency of the project was fair. The effect indicators set at the time of planning were achieved, and interviews with residents in the project area confirmed that water quality and water supply conditions have improved and confidence in the implementing agency's water supply services has increased. As for the impact of the project, safe and stable water supply to the surrounding residents, including the poor, has been realized, which is considered to have led to the improvement of sanitary environment in the households and the reduction of women's domestic work. Furthermore, the project also confirmed the effect of collaboration with projects under other schemes implemented by JICA. No negative impacts on the natural environment or resettlement were reported. From the above, the effectiveness and impact of the project were high. There were no problems in the operation and maintenance of the facilities developed in this project in terms of the institution and organizations, technology, finance, or condition of the facilities. Therefore, the sustainability of the effects of this project was high.

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

1. Project Description



Project Locations

Vailima Water Treatment Plant

1.1 Background

The Independent State of Samoa (hereinafter, referred to as "Samoa") consists of two main islands, Upolu Island, where the capital Apia is located, and Savaii Island. As an island nation, the country had been experiencing significant changes in rainfall patterns in recent years, including droughts and torrential rains that were thought to be caused by La Niña and other factors, which, together with the undeveloped water supply facilities and lack of operation and maintenance skills, caused frequent water cut-offs. In Samoa, the Samoa Water Authority (SWA) operated the water supply business, and about 80% of the population was served by SWA. Some of the systems distributed water without purification treatment, which posed a high risk of waterborne diseases. Self-sustaining water supply business operation that enabled stable supply of safely treated water was essential for the health of the people, and it was an urgent issue to develop water supply facilities and improve operation and maintenance capacities.

1.2 Project Outline

The objective of this project was to stably supply treated safe water by improving water intake facilities and constructing water treatment plants and water transmission and distribution facilities, etc. in three water supply schemes (WSSs) in the capital city of Apia, thereby contributing to the improvement of sanitary conditions in the three water supply districts of Apia.

Grant Limit /Actual Grant Amount	1,831 million yen / 1,825 million yen
Exchange of Notes Date /Grant Agreement Date	February 2014 / February 2014
Executing Agency	Samoa Water Authority (SWA)
Project Completion	November 2016
Target Area	Tapatapao, Vailima, and Vaivase Uta WSSs in Apia
Main Contractor	Konoike Construction Co., Ltd.
Main Consultant	Yachiyo Engineering Co., Ltd.
Preparatory Survey	May 2013–January 2014
Related Projects	[Technical Cooperation] ・Support Cooperation for Samoa Waterworks Operation (Miyakojima Model) (Grassroots Technical Cooperation Projects) (2010–2013) ・Operating a water resource management and water supply business in the Pacific Island (Acceptance of trainees) (2010–2015)

	・ Capacity Enhancement Project for Samoa Water Authority in Cooperation with Okinawa (CEPSO) (2014–2019) ・ Capacity Enhancement Project for Samoa Water Authority in Cooperation with Okinawa Phase 2 (CEPSO2) (2021–2024) ・ EU: Financial support for SWA's investment projects and human resource development[1] ・ Australia: Budget support for disaster recovery, technical support by Australian Civil Corp. ・ New Zealand: Training through the Samoa In-Country Program ・ ADB: Integrated Apia Master Plan for Water Supply, Sanitation and Drainage (2009–2010), financial support for sanitation and drainage projects to improve sewerage services, implementation of sanitation programs by installing septic tanks, etc.

2. Outline of the Evaluation Study

2.1 External Evaluator

Keisuke Nishikawa, Japan Economic Research Institute Inc.[2]

Juri Ishimoto, same as above[3]

2.2 Duration of Evaluation Study

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

Duration of the Study: September 2019–January 2022

Duration of the Field Study: May 2021–August 2021 (conducted remotely)

2.3 Constraints during the Evaluation Study

The evaluators were unable to travel to the project site due to the strict entry restrictions imposed by the Government of Samoa in response to the global spread of the new coronavirus infection, so the necessary information for the evaluation was collected by a remote survey from Japan. The field survey of the facilities and equipment installed in the project and the qualitative survey of the residents in the project area were all conducted by local assistants under the direction and supervision of the evaluator.

[1] This was a financial support for climate change adaptation in Samoa's water sector from 2016 to 2020, and was implemented in the form of funding based on the achievement of indicators for service improvement. One of the indicators was to increase the collection efficiency, and the implementation of this JICA project contributed greatly to the improvement of this indicator (which also led to the acquisition of financial support from the EU).

[2] Joined the evaluation team of Japan Economic Research Institute Inc. as a team member from QUNIE CORPORATION.

[3] Joined the evaluation team of Japan Economic Research Institute Inc. as a team member from Metrics Work Consultants Inc.

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

3.1 Relevance (Rating: ③[5])

3.1.1 Consistency with the Development Plan of Samoa

At the time of planning, the Government of Samoa identified access to safe and affordable water supply that met national water quality standards as one of the key priorities in the country's development policy, the *Strategy for the Development of Samoa* (2012–2016). In addition, the *Water and Sanitation Sector Plan* (2012–2016), which was a specific guideline for the above strategy, emphasized the improvement of urban water supply through SWA.

The *Strategy for the Development of Samoa* (2016/17–2019/20), which was an effective development plan at the time of ex-post evaluation, similarly identified sustainable access to safe drinking water and sanitation as one of the priority areas, and continued to prioritize improving water supply, sanitation, and wastewater treatment systems to meet water quality standards. The *Water and Sanitation Sector Plan* (2016–2019) also pointed out the need to expand water supply areas through SWA, reduce non-revenue water, improve drinking water quality, and strengthen financial sustainability for reliable, safe, and affordable water supply.

As stated above, both at the time of planning and during the ex-post evaluation, the emphasis was on improving access to safe drinking water in Samoa. Since this project aimed to provide safe water supply by improving water treatment facilities, the implementation of this project was in line with the development plan of Samoa.

3.1.2 Consistency with the Development Needs of Samoa

At the time of planning, two-thirds of the approximately 80% of the Samoan population receiving water supply services from SWA were receiving raw untreated raw water. In the three water supply schemes covered by the project (Tapatapao, Vailima, and Vaivase Uta WSSs), untreated water was supplied and the incidence of waterborne diseases was high, but there was no prospect of developing a water treatment facility. The operation of a water supply business that could provide a stable supply of safe water was essential for the health of the people, and the development of water supply facilities and the improvement of operation and maintenance management capabilities were urgent issues.

The ratio of untreated raw water supply at the time of ex-post evaluation has improved significantly since the time of planning (Table 1). On the other hand, the non-revenue water ratio is about 50% nationwide, and it is as high as about 40% in the three water supply districts covered by this project. In other words, about from 40% to 50% of the water distributed from water treatment plants and water sources does not lead to revenues. According to SWA, even during the ex-post evaluation, there were many areas where leakages

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

occurred due to the aging of the existing pipelines, causing non-revenue water. Therefore, the renewal of pipelines is still an issue. This project aims to provide a stable supply of safe water through the construction of water treatment plants and the improvement of pipelines, and it meets the development needs of the target area both at the time of planning and ex-post evaluation.

Table 1 Water supply situation in the target area

	2014	2015	2016	2017	2018	2019
Untreated raw water supply ratio (%)						
Samoa as a whole	20.3	20.0	13.7	10.1	8.0	7.5
Tapatapao	100	100	43.7	21.8	3.7	1.6
Vailima	100	100	100	54.4	4.1	0.3
Vaivase Uta *1	100	100	96.1	24.9	0.0	0.0
Non-revenue water rate (%)						
Samoa as a whole	67.9	64.1	59.5	53.7	51.8	51.7
Tapatapao	N/A	N/A	N/A	N/A	N/A	40.0
Vailima	N/A	N/A	N/A	N/A	N/A	37.0
Vaivase Uta *2	68.0	N/A	N/A	N/A	53.0	39.0

Source: questionnaire response from SWA and documents provided by JICA

*1: The Vaivase Uta WSS does not have a water treatment plant in the district, and water is sent from the Alaoa Water Treatment Plant (outside the scope of this project). The water from the plant is also sent to the adjacent Alaoa WSS.

*2: The non-revenue water rate is not for the Vaivase Uta WSS alone, but for the area including the neighboring Alaoa WSS.

3.1.3 Consistency with Japan's ODA Policy

At the time of planning, the *Okinawa Kizuna Declaration* adopted at the Sixth Pacific Islands Leaders Meeting in May 2012 stated that the Japanese government would continue to support efforts related to environmental issues, including water management. In addition, in the *Project Development Plan* (April 2014) of the *Country Assistance Policy for the Independent State of Samoa*, "environment and climate change" was positioned as one of the priority areas, and "safe water supply and water source management" was identified as a development issue. In addition, the *JICA Country Analysis Paper for the Pacific Region* (December 2014) also identified "realization of recycling-oriented islands including water sector" as a priority area for cooperation. This project aims to supply safe water through the construction of water treatment plants and other facilities, which is in line with the above policy.

As described above, this project has been highly relevant to the country'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 major outputs of the project were planned and achieved as shown in Table 2, and were generally implemented as planned, except for some changes from the original plan.

Table 2a Comparison of planned and actual main outputs (each WSS)

		Plan	Actual (Completion)
Tapatapao			
Rehabilitation of the existing water intake facility		1 unit	
Rehabilitation of the existing raw water pipeline		1,453m	
Construction of WTP	EPS	1 unit (75m^3/h)	As planned
	Clear water reservoir	1 unit (905m^3)	
Installation of pressure breaking tank		3 units	
Laying distribution pipelines		14,870m	
Installation of water supply equipment		293	90
Vailima			
Rehabilitation of the existing water intake facility		1 unit	
Rehabilitation of the existing raw water pipeline		1,057m	
Construction of WTP	EPS	1 unit (60m^3/h)	As planned
	Clear water reservoir	1 unit (715m^3)	
Laying distribution pipelines		11,936m	
Installation of water supply equipment		547	
Vaivase Uta			
Construction of transmission facility	Pumping station	1 unit	
	Water transmission pipeline	1,244m	As planned
Construction of distribution reservoir		1 unit (600m^3)	
Installation of pressure breaking tank		1 unit	
Laying distribution pipelines		10,593m	
Installation of water supply equipment		440	290

Note: WTP = water treatment plant, EPS = ecological purification system, referring to a slow sand filter

Table 2b Comparison of planned and actual main outputs (all WSSs)

	Plan	Actual
Equipment procurement	Sand washing machine (1 unit), engine pump for sand washing machine (1 unit), belt conveyor (1 unit)	As planned
Capacity building programme (soft component)	Guidance on maintenance management for the WTPs and water transmission pumping station	
	Support for public awareness activities for residents in the target water supply districts (promotion of the connecting to the water supply equipment, shift from flat rate to metered payment, water saving, understanding of disinfection by chlorination for the treated water, etc.)	

Source: Questionnaire response from SWA and interviews with the project consultants

The number of water supply equipment installed was changed during the project implementation. The connection of the water supply equipment (public service pipes, meter boxes, and water meters) procured under the project to each property was a Samoan responsibility, and the beneficiaries needed to register their water use with SWA for the connection. Although the connection to Vailima WSS was completed as initially planned, Tapatapao and Vaivase Uta WSSs were unable to register a total of 353 units because of absent and unregistered households due to overseas residence and the ongoing development of residential areas. For this reason, the number of equipment to be connected to the three WSSs until the completion of the project was changed from the originally planned 1,280 units to 927 units, and the target year for the completion of the remaining connections was changed to 2025. According to SWA, as of May 2021, Tapatapao WSS connected 734 houses against the planned 293 houses, and Vaivase Uta WSS connected 363 houses against the planned 440 houses.[6] In the case of Vaivase Uta WSS, although it is below the plan, the progress is good (about 83% of installations are completed) and it is considered that the installation will be able to be completed by the target year. Through interviews with SWA, it was confirmed that other Samoan obligations were implemented as planned.

The outputs that were not envisioned at the time of planning were as follows. In Vailima WSS, since there were many incidents of leakage from the existing distribution pipes, additional distribution pipes were laid on three important and urgent routes to ensure a stable water supply to the citizens. In addition, during the project period, a large fire (January 2016)

[6] According to SWA, the actual number of connections was confirmed from the financial customer report, which may have deviated from the actual number of connections because households residing in the Vaivase Uta area are sometimes counted as residents of the adjacent Alaoa WSS. However, as this is the most accurate figure available for this ex-post evaluation, this figure is used for the evaluation decision.

and a fire at an oil storage facility (April 2016) occurred in areas of Apia that were not covered by the project. The location of the fire hydrant could not be detected at the time, resulting in delays in firefighting operations. As a result, it was recognized that it would be necessary to determine the locations of fire hydrants from the perspective of saving lives, and valve posts were installed at a total of 288 additional locations to make it easier to check the location of fire hydrants and valves. In Samoa, water pipelines and fire hydrants were located together on the side of paved roads, and therefore it was difficult to locate fire hydrants before the installation of valve posts. Currently they can be easily found. The above additional work was the result of a flexible response to the local conditions after the detailed plan was formulated, and is considered appropriate because it was aimed at ensuring a stable water supply and the safety of the residents of the target area.


Water Supply Equipment (Water meter)

Valve Post

3.2.2 Project Inputs

3.2.2.1 Project Cost

The project cost at the time of planning was 1,831 million yen for the Japanese side and 13 million yen for the Samoan side. Since the details of the actual amount on the Samoan side could not be obtained, an evaluation judgment was made based on a comparison of the Japanese side's planned and actual amounts. The actual amount for the Japanese side was 1,825 million yen, which was within the plan (99.7% of the plan).

3.2.2.2 Project Period

The project period was 33 months (March 2014 to November 2016), compared to the planned period of 30 months (April 2014 (start of detailed design) to September 2016 (completion of main construction and soft component)), exceeding the plan (110% of the plan). The main reasons for the delay were: 1) construction interruptions due to natural phenomena, 2) coordination with the World Bank-supported road expansion project, and 3) additional work

on valve posts and water distribution pipes (see 3.2.1 Project Outputs above). Regarding 1), the approach of a cyclone in November 2015 and abnormal rainfalls in April 2016 interrupted the water-resistant coating work on the concrete part of the facility. As for 2), it was necessary to discuss the road plan with the World Bank because in Samoa, water pipes need to be laid on the side of the road, not under the paved road. According to the project consultants, the overall project period was extended by about three months due to the combination of factors mentioned above. The reasons for the delay include natural phenomena and coordination with other donors, both of which are unlikely to be external factors, so the actual project duration was judged to be 33 months including the above delay period.

As described above, although the project cost was within the plan, the project period exceeded the plan. Therefore, the efficiency of the project is fair.

3.3 Effectiveness and Impacts[7] (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Effect Indicators)

At the time of planning, the "water supply volume of purified water" and "treated water quality of the water treatment plant" were set as the effect indicators of this project. The baseline, target, and actual values for each indicator are shown in Table 3. Since the completion year of the water treatment plants was October 2016, the actual values were obtained from 2016 to the target year of 2019.

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

Table 3 Effect indicators of this project

	Baseline	Target	Actual			
	2014	2019	2016	2017	2018	2019
		3 Years after completion	Completion year	1 year after completion	2 years after completion	3 years after completion
Purification volume at WTP (m^3/day)						
Tapatapao	0	1,810	N/A	N/A	N/A	1,755
Vailima	0	1,430	N/A	N/A	N/A	2,247
Vaivase Uta[*1]	0	1,200	N/A	N/A	N/A	2,400[*2]
Treated water quality at WTP (Turbidity: NTU)						
Tapatapao	N/A	Below 5	1.06	0.85	0.67	0.65
Vailima	N/A	Below 5	N/A	0.68	0.46	0.48
Vaivase Uta	N/A	Below 5	N/A	0.72	0.66	0.44

Source: Documents provided by JICA, questionnaire response from SWA
*1: Water is distributed from the Alaoa WTP to the district through the water transmission pumps, etc., constructed in this project. Therefore, the above figures refer to the amount of water distributed from the Alaoa WTP.
*2: Actual result as of February 2019

As for the purification volume, Vailima and Vaivase Uta have achieved their targets. In the case of Vaivase Uta, a new water treatment plant was not built due to the inability to secure an adequate water source, and water is distributed from the Alaoa WTP. Therefore, the figures in Table 3 indicate the amount of water distributed from the Alaoa WTP to the district. According to SWA, the actual figure in Vaivase Uta was much higher than planned because the figure may include the water supply to other water supply districts. Although data on Vaivase Uta WSS alone were requested, according to SWA, it was difficult to capture the water supply volume for this area alone because the Alaoa WTP supplies water to multiple WSSs. Therefore, the degree of achievement was judged by comparing this actual value with the planned value. In Tapatapao, the target value was 1,810 m^3/day, while the actual value in 2019, the target year, was 1,755 m^3/day. Due to the delay in the connection of the water supply equipment to each household, the treated water supply was slightly below the target, but since it had already reached 97% of the target level, it can be considered that there was no problem.

As for the treated water quality at the WTPs, all WSSs are within the target value of 5 or less.

3.3.1.2 Qualitative Effects (Other Effects)

As the qualitative effects of this project, “improvement of sanitary environment by supplying treated water,” “securing stability of the water supply,” and “increase in reliability

of SWA service" were assumed. The "improvement of sanitary environment by supplying treated water" was considered to be the impact of the project (see "3.2.2 Impacts" below).

At the time of project planning, problems such as supply of untreated raw water, water cut-off during the dry season, and muddy water during rainfall were pointed out, but interviews with residents[8] in the target WSSs confirmed that the water supply situation has improved. Before the completion of the project, there were water supply interruptions due to cyclones and heavy rains, but after the completion of the project, there were almost no interruptions and 24-hour water supply has been realized. Although there are occasional planned water cuts for maintenance, they are over in a few hours and SWA informs the affected residents of the cut-off time in advance, so that it does not interfere with their daily life. In addition, before the completion of the project, muddy water was generated when it rained, but after the completion of the project, almost no muddy water is seen. Of the 30 households interviewed, three indicated that they sometimes tasted and smelled chlorine in tap water, but overall, they were satisfied with the quality of the water. All households indicated that they were also satisfied with the water quantity and water pressure.

Thus, there is a high level of satisfaction with the water supply services (quality and quantity of water supply) provided by SWA, and all the residents interviewed also indicated that they trusted SWA.

3.3.2 Impacts

3.3.2.1 Intended Impacts

From the interviews with the residents of the target water supply area, it was confirmed that the sanitation environment has improved after the completion of the project. Regarding the sanitation environment in their homes, they replied that the constant availability of water made it easier to wipe down the kitchen and floors, and they were able to keep their rooms and bodies clean. They also said that they were able to use tap water for cooking without boiling. As for the surrounding environment, respondents said that since water was always available, there was no longer a need to limit water usage in case of a water outage, and that the village was well kept and always clean.

3.3.2.2 Other Positive and Negative Impacts

(a) Impacts on the Natural Environment

At the time of planning, the project was classified as Category B as it was judged that the

[8] A qualitative survey was conducted with 10 households in each WSS, for a total of 30 households. The interviewees were as follows: Tapatapao WSS (5 males (1 in his 20s, 1 in his 30s, 1 in his 50s, 2 in their 60s), 5 females (1 in her 20s, 1 in her 40s, 2 in their 50s, 1 in her 60s)), Vailima WSS (5 males (1 in his 20s, 2 in their 50s, 2 in their 60s), 5 females (1 in her 30s, 1 in her 50s, and 3 in their 60s)), Vaivase Uta WSS (6 males (1 in his 20s, 2 in their 30s, 1 in his 50s, 2 in their 60s), 4 females (1 in her 50s, 3 in their 60s)).

undesirable impacts on the environment and society would not be significant based on the *JICA Guidelines for Environmental and Social Considerations* (2010). The project was required by Samoa's law regarding the Environmental Impact Assessment to submit a simplified Environmental Impact Assessment report to the Ministry of Natural Resources and Environment. According to SWA, the report was submitted to the Ministry as scheduled and approved in February 2014.

As for the implementation of the project, mitigation measures were planned through avoidance of soil runoff and civil works during rainy season and heavy rainfalls, and through vegetation protection. According to the project consultants, the mitigation measures were taken as planned, especially the excavation work for the pipeline construction, which was feared to have an impact on water quality, but was carried out in a short period of time;,and the residents were informed of the location and schedule of the pipeline construction in advance. As for environmental monitoring during the construction, SWA and the contractor visually checked for any problems in terms of air pollution, water pollution, waste, etc., based on the environmental monitoring plan, and the information was shared among the concerned parties in weekly meetings. The residents interviewed did not mention any negative impact on the natural environment.

(b) Resettlement and Land Acquisition

At the time of planning, it was necessary to secure land for the implementation of the project as some of the land was privately owned or customary land, and it was planned to make lease agreements. According to SWA, written agreements were obtained from landowners in February 2014 for the land that needed to be leased for the implementation of the project.

(c) Unintended Positive/Negative Impacts

Other impacts were assumed to be "benefit to the poor" and "reduction of women's domestic work." In addition, the effects of collaboration with projects under other schemes implemented by JICA were also confirmed. The status of each impact is described below.

1) Benefit to the poor

At the time of planning, it was expected that the project would improve the water supply in the target area and benefit the poor. According to SWA, water pipes were connected to all households in the target WSSs, and all residents, including the poor, had access to safe water. Interviews with residents including the poor showed that even after the completion of the project, most households were still paying less than 80 Samoan Tala/month (about 3,300 yen/month), which is an amount that the poor can afford, and many of them said that

the water tariff was reasonable.

2) Reduction of women's domestic work

According to the residents interviewed, the easier access to water has made it unnecessary to go to the nearest water point, and they are now able to complete household chores such as washing dishes and laundry inside the house. In addition, some respondents said that the project has shortened their housework time by eliminating the need to boil water and allowing them to use the washing machine. Others said that before the project, they had to wait for the water supply to be resumed when the water supply was cut off. However, after the completion of the project, water was always available, which made it possible to water the plants in the garden all at once and reduced the overall time required for watering.

3) Effect of collaboration with other schemes

Prior to this project, JICA had been providing continuous technical assistance to SWA through various schemes (grassroots technical cooperation, subject-specific training, and technical cooperation). Over the past 10 years of technical assistance, SWA has been able to provide safe water supply by improving its technology for maintaining WTPs using the Ecological Purification System (EPS), implementing water supply services based on water quality and quantity data, and detecting and repairing water leakage. This project introduces WTPs using the EPS method, which has been proven effective and established through past technical assistance, and also promotes the target area's long-term goal of a "stable supply of safe water in the capital city of Apia" through integrated support with related technical cooperation projects (see the BOX).

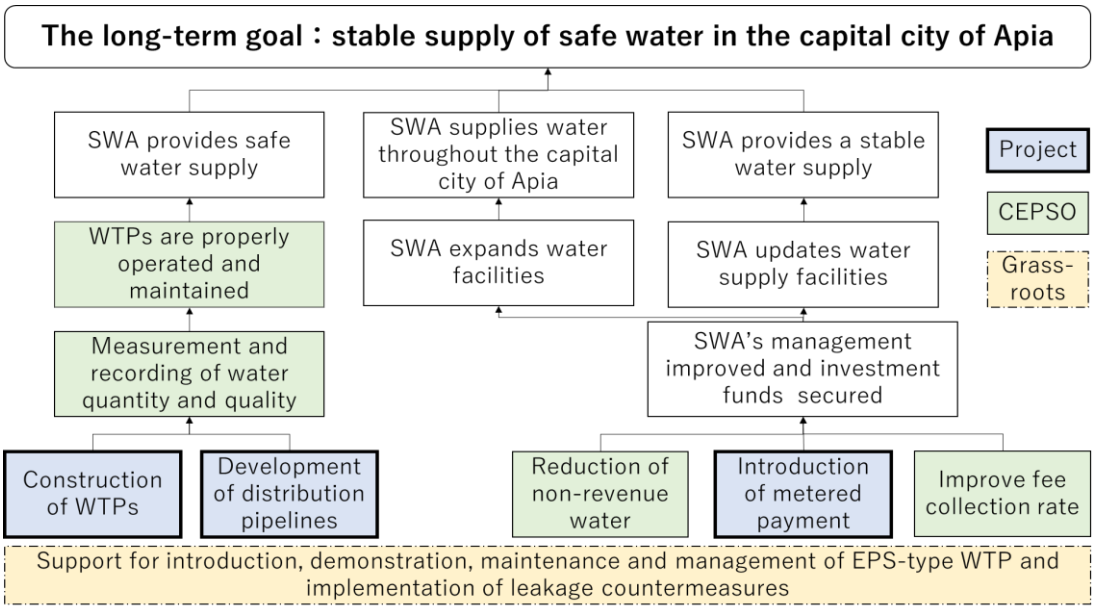
BOX Effect of collaboration with other JICA schemes

Prior to this project, JICA has been providing continuous technical assistance to SWA through various schemes (grassroots technical cooperation, subject-specific training, and technical cooperation). For example, in the grassroots technical cooperation proposed by Miyakojima City, Okinawa Prefecture, JICA provided technical support for the maintenance and management of the WTP applying EPS and leakage countermeasures at Alaoa and other WTPs. Furthermore, the subject-specific training provided through the cooperation of the water supply business organization in Okinawa Prefecture, mainly led by the Okinawa Prefectural Enterprise Bureau, enabled the SWA staff to operate the WTP applying EPS. Through the series of cooperations, guidance on the operation and maintenance of WTP applying EPS was provided mainly by an academic expert (Nobutada Nakamoto, Professor Emeritus of Shinshu University), who is an

authority in this field. The results and knowledge gained from such prior support were actively utilized in the implementation of this project. Specifically, through the grassroots technical cooperation, guidance was given on the operation and maintenance management methods of the Alaoa WTP, and the EPS-type WTP, which had been proven to be capable of appropriate water treatment, was introduced. Based on the existing manual for the maintenance and management of the Alaoa WTP, a manual for the project facilities was prepared.

In addition, from the planning stage, the mutual collaboration between the project and the technical cooperation "Capacity Enhancement Project for Samoa Water Authority in Cooperation with Okinawa" (CEPSO) was considered. At the time of planning, the business situation of SWA was deteriorating due to the inability to expect water tariff income from the flat rate system and non-revenue water, and thus it was aimed to ensure a stable supply of safe water in the capital city of Apia. In response to this long-term goal, the project provided safe water supply to untreated raw water supply areas and promoted the introduction of a metered payment system (see "3.4.3 Financial Aspects of Operation and Maintenance" below), while the CEPSO promoted the reduction of non-revenue water through water quality management and leakage prevention. In addition, the staff members supported by the CEPSO are in charge of the operation and maintenance of the facilities constructed under the project, and the skills and knowledge they acquired through the CEPSO are useful for the proper operation and maintenance of the facilities, thus creating a synergistic effect.

As described above, the integrated support between the schemes is contributing to the achievement of the target area's long-term goal of "stable supply of safe water in the capital city of Apia."



Source: Made by the evaluator based on the documents provided by JICA

Figure 1 Relationship between this project and other schemes

As described above, this project has mostly achieved its objectives. Therefore, the effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ③)

3.4.1 Institutional/Organizational Aspects of Operation and Maintenance

SWA, in charge of operation and maintenance of the project, consists of eight departments with a total of 301 staff members as of March 2021. As assumed at the time of planning, the SWA Urban Operations (Maintenance Team, Non-Revenue Water Team, and Leak Detection Team) is in charge of the maintenance of the facilities developed under the project (Table 4). According to SWA, in order to ensure that the provision of water supply services would not be disturbed during the absence of the team in charge, other staff members would serve concurrently, and the staff was sufficient.

Table 4 The structure for maintenance at the time of ex-post evaluation (SWA Urban Operations)

Team	Responsibilities	Number of staff
Maintenance	Operation and maintenance of the entire water supply system and repair in case of malfunction	31
Non-Revenue Water	Grasping the amount of water demand, managing the amount of water supply, and grasping and taking measures for unknown water	3
Leak Detection	Leak detection, operation and maintenance of water supply networks, etc.	6

Source: Questionnaire response from SWA

The daily operation and monitoring of each facility are carried out by a dedicated operator. At the Tapatapao WTP and the Vailima WTP, operators (one for each facility) are stationed from 6:00 a.m. to 6:00 p.m. to conduct daily operations and inspections. During the night, remote monitoring is conducted (see "3.4.4 Status of Operation and Maintenance" below). At the Alaoa Pumping Station, two operators (who serve concurrently at the Alaoa WTS) conduct daily operation and monitoring in rotation. According to SWA, no failure or malfunction due to the shortage of staff members has been observed.

As described above, it is considered that there are no particular problems in the institutional and organizational aspect of operation and maintenance of the project.

3.4.2 Technical Aspects of Operation and Maintenance

The staff responsible for the operation and maintenance of the project have a bachelor's degree or diploma in civil engineering or science, or a qualification for plumbing and other fields, and they have at least three years of work experience. Since 2006, SWA has received

technical assistance for operation and maintenance of WTPs, water quality management, leak detection and countermeasures, etc., through grassroots technical cooperation, subject-specific training, and technical cooperation projects (hereinafter referred to as "Technical Cooperation"), and the staff in charge are equipped with the basic skills to maintain and operate the facilities developed under the project. In addition, although there are no facilities requiring special skills at the WTPs constructed under the project, the Technical Cooperation mainly targeted the improvement of the Alaoa WTP. Therefore, initial technical guidance specific to the new WTPs constructed under the project, as well as operation and maintenance guidance, was provided as a soft component under the project.

On-the-job training (OJT) has been provided to new hires at SWA. Although no training programs other than OJT were confirmed, the CEPSO was implemented at the same time as this project, and a successor CEPSO Phase 2 is being planned. Thus, it can be said that SWA continues to have opportunities to improve their capacity in operation and management of water supply facilities.

Based on the above, it is considered that the SWA staff in charge have the skills to operate and maintain the facilities constructed under the project and that there are no particular problems in the technical aspect.

3.4.3 Financial Aspects of Operation and Maintenance

At the time of project planning, SWA's billing efficiency and cost recovery rates for FY 2011/2012 were both 75%, and SWA was operating at a loss. Through this project, it was expected that the water supply service would be improved, and the conversion to tariff collection based on the metered payment system through the installation of water meters would increase the billing efficiency rate and improve SWA's financial situation. Table 5 shows the changes in SWA's billing efficiency rate, cost recovery rate, and the number of customers over time. Compared to before the implementation of the project, both the billing efficiency rate and the cost recovery rate are on an increasing trend, and after the implementation of the project, they have been maintained at 100%. The improvement in the billing efficiency rate can be attributed to the increase in the amount of water bills paid and the improvement in the customer database, etc., which have made it possible to collect bills more efficiently. In addition, the increase in the number of meter connections (number of customers) is thought to have contributed to the improvement in the cost recovery rate.

In addition, according to SWA, the quality of water supply services has been improved with the support of the EU, leading to the expansion of water supply coverage and increase in the number of meter connections (customers), while the improvement of billing efficiency rate is mainly due to SWA's self-help efforts.

Table 5 SWA's billing efficiency and cost recovery rates and number of customers

	2014	2015	2016	2017	2018	2019
Billing efficiency (%) *1	107	100	100	107	105	104
Cost recovery (%) *2	72	68	89	97	109	107
Number of customers *3	16,574	17,778	18,004	19,660	20,669	22,313

Source: Questionnaire response from SWA, SWA Annual Report 2015–2016 p. 10, 2019–2020 p. 6

*1: Ratio of collections against water sales

*2: Ratio of income against expenses (except for depreciation)

*3: Number of customers for residential and commercial use who were billed for water services

Water tariffs of SWA are shown in Table 6. The flat rate of 20 Samoan Tala per month was converted to the metered payment system after the completion of the project. Water tariffs are based on usage for residential and commercial use. Water tariffs were revised in July 2019 and were scheduled to increase, but this has not yet been applied due to a measles outbreak and the global spread of COVID-19.

Table 6 Water tariffs of SWA

	After the project completion		At the time of the ex-post evaluation	
	Amount of use (m^3/month)	Tariff (S$/$m^3$)	Amount of use (m^3/month)	Tariff (S$/$m^3$)
Household	0.50	0.50	~15	0.77
	66	1.40	16~40	1.67
	67~	1.90	41~	2.17
Business	~40	1.50	~40	1.77
	41~	2.00	40~	2.27

Source: Documents provided by SWA

SWA's financial data since 2013 are shown in Table 7. SWA's financial situation, which was in deficit when the project was planned because expenditures exceeded revenues, has improved. Since the completion of the project, water fee revenues have increased and SWA has maintained a surplus.

Table 7 Profit and loss statement of SWA

(Unit: thousands Samoan Tara)

	2013	2014	2015	2016	2017	2018	2019
Income	**19,937**	**20,650**	**23,400**	**22,915**	**25,882**	**26,909**	**27,600**
Customer water service revenue	11,103	12,449	14,947	15,870	17,079	18,096	18,807
Government grants	4,723	5,966	5,688	3,803	4,744	3,878	3,680
Other income	4,111	2,235	2,765	3,242	4,058	4,935	5,113
Expenses	**25,371**	**22,746**	**24,507**	**24,289**	**23,814**	**26,626**	**26,990**
Administration costs	3,081	2,632	2,470	2,479	2,817	3,063	3,373
Personnel costs	6,367	6,601	6,858	7,084	7,383	8,219	8,474
Operations and maintenance costs	8,931	8,017	9,148	9,410	9,017	9,881	9,551
Depreciation	4,328	4,600	4,613	4,630	4,922	5,199	5,333
Other cost	2,664	896	1,419	685	-325	265	258
Finance costs	84	109	-	12	4	64	29
Net profit	**−5,518**	**−2,204**	**−1,107**	**−1,362**	**2,064**	**218**	**639**

Source: SWA Annual Report 2013–2014 p. 4, 2016–2017 p. 5, 2017–2018 p. 5, 2018–2019 p. 5, questionnaire response from SWA

Although the operation and maintenance costs specific to the facilities and equipment developed in this project could not be confirmed, at the time of planning, the annual cost for the operation and maintenance of the facility was estimated to be approximately 510,000 Samoan Tala. This was less than 3% of SWA's total water services revenue and was considered sufficient to cover the cost. According to SWA, operation and maintenance is important for service provision and is always given priority in the budget allocation.

Based on above, it is considered that there are no particular problems in the financial aspect of operation and maintenance.

3.4.4 Status of Operation and Maintenance

From the site visit by the local assistants and the interview with SWA, it was confirmed that the facilities developed in this project were in good operating condition. No defects or failures were reported in the raw water pipelines and distribution pipes. However, it was found that the sand washing machine that was part of the equipment provided was not used during the ex-post evaluation. According to SWA, it was not used because the washing speed was slow and the amount of sand that could be washed by the machine during the day was insufficient compared to the amount needed for sand replacement. The sand washing machine is scheduled to be replaced by the end of FY2021. The sand washing is done about once a year, and since

the sand can be washed manually without the sand washing machine, the stoppage of the sand washing machine was not causing any major problems in the maintenance of the facility.

Regarding the maintenance of the facility, as recommended at the time of planning, regular maintenance of the WTP (cleaning work of the settling tank (once a year), removal of mud in the roughing filter tank (once a month), removal of dirt from the filter tank (once every three months), and re-sanding work) were being carried out.

At the time of planning, customers were supposed to install the water pipes from the meter to each house, and customers' faulty or illegal connections were a cause of leakage and water theft. According to SWA, at the time of ex-post evaluation, all these faulty and illegal connections in the WSSs in Apia had been removed. From the project site visit, it was also confirmed that the water meters were properly installed and in good condition. According to SWA, the main cause of non-revenue water is leakage from aging pipelines. Although the data on the amount of leakage in the target WSSs has not been confirmed, in light of the fact that the non-revenue water rate has been significantly reduced (see previously mentioned "3.1.2 Consistency with the Development Needs of Samoa"), the leakage situation is considered to have improved.

Regarding the operation of the WTPs, the water volume in the balance tank and distribution reservoir of the plant is constantly monitored and recorded at the call center by a remote monitoring and control system (Supervisory Control And Data Acquisition: SCADA[9]). The water volume data is output in the form of reports every three hours and shared with the staff and management. Based on the reports, the water quality standards are also checked by the operators of the WTPs. As for the water quantity, the operator and staff also visually check the condition of the water intake, water pipes, and filtration tanks, etc. to ensure that there is sufficient water flow from the water source to the treatment plant and that the filtration tanks are maintained in good condition. For leak monitoring, assistance, such as staffing, the securing of equipment, and trainings on leak detection, were implemented through CEPSO. SWA continues to use the standard operating procedures (SOPs) and data collection techniques developed in this project. In addition, SWA continues to receive online assistance from CEPSO experts to advance its work on non-revenue water and leak detection, as well as to share information among departments at monthly meetings.

According to SWA, there are no problems in procuring spare parts with respect to funding and procedures. At the time of planning, it was estimated that about 30,000 Samoan Tala per year would be required for the purchase of spare parts. As shown in the previous section, "3.4.3 Financial Aspects of Operation and Maintenance," there is no major problem in procurement because the customer water service revenue is sufficient to cover the cost. In

[9] One of the industrial control systems, which monitors and controls manufacturing processes and production equipment at plants and factories with computers

addition, there were no reports of problems such as equipment failure or aging due to lack of funds for the facilities and equipment developed in this project.

Based on the above, it is considered that there are no problems in the status of operation and maintenance.

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

4. Conclusion, Lessons Learned, and Recommendations

4.1 Conclusion

The objective of this project was to contribute to the improvement of sanitary conditions in three water supply districts in Apia, the capital city of Samoa, by ensuring a stable supply of purified and treated safe water; and in the project, water intake facilities were improved and water treatment plants, water transmission and distribution facilities, etc. were constructed. The project was consistent with Samoa's development policy and development needs from the time of the project planning to the time of the ex-post evaluation, as well as with Japan's assistance policy at the time of the project planning, and the relevance was high. As for the implementation of the project, the facilities were constructed as planned and the project cost was within the plan, but as the project period exceeded the plan, the efficiency of the project was fair. The effect indicators set at the time of planning were achieved, and interviews with residents in the project area confirmed that water quality and water supply conditions have improved and confidence in the implementing agency's water supply services has increased. As for the impact of the project, safe and stable water supply to the surrounding residents, including the poor, has been realized, which is considered to have led to the improvement of sanitary environment in the households and the reduction of women's domestic work. Furthermore, the project also confirmed the effect of collaboration with other schemes implemented by JICA. No negative impacts on the natural environment or resettlement were reported. From the above, the effectiveness and impact of the project were high. There were no problems in the operation and maintenance of the facilities developed in this project in terms of the systems and structures, technology, finance, or condition of the facilities. Therefore, the sustainability of the effects of this project was high.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Implementation of non-revenue water measures through leak detection and repair work and implementation of long-term preventive maintenance plans

Although there has been a significant improvement from before to after the start of the project, the non-revenue water rate is still high at about 50% in all of Samoa, including non-project areas, at the time of ex-post evaluation, and planning and implementing non-revenue water measures is still a priority issue in the country. The main causes of non-revenue water are inadequate construction of existing pipelines and leakage from aging water distribution pipes, which are outside the scope of this project. SWA has acquired knowledge and skills on leakage detection and repair through the support of the CEPSO, and is currently taking measures against leakage with continuous support from experts of the technical cooperation project. In addition, it is expected that the non-revenue water control activities in the "Capacity Enhancement Project for Samoa Water Authority in Cooperation with Okinawa Phase 2" (CEPSO2), which will be implemented from FY2021, will be expanded to other areas and that the training system for acquisition of non-revenue water control technology in SWA will be enhanced. SWA is expected to continue leak detection and repair work in accordance with the SOPs developed by the CEPSO, as well as identifying the amount of leakage, prioritizing old pipes based on leak monitoring, and formulating and implementing long-term preventive maintenance plans of renewing old pipes and doing other work

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

<u>Importance of integrated collaboration with other schemes in infrastructure projects</u>

Prior to this project, JICA had been providing continuous technical assistance to SWA through various schemes (grassroots technical cooperation, subject-specific training, and technical cooperation). Through more than a decade of long-term support, SWA has been able to maintain water treatment plants using an ecological purification system, provide water supply services based on water quality and quantity data, and improve technologies for detecting and repairing leaks, thereby ensuring a safe water supply. However, since there were still water supply areas with untreated raw water in Samoa, water treatment facilities were developed in this project by utilizing the results and knowledge gained through such prior support. In particular, the ecological purification system, which had proven to be capable of appropriate water treatment through the guidance of the operation and maintenance methods at the Alaoa WTP through grassroots technical cooperation, was introduced at the Tapatapao WTP and the Vailima WTP in this project; and based on the manual for the maintenance and management of the Alaoa WTP, a manual for the project facilities was prepared. It can be said that the results of the previous project were utilized in this project. In addition, the technical

cooperation project “CEPSO” (2014–2019) was implemented at the same time as this project, and the quality of SWA’s water supply services was improved through technical support for water quality control and for non-revenue water management by leakage prevention and other means. The staff members supported by the technical cooperation project are in charge of the operation and maintenance of the project facilities, and it was confirmed that the skills and knowledge acquired through the technical cooperation project are useful for the proper operation and maintenance of the project facilities, thus creating a synergetic effect.

In the case of introducing the facilities and equipment with which the executing agency is not familiar, there is a concern that the capacity building program (soft component) provided by the grant aid and the OJT alone will not be sufficient to acquire the necessary knowledge for operation and maintenance management. However, by strengthening the maintenance capacity through prior or parallel technical cooperation projects, the sustainability of the project effects can be enhanced. In this way, it is important to fully utilize the results of prior assistance and to integrate technical cooperation projects and grant aid in order to promote the effectiveness of each project and, in turn, to promote the achievement of the long-term goals of the target area.

Importance of planning the entire supply system in infrastructure development where end-users will be the beneficiaries

In water supply improvement projects such as this project, the effective functioning of the entire water supply system will ensure a stable supply of safe water from the intake point to the users. This project aimed to ensure a stable supply of safe water through the improvement and renovation of water purification, transmission, and distribution facilities. Based on the achievement of the effect indicators set at the time of planning and interviews with local residents, it was confirmed that both the volume and quality of water supply improved significantly from before the implementation of the project, and that safe and stable water supply was realized. The importance of developing the entire system can be applied not only to the water supply sector, but also to the electric power sector, for example, when developing the electric power supply system from generation to transmission to distribution.

In the future, when planning infrastructure development projects in which end users will be the beneficiaries, such as in the water supply and electric power sectors, it will be important to check the status of development of each system in the target area, as in this project, and to carefully examine the project scope and content to ensure that the entire supply system functions.

End

Solomon Islands

FY2019 Ex-Post Evaluation of Japanese Grant Aid Project

"Project for Improvement of Honiara Port Facilities"

External Evaluator: Atsuko Orimoto, Japan Economic Research Institute Inc.

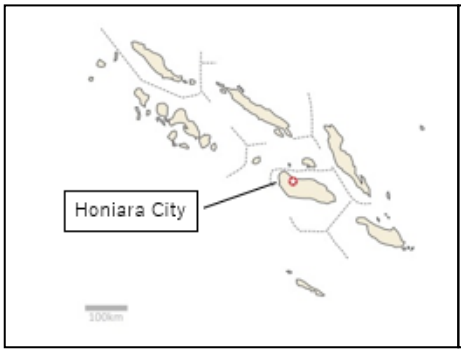
0. Summary

This project was aimed at building and enhancing the port facilities thereby realising greater effectiveness and efficiency in the management and the cargo handling at Honiara Port, which is the most important port in the Solomon Islands.

This project has been highly relevant to the country's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance is high. With regard to implementation, the project components were carried out mostly as planned, and the project cost and period were within the plan. Consequently, the efficiency is also high. All quantitative indicators, such as elimination of berth waiting time and improvement on efficiency of cargo handling, of this project were achieved. Furthermore, safety of cargo handling and ship routes were secured and further qualitative effects have been emerging. As to the impact of the project, although the promotion of logistics and the reduction of transportation costs could not be verified, several positive impacts have been confirmed; unemployment reduction; profit from the restoration of fiscal balance of the Solomon Islands Ports Authority (SIPA) has made possible systematic investment in further improvements of the facilities and equipment, and; Honiara Port has been recognised as a sufficiently equipped and properly managed international port. Therefore, effectiveness and impacts of the project are high. With regards to operation and maintenance, the financial aspect is particularly promising, and no major problems have been observed in the institutional/organizational and technical aspects and current status of the operation and maintenance system. Therefore, sustainability of the project effects is high.

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

1. Project Description



Project Location

Aerial Photograph of Honiara Port

1.1 Background

The Solomon Islands is an island country, with the islands scattered across a sea area of 1,632,964 km^2. The distance between the eastern and western edge of the country is 1,666.8 km. Therefore, most international and domestic cargos are transported by sea. There are six major sea ports in the country; however, international cargos are mainly handled at Honiara Port, which is located at the capital city. The main commodities imported into the country are food, industrial materials and equipment, clothes and fuel, which are essential for the everyday life of the people. The main exports of the Solomon Islands are palm oil, cacao, timber and fisheries products, which are very important to support the country's economy.

Ethnic tension erupted in late 1990s and the volume of cargo handling at Honiara Port greatly decreased during that time; however, it sharply bounced back once the conflict ceased in 2003 and the economy started to recover. As a result, cargo volume exceeded the cargo handling capacity of Honiara Port at the time of planning, and many container ships had to wait offshore a long time before berthing. Furthermore, although Honiara Port had an international berth with an extension of 120m, the berth extension was insufficient for larger sized ships and some parts of the berth did not meet the structural strength requirements to handle heavy cargo. Therefore, Honiara Port could only handle light-weight cargo and there were safety and efficiency concerns during cargo handling operations for container ships.

At the time of planning, the export of palm oil and mineral resources, etc. had been expected to increase and there was growing concern regarding a risk of collision between large sized international ships and small sized domestic ships moored nearby due to the narrow water area adjacent to the international wharf. Under such circumstances, it was urgently required to improve cargo handling efficiency and to secure safety and security of the port so as for the port to function as an international logistics hub, and to pursue future economic development of the country through the construction of a second wharf.

1.2 Project Outline

The objective of this project is to realise effectiveness and efficiency in the management of and the cargo handling at Honiara Port, by improving and enhancing the port facilities, thereby contributing to the smoother international cargo trade and economic development of the Solomon Islands.

Grant Limit / Actual Grant Amount	52 million yen / 52 million yen (Detailed Design) 2,681 million yen / 2,607million yen (Construction)
Exchange of Notes Date /Grant Agreement Date	January 2014 / January 2014 (Detailed Design) May 2014 / May 2014 (Construction)

Executing Agency	Solomon Islands Ports Authority
Project Completion	June 2016
Target Area	Honiara City
Main Contractor(s)	The Consortium of Toa Corporation and Kitano Construction Corporation
Consultant	ECOH Corporation
Preparatory Survey	August – September 2012 (I) February – December 2013 (II)
Related Projects	[General Grant Aid] Project for Construction of Market and Jetty in Auki in Solomon Islands (2010 – 2012) [Technical Cooperation] Data Collection Survey on Strategic Development of Maritime Infrastructures in the Pacific Region (2010) [Other International and Aid Agencies] Asian Development Bank: Honiara Port Development Project (Phase I: 1982, Phase II: 1990), Domestic Maritime Support Project (2011 – 2018) Pacific Region Infrastructure Facility: Honiara Port Scoping Study, Solomon Islands (February, 2012)

2. Outline of the Evaluation Study

2.1 External Evaluator

Atsuko Orimoto (Japan Economic Research Institute Inc.)[1]

2.2 Duration of Evaluation Study

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

Duration of the Study: October, 2019 – October, 2020

Duration of the Field Study: February 8, 2020 – February 22, 2020

2.3 Constraints during the Evaluation Study

Due to the COVID-19 outbreak, the evaluator could not conduct a second field study. Therefore, additional information was collected remotely through online interviews and via the

[1] The consultant is from Japan Development Service Co., Ltd., who assisted Japan Economic Research Institute Inc. with this ex-post evaluation.

local associate. There were limitations to obtain all the information and data required; therefore, some quantitative data under Impacts is not available in this report.

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

3.1 Relevance (Rating: ③[3])

3.1.1 Consistency with the Development Plan of the Solomon Islands

At the time of project planning, *National Development Strategy (NDS) 2011 – 2020* was the National Development Plan of the Solomon Islands and well-maintained ports facilities and maritime service were considered essential for the economic development of the nation. Moreover, in *Solomon Islands National Infrastructure Investment Plan (SINIIP) 2013-2023*, which was about to be finalised, this project was categorised as one of the highest priority projects.

The development plan at the time of the ex-post evaluation was *National Development Strategy 2016–2035*, which had been updated in 2016. In a Medium Term Strategy of Objective One: Sustained and Inclusive Economic Growth, expanding and upgrading weather resilient infrastructure and utilities focused on access to productive resources and markets and for essential services was seen as a priority. Moreover, it was stated that priority should be given initially to those investments that are targeted at key productive sectors and initiatives, providing links to economic possibilities and opportunities, and, in the transport sector, the importance of shipping services and maritime infrastructure was emphasised. In particular, this project was clearly mentioned in the NDS as a JICA funded project to be completed. The SINIIP was still in effect at the time of the ex-post evaluation. A *National Transport Plan (NTP) 2017–2036* was developed from the SINIIP to specialise in transport infrastructure. In the NTP, maritime transport was positioned as one of the most important components in this sector, and in *Medium Term Transport Action Plan 2019–2023* of the NTP, keeping Honiara Port in good condition was prioritised. Furthermore, *SIPA Development Strategy. (2018–2023)* was created to show SIPA's commitment towards the continuation of maintenance, expansion and investment to keep improving services provided by Honiara Port.

This project aimed to realise effectiveness and efficiency in the management of cargo handling at Honiara Port, by improving and enhancing the port facilities, thereby contributing to increases in international cargo trade and economic development. It is consistent with the development plan of the Solomon Islands both at the time of planning and ex-post evaluation.

3.1.2 Consistency with the Development Needs of the Solomon Islands

The Solomon Islands is an island country, where the islands are scattered across a vast sea area,

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

and most international and domestic cargos are dependent on sea transportation.

Container cargo handling is only possible at two international ports, Honiara Port and Noro Port; therefore, the vast majority of international cargo is handled at those two ports. In recent years, SIPA has assigned Noro Port as an International Fishery Port, and Honiara Port has stopped dealing with fish cargo transhipment; however, international cargos are mainly handled at Honiara Port and the cargo handling volume sharply increased during the recovery of law and order and economy following the ethnic tension ending in 2003. One of the main causes driving the increase in cargo handling volume was an increase in population and general trading volumes in both export and import. The cargo volume had grown beyond the capacity of Honiara Port and increasing cargo handling volume was SIPA's priority for urgent action (See Table 1).

Table 1 Population of the Solomon Islands

Year	2013	2014	2015	2016	2017	2018
Population (thousand)	571	587	603	619	636	653

Source: The World Bank Data[4]

At the time of the planning, cargo handling operations had been inefficient due to the short berth length in relation to the size of calling ships, and there was a growing risk of collision for both large sized international ships coming in and small sized domestic ships moored nearby due to the narrow water area adjacent to the international wharf. Therefore, Honiara Port was struggling to fulfil its requirements such as safety as the main port. Moreover, as shown in Table 1, the population of the Solomon Islands increased by 20 percent between 2013 and 2018, and the volume of exports and imports increased significantly. As a result of this project, both cargo handling efficiency and safety have improved and Honiara Port better fulfils its function as the most important international port in the Solomon Islands.

Furthermore, there were several large-scale cyclones and floods which struck the Solomon Islands before and after the project. These had caused damage to the first wharf and it had deteriorated rapidly and was only partially functioning. Therefore, the need to build strong port facilities, which would not be destroyed easily by natural disasters, was commonly recognised in the country.

Based on the above, this project has been consistent with the development needs of the Solomon Islands both at the time of planning and ex-post evaluation.

3.1.3 Consistency with Japan's ODA Policy

At the time of the planning, 'Overcoming Vulnerability' was one of the priority areas for assistance for the Solomon Islands in the Country Assistance Policy (December 2012), and

[4] URL address: https://data.worldbank.org/country/solomon-islands?view=chart (accessed on 12 May 2020.)

under ‘Program for Development of Economic Infrastructure and Improvement of Management and Maintenance’, Japan focused on construction and maintenance of transport infrastructure. Moreover, Japan had implemented 17 General Grant Aid Projects for ports in 8 pacific islands nations. At the Sixth Pacific Islands Leaders Meeting held in 2012, *Okinawa “Kizuna” Declaration* was adopted by the Leaders of Japan and the Pacific Islands Forum. Under one of the five pillars, Sustainable Development and Human Security, it was emphasized that high quality infrastructure would continue to play a fundamental role in securing reliable transport links and access to energy as well as the sustainable development of agriculture, fisheries and tourism.

This project was to assist reliable transportation and high-quality infrastructure such as ports to secure sustainable development, therefore, at the time of planning, this project was highly consistent with Japan’s direction to assist the Pacific and the Solomon Islands.

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

3.2 Efficiency (Rating: ③)

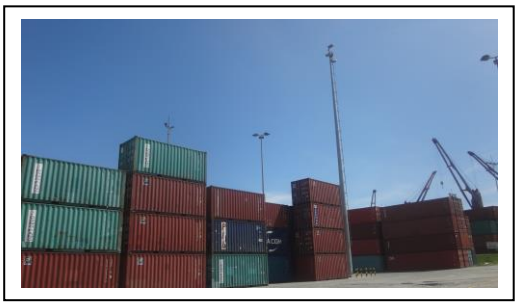
3.2.1 Project Outputs

The planned and actual project components are as shown in Table 2. Since unexploded cannon shells from World War II were found in the reclamation and concrete materials collected in the field, the Government of the Solomon Islands requested a metal detector survey, which was approved as an addition to the original plan. Apart from the additional survey, most components were carried out as planned.

Table 2 Planned and Actual Contents of the Project

Components	Plan	Actual	Remarks
International Wharf			
Berth Extension	150m	150m	
Revetment Extension	155m	155m	
Water Depth	11m	11m	
Dredging	6,680 ㎥	6,680 ㎥	
Filling	58,900 ㎥	58,900 ㎥	
Mooring Dolphin	2 Units	2 Units	Mooring dolphin without connection bridge. See '3.4.4' for more details.
Container Yard			
Yard Pavement	6,700 ㎡	6,700 ㎡	
Apron Pavement	10,600 ㎡	10,600 ㎡	
Access Road Pavement	1,922 ㎡	1,922 ㎡	
Accessories			
Water Supply Facility	1 Set	1 Set	Pipe laying and 2 faucets
Lighting Facility	1 Set	1 Set	Brightness: 30 lux (Apron), 20 lux (Yard)
Beacon	2 Units	2 Units	Lighting distance: 5 nautical miles
A metal detector survey for unexploded shells	-	1 Set	Unexploded cannon shells were found in reclamation and concrete material collected field, a metal detector survey was added and conducted.

Source: Prepared from information of the Second Preparatory Survey Report for Outline Design on the Project for Improvement of Honiara Port Facilities in Solomon Islands, and information provided by JICA



Container Yard

Container Cargo Handling

The obligations of the Solomon side, which are listed below, were agreed and fulfilled. They were confirmed at the ex-post evaluation.

- Land securement for a temporary yard neighbouring the project site.
- Implementation of EIA, acquisition of Environmental Permit and Facility Construction

Permit (Honiara City Council).

- Site clearance and removal of wastes and debris from the project site.
- Services of electricity, water, etc. to the new international wharf construction area.
- Securement of staff and budget for operation and maintenance of facilities.
- Exemption of tax and other duties assessed on imported materials and equipment from overseas.
- Commission payment for banking arrangement and fees

In addition, it was observed during the ex-post evaluation survey that SIPA had continued making further improvements at the Honiara Port facility using its own funding. Improvements included the installation of Closed-Circuit TeleVision (CCTV) Security System and changing all security lighting to solar and LED.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The cost of this project borne by Japan was planned to be approximately 2,733 million yen (138 million yen for the detailed survey and construction supervision and 2,595 million yen for construction), with another 15 million yen planned as implementation expenses to be borne by the Solomon Islands[5].

Table 3 summarises the actual costs contributed by Japan and the Solomon Islands.

Table 3 Actual Project Costs

Country	Items	Cost (mil. yen)
Japan	Detailed Survey	52
	Supervision	86
	Facility Construction	2,521
	Sub-total	2,659
Solomon Islands		15
TOTAL		2,674

Source: Prepared from information provided by JICA and SIPA

The actual project cost was 2,659 million yen (Japanese side), which was within the planned amount (approx. 97% of the plan). The evaluator could not confirm the exact amount of costs borne by the Solomon Islands; however, the cost was reported as having been approx. 15 million yen as planned (approx. 100% of the plan). Moreover, SIPA continued improving the facility of Honiara Port with its own funding after the completion of the project.

Therefore, the total cost of the project was 2,674 million yen, which was less than the

[5] Exchange rate: 1 SBD = 12.23 JPY (As of December 2012, at the time of planning)

planned amount (approx. 97% of the plan).

3.2.2.2 Project Period

The period of this project was expected to be 32 months, which included eight months for a detailed design survey and tendering. The actual project period was 29 months from February 2014 to June 2016, and the project was executed for a significantly shorter period than planned (91% of plan). The shorter project period, with high quality construction, became possible mainly due to the selection of a well-experienced and reputable sub-contractor for the installation of the steel pipe pile foundation[6]. A metal detector survey was added to the original plan, nonetheless the project was executed within the plan (91% of the plan).

Both the project cost and project period were within the plan. Therefore, efficiency of the project is high.

3.3 Effectiveness and Impacts[7] (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

In this project, 'Number of Waiting Container Ships for Berth', `Efficiency of Container Handling Operation (Number of Container Handled in both the first and second wharves per Hour)`, `Efficiency of Vehicle Discharge from Ro-Ro Ship (Number of Vehicle Discharged per Hour)` and `Increase of Stacking Capacity of Container Yard' had been selected to be the operation indicators and targets that were set at the time of planning. The actual indicators were confirmed as shown in Table 4 at the time of ex-post evaluation.

[6] The steel pipe pile foundation is widely used as revetment wall of ports, and huge steel pipes with wielded fittings are lined up vertically. Because of the advantage, its strong supporting power and flexural rigidity, it can apply to wharf on a deep sea.

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

Table 4. Quantitative Effects (Operation and Effect Indicators)

	Baseline	Target	Actual[*1]		
	2013	2019	2016	2017	2019
		3 Years After Completion	Completion Year	1 Year After Completion	3 Years After Completion
1) Number of Waiting Container Ships for Berth	4 to 5 ships/month	Nearly 0 ship/month	approx. 0.5 ship/month	Nearly 0 ship/month	Nearly 0 ship/month
2) Efficiency of Container Handling Operation (Number of Containers Handled per Hour)[*1]	15 TEU/hour	20 TEU/hour	20 TEU/hour	20 TEU/hour	20-22 TEU/hour
3) Efficiency of Vehicle Discharge from Ro-Ro Ship (Number of Vehicles Discharged per Hour)[*2]	10 vehicles/hour	30 vehicles/hour	30 vehicles/hour	30 vehicles/hour	30 vehicles/hour
4) Increase of Stacking Capacity of Container Yard[*3]	22,035 TEU/year (Insufficient Shortly)	33,341 TEU/year (Sufficient for Target Year)	33,341 TEU/year	33,341 TEU/year	> 33,341 TEU/year

Source: Prepared from information of the Second Preparatory Survey Report for Outline Design on the Project for Improvement of Honiara Port Facilities in Solomon Islands, and information provided by JICA

*1: The baseline indicator is the potential maximum efficiency when all equipment, staff members and facilities are available. The reason for increases in maximum efficiency at the time of the ex-post evaluation was that SIPA introduced better equipment using their own funds and utilises them for container handling.

*2: The baseline and target indicators were calculated as potential maximum efficiency in cargo handling of containers (vehicles inside) or directly downloading by driving vehicles using a ramp of a ship, which has Ro/Ro (Roll-on/Roll-off) facilities[8].

*3: Increases for stacking capacity of container yard were automatically achieved, while this project created/upgraded container yard.

While the priority order of calling vessels is; 1. cruise liners; 2. cargo ships; and 3. others (including diplomatic vessels), calling permissions to diplomatic vessels are only granted at times which avoid clashing with cruise liners and/or cargo ships. Owing to such improvement in shipping schedule management, Honiara Port achieved almost zero waiting for the berthing of container ships.

The baseline of 'Efficiency of Container Handling Operation (Number of Containers Handled per Hour)' was not an actual number but potential maximum efficiency when all existing equipment, staff members and facilities were available. The maximum efficiency of container handling operations at the ex-post evaluation achieved a higher level, since the

[8] This project made possible use of Ro-Ro ramp, vehicles can move between wharf and ship by driving using the ramp.

second wharf was completed by this project and SIPA introduced more and better equipment with their own funds and started utilising them for container handling.

Similarly to the container handling, the baseline of 'Efficiency of Vehicle Discharge from Ro-Ro Ship (Number of Vehicles Discharged per Hour)' was calculated as the potential maximum efficiency at the time of planning. Vehicles had been transported in containers until completion of the project thus the number of vehicles discharged had equalled the number of containers handled. However, after construction of the second wharf, cargo ships with Ro-Ro functions could utilise the ramp and directly download vehicles by driving them, therefore; the target was achieved.

Increase in stacking capacity of the container yard (yard capacity) was automatically achieved, after the project created/upgraded the container yard (calculated with empty four containers in one stack). Moreover, SIPA has continued to expand and upgrade the container yard using their own funds and has purchased side lifters, which can stack up to seven empty containers; therefore, it is expected that the project has achieved yard capacity beyond the target (the precise figure was not provided).

3.3.1.2 Qualitative Effects (Other Effects)

At the time of planning, the following qualitative effects were expected to be achieved through the implementation of this project.

1) Promotion of Logistics (The function as an international port is enhanced and the logistics are promoted by inputting the new international wharf.)
2) Reduction of Transportation Costs (Reduction of transportation costs can be expected by upgrading the safety and efficiency of container handling operation at Honiara Port.
3) Shortening of Port Time and Elimination of Berth Waiting Time (As a benefit for shipping companies, shortening of port time and elimination of berth waiting time of calling container ships are expected by implementation of the project.)

With regard to "1)", the total volume of cargo is influenced by the wider economic situation and the price of export products rather than the condition of Honiara Port, and the effect of this project was not confirmed. However, all interviewees expressed that; the quality of goods, such as industrial commodities, daily necessities and other items handled, have improved, since there were more ships from different countries and more varieties of goods have become available, and; the functionality of Honiara Ports had been enhanced. Therefore, some degree of effect was observed.

Qualitative indicator "2) Reduction of Transportation Costs" is considered to be an impact, which was to be achieved after the safety and efficiency of container handling was improved through the project, therefore, this indicator was analysed in "Impacts". According to SIPA's

CEO, it was not only the efficiency of cargo handling that was improved, but also, the port itself has become safer. Navigation of large cargo vessels has become much easier, since the view around the newly constructed second wharf is clearer and there is wider berthing space. This helps prevent collisions with domestic ships and the wharf or jetties, and shortens the duration of berthing and departure. Therefore, both safety and efficiency were greatly enhanced.

With regards to "3) Shortening of Port Time and Elimination of Berth Waiting Time", in the past, some container ships were longer than the length of the first wharf, and containers had to be moved on the ship from one side to the other before downloading or ships had to reposition after downloading some of the containers from one end of the ship. However, the second wharf made it possible for containers to be downloaded from a single position and, with easier navigation, thus port time was reduced greatly. Regarding berth waiting time; both people concerned with the project and the wider general public confirmed that nowadays almost no ship was witnessed waiting.

3.3.2 Impacts

3.3.2.1 Intended Impacts

The intended impact of the project was `contributing to the smoother increases in international cargo trade and economic development in the Solomon Islands`. Therefore, it was decided to ascertain if there had been any improvement in the total exports/imports, Gross Domestic Product (GDP), Gross National Income per capita, labour force and unemployment rates.

Table 5 Change on Total Amount of Export and Import (Year 2000 = 100%) [9]

	2013	2014	2015	2016	2017	2018
Total Export	368.9	310.1	352.9	403.3	428.0	448.4
Total Import	286.3	269.6	283.5	289.2	348.7	351.9

Source: Prepared from data obtained from WB website[10]

Table 6: GDP (Current billion USD) and GNI (USD)[11]

	2013	2014	2015	2016	2017	2018
GDP	1.13	1.172	1.155	1.23	1.31	1.396
GNI	1,770	1,840	1,870	1,830	1,870	2,020

Source: Prepared from data obtained from WB website [12]

[9] Only data up-to 2018 was available, when it was accessed.
[10] URLaddress: https://data.worldbank.org/country/solomon-islands?view=chart (accessed on 12 May 2020)
[11] Only data up-to 2018 was available, when it was accessed.
[12] URLaddress: https://data.worldbank.org/country/solomon-islands?view=chart (accessed on 12 May 2020)

Table 7 Labour Force (1,000 persons) and Unemployment rate (%)

	2013	2014	2015	2016	2017	2018	2019
Labour Force	243	250	257	264	271	279	286
Unemployment Rate	2.04	2.10	2.01	1.93	1.77	1.79	1.79

Source: Prepared from data obtained from WB website [13]

As shown in Table 5, the volume of international cargo (exports/imports) increased by approx. 22% for export and approx. 23% for imports, compared between 2018 and 2013. Among the main economic index, GDP increased by approx. 24% and GNI per capita by approx. 14% (See Table 6). Furthermore, the labour force increased by approx. 18% and the unemployment rate decreased by 0.25% compared between 2019 and 2013 in Table 7. This indicates that the number of employed people has been increasing.

Some shipping companies commented that imports in year 2019 had decreased and SIPA, the Solomon Islands' Government, and all concerned people in the maritime industry, unanimously agreed that the amount of imports and exports was affected greatly by the broader economic situation and the price of primary products.

Numbers for SIPA's staff members were 224 in 2013 and 478 in 2018. Although not verified by statistical data, SIPA's CEO estimates that there are over 10,000 people employed in relation to SIPA, such as shipping companies and domestic cargo companies.

As described above, between the base year (2013) and the ex-post period (2018/2019), this project contributed to some extent to the economic development of the Solomon Islands both in terms of promotion of employment and increasing logistics.

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Natural Environment

This project was not regarded as a large-scale project within the port sector as determined by JICA's *Guidelines for Environmental and Social Considerations* (April, 2010) and it was considered that undesirable impacts on the environment through project implementation would not be serious. This project is therefore categorized as "B" within JICA's Environmental and Social Considerations.

To alleviate the effect on the aquatic ecosystem, contamination prevention membrane was set in the sea during dredging, and no particular associated problems were observed. The Ministry of Environment is responsible for monitoring water quality around Honiara Port. Water quality monitoring was not carried out, but no water pollution was reported during construction. Surface water drained from Honiara Port is mainly rainwater and its impacts on the aquatic ecosystem are considered minimal. The Environmental Impact Assessment (EIA) report for this project was approved by the Ministry of Environment at the time of planning

[13] URLaddress: https://data.worldbank.org/country/solomon-islands?view=chart (accessed on 12 May 2020)

and it was confirmed that the project was conducted in accordance with the conditions described in the Environment License.

2) Resettlement and Land Acquisition

Neither resident resettlement, nor land acquisition was required, as the land belongs to the Government of the Solomon Islands.

3) Unintended Positive/Negative Impacts

More self-funded investment after recovering fiscal balance (positive impact)

As SIPA secured a larger space (the second wharf) to handle cargo more efficiently, the income from wharf fees and cargo handling fees increased rapidly and SIPA's fiscal balance improved after completion of the project in 2016. This made it possible for SIPA to further invest in facilities and equipment, and significant impacts were observed, such as the improvement of safety at the domestic jetty, reduced electricity bills, increased donations to the Solomon Islands Government and community.

- Upgrading facilities: repair and re-tarmac of the container yard (outside of the scope of the project); provision of three cranes and other equipment; replacing existing lights with LED lights and installation of solar lights; introduction of new terminal management system and new security system such as CCTV.
- Improvement of safety and security: changing to LED lights realised electricity cost savings, and has enabled the expansion of the lighting area and operation duration. With the introduction of CCTV, less theft and vandalism were reported, thus the security situation of Honiara Port has improved significantly.
- Improvement of the domestic wharf: LED security lights were installed and maintenance and construction of jetties began (four new jetties have been designed and one jetty was about to be built).
- Contribution towards the capacity improvement of customs and quarantine of Solomon Islands Government: donation of an X-ray scanner for quarantine (approx. two million US dollar)
- Community support: donations to the central hospital, schools, etc.

More recognition as an international port fulfilling international standards (positive impact)

After completion of the project, SIPA was accepted as a provisional member of the International Association of Ports and Harbours, which is an affiliated association of the International Maritime Organization, and became a full status member in August 2019. Moreover, Honiara Port was recognised as a sufficiently equipped and properly managed international port and signed a partnership agreement with Jurong Port, which is a main

domestic port in Singapore and Ports Australia, which represents both Australian Government and private ports in Australia.

With regard to effectiveness, all targets of operation indicators were achieved and the efficiency of cargo handling was significantly improved. Furthermore, safety of cargo handling and ship routes were secured and further qualitative effects have been emerging. As to the impact of the project, there has been economic development to some degree after the completion of the project, and the profit from the restoration of fiscal balance has made possible investment in further improvement of the port. Initial impacts have borne subsequent impacts and many positive effects were observed. There were no particular negative effects on the environment and no land acquisition or resettlement cases have occurred.

This project has largely achieved its objectives. Therefore, effectiveness and impacts of the project are high.

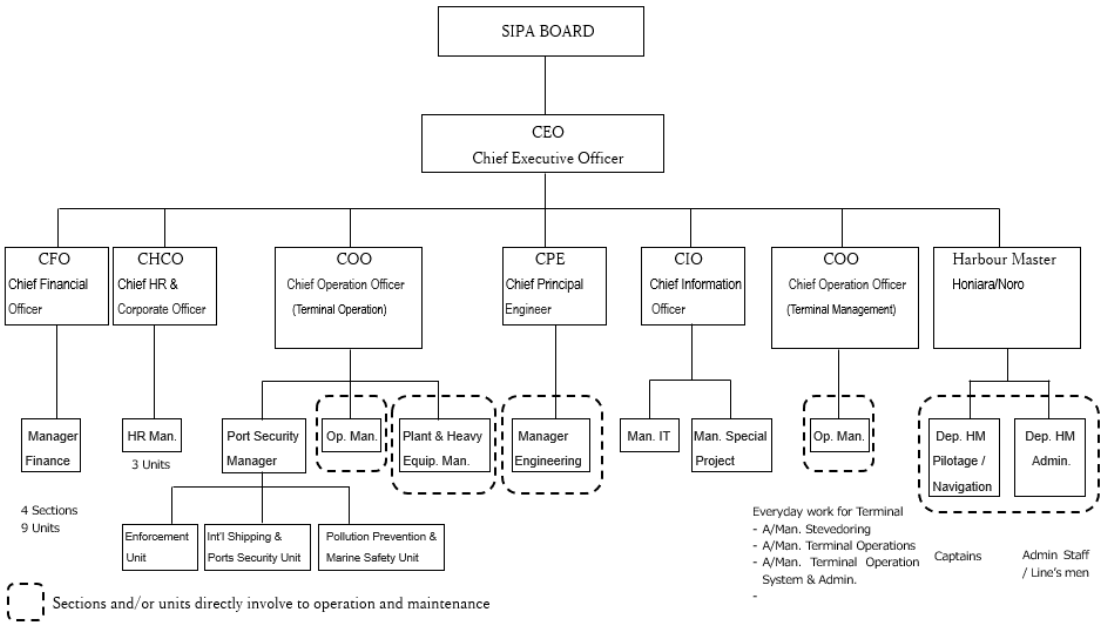
3.4 Sustainability (Rating: ③)

3.4.1 Institutional/Organizational Aspect of Operation and Maintenance

Soon after completion of the project the executing agency, SIPA, recruited the current CEO and under his leadership organisational reform began and has been ongoing. At the time of planning, there were four Departments, namely, Operation Department, Engineering Department, Financial Department and Corporate Service Department, with a total of 224 employees. As of September 2018, the number of employees reached 478 across eight departments including two ports. The eight departments are, Finance Department, Human Resource Department, Terminal Operation Department (Port Security Section, Ports Service Operation Section, Plant/Heavy Equipment Section), Engineering Department, Information Department, Terminal Management Department, Honiara Port and Noro Port. Honiara and Noro ports each include a Pilotage and Navigation Section. Facilities provided under this project are mainly looked after by the Engineering Department. Section managers for the Ports Service Operation and Plant/Heavy Equipment Section are also directly involved with maintenance of the port. Under supervision of the Chief Principal Engineer, the Engineering department contains sections in charge of general building and plumbing, marine infrastructure, port terminals, electrical and property. The Engineering Department is responsible for marine and terminal infrastructure and also planning on new projects.

This project made it possible for Honiara Port to operate 24 hours a day for 365 days, and it has resulted in organisational structural reform and an increase in the number of staff members, 99% of whom are Solomon Islanders. The sufficiency rate of employees is 95%. SIPA continues its efforts with recruitment and, with the introduction of a new terminal management system

(IT), it was confirmed that Honiara Port operated more efficiently and there were no problems found in the operational aspect of sustainability.



Source: Prepared from organisational chart (2020) provided by SIPA

Figure 1 Organisational Chart of SIPA (Top Executives Simplified)

Moreover, safety at Honiara Port has improved dramatically with the enhancement of security, such as the increasing numbers of security personnel, introduction of a biometrics security system and conducting training courses for security guards. This has contributed towards the further enhancement of the organisational aspect of operation and maintenance. There were some vacancies at the time of the ex-post evaluation, however, main positions, which required qualifications, were filled and the SIPA was making continuous effort for recruitment. Therefore, there were no problems found with the organisational aspects of operation and maintenance at SIPA.

3.4.2 Technical Aspect of Operation and Maintenance

The main facility, which entails the berth in the second international wharf and the north and south revetment was designed with 50 years of service life. Therefore, in principle, it should not require major maintenance work. However, at the time of planning, it was recommended that to prolong its life for good usage in the future, early discovery of damage and appropriate and timely repair are essential through regular inspection of the berth facilities; such as depths and conditions of berth at the front water area, mooring dolphins, armour blocks, and access road.

Regarding the technical level of operation and maintenance, during the project period on-the-job training was provided to the Engineering Department to enhance their maintenance

capacity. At the time of the ex-post evaluation, staff members of the Engineering Department have sufficient technical skills to plan and implement small-scale repair; such as repairing tarmac areas and the expansion of the temporary container yard. However, SIPA is promoting capacity enhancements for technical staff and is considering the recruitment of a foreign expert specialised in areas such as ship repair and/or slipway[14] to provide workshops and on-the-job training for further enhancing the technical skills of their workforce.

At the time of planning, maintenance of stevedoring equipment, which includes forklifts, was conducted under the Engineering Department. However, the Plant/Heavy Equipment Section was subsequently transferred to the Terminal Operation Department as part of the organisational reform. Separate units based around the brands of the equipment were created to strengthen the skills capacity on maintenance and troubleshooting for each brand.

During the ex-post evaluation, the Harbour Master of Honiara Port was recruiting more lines' men[15] and captains. All captains within SIPA were trained and qualified overseas and it is a requirement for lines' men to have completed attachments to large ports in Singapore or Australia. This is desirable for the lines' men in terms of safety and strengthening of their technical skills as they can acquire experience of tethering in large ports, where many large ships call.

Therefore, in regard to technical aspects of operation and maintenance, there were no particular concerns regarding operation and maintenance of facilities. Staff members concerned with operation and maintenance have sufficient levels of technical skill and opportunities for capacity enhancement as needed.

3.4.3 Financial Aspect of Operation and Maintenance

SIPA's recent income and expenditure are as shown in Table 8.

Table 8: Income and Expenditure of SIPA

(Unit: million Solomon Dollars)

Fiscal Year	2013	2014	2015	2016	2017	2018
Income						
Ports Charges and fees	86.8	94.5	118.1	226.9	195.3	205.9
Other income	10.3	12.7	17.3	13.9	18.8	26.1
Expenditure						
Administration	-63.1	-70.7	-62.6	-71.2	-75.2	-65.9
Personnel Cost	-32.5*	-42.8	-46.3	-46.9	-62.4	-79.3
Profit from Operations	1.5	-6.2	26.4	122.8	76.4	86.8
Net Finance Cost	0.0	0.2	-0.1	-0.1	0.9	1.3
Net Profit	1.6	-6.5	26.3	122.7	77.3	88.1

Source: Prepared from information provided by SIPA

[14] Slope to bring ship on land.

[15] Line's mem are the workers who fasten lines (ropes and/or cables) of large vessels to facilities of wharves such as mooring dolphins and bollards.

Due to the improvement of facilities achieved by this project, SIPA's income from port charges and fees nearly doubled in comparison with prior to the project implementation. This, in combination with management efforts, has led to net profits drastically increasing since the completion of the project in 2016.

At the time of planning, it was expected to use the second wharf only for the handling of container ships for the time being. However, when two container vessels call at the same time, both the first and second wharves are used. Moreover, shift numbers have increased, because Honiara Port started to operate 24 hours 365 days after completion of the project; and with the enhancement of Noro Port as an international port, the total number of staff members has almost doubled. This caused personnel costs to rise from 2017.

After completion of the project, personnel costs and electricity bills increased; however, SIPA self-financed the purchase of equipment, introduced new systems and further improved facilities. As the project brought a significant rise in revenue, this is more than sufficient to cover the additional costs and SIPA has secured and manages a budget sufficient for maintenance.

Repair Work by Self-Funding

Donated X-ray Scanner for Quarantine Office

Therefore, the financial situation of operation and maintenance was assessed as very satisfactory at the time of the ex-post evaluation.

3.4.4 Status of Operation and Maintenance

SIPA understands the importance of regular inspections and repairs for the second wharf facility. Technicians from the Engineering Department and Honiara Port management strictly practice regular check-ups and monitor appropriate usage of the wharf. Therefore, the status of operation and maintenance of the facilities/equipment remained very good at the time of the ex-post evaluation. Damage to the concrete construction of the facilities, which was pointed out during the defects inspection, has already been repaired by SIPA, and the bollards are regularly repainted.

The overall status of the facilities has improved further, subsequent to the defect inspection, since repairs outside the project scope have been carried out. Facilities provided under this

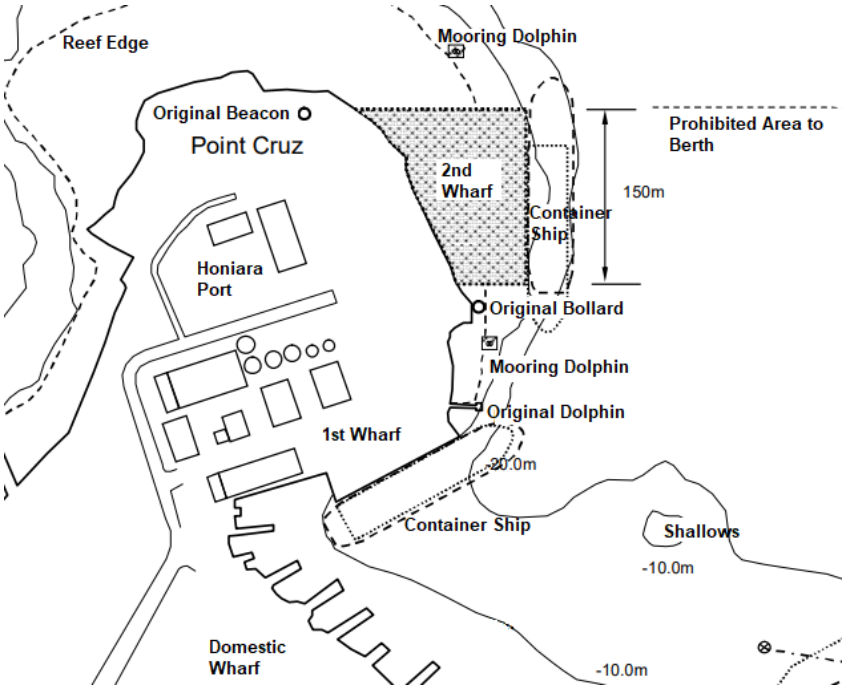
project contribute towards the more efficient operation of Honiara Port and have been a driving force to increase SIPA's profit.

All the facilities provided were utilised fully. Generally, container vessels and cargo ships, other than copra ships[16], are berthing at the second international wharf for stevedoring. However, both the first and second wharves are utilised if it is necessary to receive two vessels, container and/or cargo ships, simultaneously. Cruise liners are always given priority to berth at the second wharf.

The only operational concern raised during the ex-post evaluation was access to the mooring dolphins[17]. At the time of planning. neither the Solomon nor Japanese sides gave sufficient attention to the desirability of building a connection bridge to the dolphins. Island style dolphins accessed by small boats were designed, approved and constructed. However, actual use has revealed that the dolphin facing towards the open sea can face high waves. The size of the vessels/boats berthing makes a difference to the maximum allowable wave height to berth (1,000t～5,000t: 0.5m, > 5,000t: 0.7m). The maximum allowable wave height for small boats transporting line's mem is only 0.3m, causing the line's men, who finished the tethering work, to sometimes have to wait on the dolphin until the sea becomes sufficiently calm for their safe return. Previously, SIPA's line's men used to work on the dolphins using a connected bridge and had become accustomed to freely moving between the dolphins and the wharf. In high seas they can feel unease that they are unable to safely come back to the wharf immediately after completing their tasks.

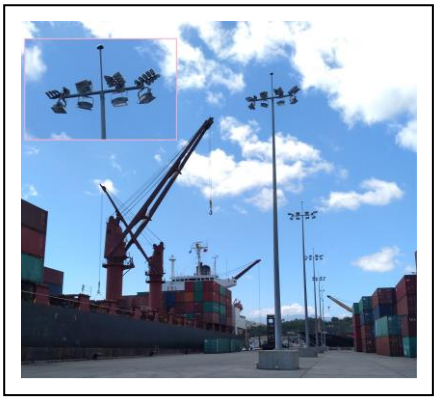
[16] Cruise liners are given priority to berth at the second wharf, however, copra ships whose cargo are coconut oil have strong odor and, to avoid staining, are not allowed to use the second wharf.

[17] Facilities piled in the water in ports for securing the vessels by using ropes. Top of pillar stakes are normally out on the surface of the water.



Source: Information of the Second Preparatory Survey Report for Outline Design on the Project for Improvement of Honiara Port Facilities in Solomon Islands

Figure 2: Locations of Mooring Dolphins on the First and the Second Wharves



LED Lights

Mooring Dolphin

Apart from concerns with the mooring dolphins` access, no accidents around Honiara Port were reported and there have been no problems after the completion of the project. Therefore, in regards to the status of operation and maintenance, there were no particular problems found other than a wish for a connecting bridge to the mooring dolphin.

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

This project was aimed at building and enhancing the port facilities thereby realising greater effectiveness and efficiency in the management and the cargo handling at Honiara Port, which is the most important port in the Solomon Islands.

This project has been highly relevant to the country's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance is high. With regard to implementation, the project components were carried out mostly as planned, and the project cost and period were within the plan. Consequently, the efficiency is also high. All quantitative indicators, such as elimination of berth waiting time and improvement on efficiency of cargo handling, of this project were achieved. Furthermore, safety of cargo handling and ship routes were secured and further qualitative effects have been emerging. As to the impact of the project, although the promotion of logistics and the reduction of transportation costs could not be verified, several positive impacts have been confirmed; unemployment reduction; profit from the restoration of fiscal balance of the SIPA has made possible systematic investment in further improvements of the facilities and equipment, and; Honiara Port has been recognised as a sufficiently equipped and properly managed international port. Therefore, effectiveness and impacts of the project are high. With regards to operation and maintenance, the financial aspect is particularly promising, and no major problems have been observed in the institutional/organizational and technical aspects and current status of the operation and maintenance system. Therefore, sustainability of the project effects is high.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

It is important that the line's men feel confident working on the mooring dolphin located on the open sea. Therefore, it is recommended that SIPA undertake consultation and examine the practicality of building a connecting bridge between the wharf and the dolphin and/or other solutions to improve the situation. [18]

4.2.2 Recommendations to JICA

If improvement in operation of the mooring dolphin is found necessary after consultation and examination within SIPA; it is recommended that JICA work together with SIPA to explore possible countermeasures in the future.

[18] During finalizing the report in December 2020, CEO informed that the boat for tethering was changed to larger boat and safety of line's men was secured for the time-being, however, it was not directly verified by the evaluator.

4.3 Lessons Learned

Necessity to check thoroughly the way the existing facilities work during the design stage.

The old mooring dolphins had a connecting bridge between the first wharf and the dolphins; however, the new mooring dolphins attached to the second wharf, were designed and constructed as “island style” for this project. Line’s men have to use a small boat to go back and forth between the wharf and the dolphins. At the time of planning, the executing agency was also unaware of any potential problems. However, the allowable wave heights for berthing are different between large vessels and small boats, and there are times when the line’s men could not return to the wharf after tethering.

If there is an existing facility, its on-going operation should be examined in advance of design and consultation undertaken with the recipient side whether the expected operation of the new facility could cause any problems.

Choosing facilities/equipment with low running costs to increase sustainability.

The electricity cost of lighting in ports makes up a significant proportion of running and maintenance costs, due to night stevedoring and security, and lighting facilities were included in the project scope. SIPA wished to be certified as a Green Port, and therefore changed all lighting to LED lights at both Honiara Port and Noro Port. As a result, SIPA reduced running costs and was able to increase the number of lights at both international wharves and the Domestic Port. This has helped greatly to improve the efficiency and safety of cargo handling and security at the port.

To increase sustainability, it is very important to keep running costs low. Therefore, it is desirable to consider long-term cost efficiency and energy saving rather than simply the cheapest initial cost. This is especially important when a project includes facilities and/or equipment, which consume significant quantities of energy.

Selection of contractors based on quality and experience (Good Practice)

The shorter project period, with high quality construction, became possible mainly due to the selection of a well-experienced and reputable sub-contractor for the installation of the steel pipe pile foundation. Aiming to shorten the project period, a Japanese specialist company that employs highly experienced operators was selected for the installation of the steel pipe pile foundation. Moreover, the crane chosen to use was bigger and of a higher specification than was specified in the plan, for the safety concerns. Although using a top-class contractor and expensive equipment meant a higher unit cost, the main contractor felt that based on the quality and performance the expense was justified. As a result, the overall project period was reduced and high quality construction was achieved.

Important points to consider when designing civil engineering construction in developing countries are as follows:

1. The need to match requirements (request) of the recipient country.
2. Robustness of construction (not easily broken).
3. Ease of maintenance.

Therefore, when the contractors for key construction elements and equipment are selected it is preferable to consider, not only initial costs, but also quality and performance/experience. This will help to secure sustainability through prolonging the life of the facility and the equipment provided.

Pacific Region

FY2019 Ex-Post Evaluation of Technical Cooperation Project

"Promotion of Regional Initiative on Solid Waste Management In Pacific Island Countries"

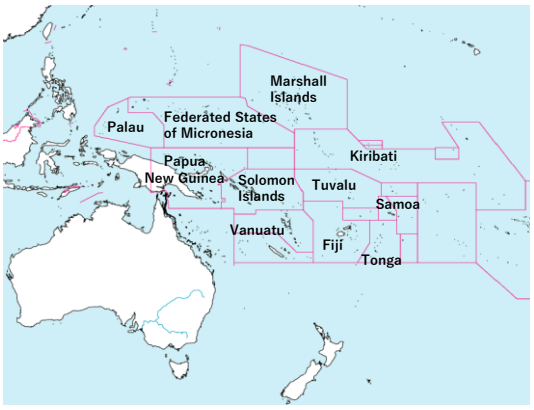
External Evaluator: Keisuke Nishikawa, Japan Economic Research Institute Inc.
Hisae Takahashi, Ernst & Young ShinNihon LLC.
Atsuko Orimoto, Japan Economic Research Institute Inc.

0. Summary

This project aimed to improve the capacity (human resources and institutions) for waste management in the Pacific island countries through the implementation of a regional waste management strategy as a regional project for 11 countries in the Pacific region. The project was consistent with the waste management policies and needs of the entire region and each country at the time of planning and completion. It is also highly consistent with Japan's ODA policy for the Pacific region at the time of planning. Therefore, the relevance is high. With regard to the achievement of the Project Purpose for the region and for each country, some issues were observed, but it was achieved as a whole. After the completion of the project, in addition to the activities in this project, such as the development of a final disposal site using a semi-aerobic method and the investigation of waste quality, further improvements in waste management, namely waste reduction, promotion of recycling, and the prohibition of the use of disposable plastics, have been observed. The Overall Goal was generally achieved accordingly. Therefore, the effectiveness and the impact of this project is high. Concerning efficiency, although it was judged that the project period was within the plan, the project cost exceeded the plan; therefore, the efficiency is fair. The sustainability of the effects generated by this project was evaluated to be fair because of the issue on the transfer of technical skills due to the shortage of human resources and transfer of personnel in charge of waste management, and the issue of maintaining and improving technical skills, especially through continued mutual learning among countries.

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

1. Project Description



Target countries of this project
(11 countries)

Baruni Landfill, improved through this project
(Papua New Guinea)

1.1 Background

Waste management in the Pacific island countries was often difficult in securing appropriate waste disposal sites due to geographical conditions such as the small size of land and social background such as the traditional land ownership system, and it was recognized as the most urgent and difficult problem at the third Pacific Islands Leaders Meeting (PALM3). Many of the existing disposal sites were open dumping at which waste was simply dumped. In addition to the inadequate leachate treatment facilities, the lack of technical maintenance capacity had led to serious impacts on marine (coral reef) and terrestrial tourism and industrial resources as well as public health. In addition, the rapid modernization of lifestyles and the concentration of population in urban areas have resulted in a noticeable increase in the variety and volume of waste. Achieving proper disposal of waste had been one of the major issues common to island nations in the Pacific region.

For this, Japan has been promoting cooperation in waste management since 2000 based on the declarations issued at the Pacific Islands Leaders Meeting, etc. and has positioned "waste management measures" as one of the most important agendas in environmental protection, which was a priority area of assistance. In addition to bilateral technical cooperation, the "Solid Waste Management Project in Oceania Region" targeting the Pacific region has been implemented since FY2006 based in Samoa, including the dispatch of individual experts to the Secretariat of the Pacific Regional Environment Programme (SPREP) headquartered in Samoa. Also, it supported SPREP to develop a regional strategy for waste (2010-2015), which set 9 priority areas and 41 actions to solve them as common issues in the region.

Despite these efforts, the number of personnel in the waste management field was limited due to the small population. In addition, even though staff members were trained, the institutional infrastructure for utilizing their abilities was weak, so some left the region, resulting in a

situation where both the quality and quantity of human resources engaged in waste management were insufficient. These problems were not only faced by the government but also by the private sector and NGOs, etc.

1.2 Project Outline

Overall Goal		Sustainable management of solid waste in the Pacific Region is enhanced.
Project Purpose		Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation of the Pacific Regional Solid Waste Management Strategy.
Output[1]	Output 1	Human capacity of solid waste management is strengthened through trainings and workshops.
	Output 2	Waste management options for atoll are studied.
	Output 3	Knowledge experience and lessons through the project and the past assistance are shared among Pacific Islands Countries (hereinafter referred to as "PICs").
	Output 4	Regional network among PIC countries is strengthened.
	Output 5	Regional system to monitor the RS2010-2015 is established.
Total cost (Japanese side)		1,086 million yen
Period of Cooperation		January 2011 – October 2016 (Extension period: February 2016 - October 2016)
Country		11 PICs (Fiji, Papua New Guinea (hereinafter referred to as "PNG"), Solomon Islands, Vanuatu, Marshall Islands (hereinafter referred to as "RMI"), Federated States of Micronesia (hereinafter referred to as "FSM"), Palau, Kiribati, Tuvalu, Tonga, Samoa)
Partner Country's Implementing Organization		Secretariat of the Pacific Regional Environment Programme (SPREP) and Implementing Agencies in charge of solid waste management in 11 PICs
Supporting Agency/Organization in Japan		Shibushi City, Okinawa Citizens Recycling Movement, etc.
Related Projects		[Technical Cooperation] Technical Cooperation Project

[1] The results of this project consist of the results of 12 individual projects (activities of regional cooperation and activities in each of the 11 countries). The results of the "regional collaboration" are described here.

	・ Palau “Improvement on Solid Waste Management in the Republic of Palau” (2005 – 2008) ・ Samoa “Solid Waste Management Project in Oceania Region” (2006 - 2010) ・ Vanuatu “Project on Improvement of Bouffa Landfill in the Republic of Vanuatu” (2006 – 2008) ・ Fiji “Waste Minimization and Recycling Promotion Project” (2008 – 2012) ・ Pacific Island Countries “Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries Phase 2” (2017 – 2022) <u>Grassroot Technical Cooperation</u> ・ Fiji, Vanuatu “Promotion of Shibushi Model (Waste Minimization without incineration) from Fiji to Pacific Island Countries” Shibushi City (2011 - 2013) ・ Palau “Integrated Programme for Environmental-friendly Compost System in the Republic of Palau” Mie Prefecture/The International Center for Environmental Technology Transfer (2011 – 2013) ・ Tonga “Great Vava'u and Okinawa Mottainai Movement Project” Naha City/ Okinawa Citizens Recycling Movement (2011 – 2014) ・ Vanuatu, Samoa “Promotion of Shibushi Model (Waste Minimization without incineration) from Samoa to Pacific Island Countries” Shibushi City (2014 – 2016) ・ Solomon “Establishing Separate Collection System of Household Waste in Cooperation with Public and Private Sectors Based on a New 3Rs[2] (Reduce, Reuse, Recycle and Return) Concept” Learning and Ecological Activities Foundation for children (2014 – 2017)) [Grant Aid] <u>General Grant Aid</u> ・ Palau “The Project for the Construction of National Landfill” (2018) <u>Assistance for Grass-Roots Human Security Projects</u> ・ Fiji: “Provision of a shredder and composting house to Suva City Council” ・ Solomon: Construction of final disposal site’s office and training center / fence in Ranadi

[2] 3R stands for Reduce, Reuse and Recycle, and is a key word in waste management.

	・Vanuatu: Provision of medical incinerators ・FSM: Provision of waste collection vehicles (Chuuk, Pohnpei), Provision of waste disposal vehicles (Pohnpei, Chuuk, Kosrae), Provision of recycling equipment (Yap), Renovation of recycling center (Pohnpei), Construction of new final disposal site (Kosrae, Yap) ・Palau: Construction of a composting facility, recycling center, and waste sorting station (Koror), and provision of waste collection vehicles ・RMI: Provision of wheeled garbage cans (Majuro), construction of fence for final disposal site (Ebeye), provision of heavy equipment for waste disposal (Ebeye) [Other International Organizations, Aid Agencies, etc. (Only major projects)] <u>New Zealand</u> ・FSM: Provision of a weigh bridge (Kosrae). ・Solomon: Rental of heavy equipment, provision of bulldozers, and construction of fences at the Ranadi landfill ・Kiribati: Urban Development Program <u>International Monetary Fund (IMF)</u> ・FSM: Construction of a new landfill (Yap) <u>United Nations Development Programme (UNDP)</u> ・Fiji: Subsidy program for home compost of Suva City ・Vanuatu: Support for disaster waste disposal ・Palau: Installation of solar panels at the recycling center (Koror) <u>United States</u> ・FSM/Palau: Establishment of Compact Trust Fund for solid waste management ・RMI: Financial support for the Environmental Protection Agency and Majuro Atoll Waste Company <u>World Bank</u> ・PNG: Provision of training opportunities for youth from the waste picker’s communities

1.3 Outline of the Terminal Evaluation

In the terminal evaluation conducted in August-September 2015, the following judgments were made regarding the expected achievement of the Project Purpose and the Overall Goal, as well as the recommendations described in 1.3.3.

1.3.1 Achievement Status of Project Purpose at the Terminal Evaluation

The achievement of the Project Purpose was measured by examining the indicators set for the activities of regional cooperation, as well as the indicators common to the individual projects in each country, and the indicators specific to each country. As a result, most of the set indicators were "achieved" or "largely achieved", and it was expected that the Project Purpose as a whole would be largely achieved based on the overall achievement status.

1.3.2 Achievement Status of the Overall Goal at the Terminal Evaluation

The prospects for achieving the Overall Goal varied from country to country, from high prospects to low prospects. With regard to regional cooperation activities, areas that island countries needed to solve through cooperation with one or more other island countries were gradually identified, such as "final disposal sites using semi-aerobic methods," "clean school program[3]," "waste quality survey," "composting," and "disaster waste management", and it was assumed that the prospects for achieving the Overall Goal were relatively high.

1.3.3 Recommendations from the Terminal Evaluation

The following three main recommendations were made at the time of the terminal evaluation.

(1) Utilization of expert database

Although the expert database was created as a database of SPREP through this project, it is not clear how to utilize it. It is important for SPREP to take the lead in considering how to utilize the database, as it will be useful for the future utilization of local experts in the Pacific region.

(2) Steady implementation of the recommendations summarized at the time of terminal evaluation

The activities that should be carried out before the completion of the project in each country have been compiled as recommendations. Since the implementation of these activities will lead not only to the achievement of the Project Purpose but also to the assurance and improvement of the sustainability of the project effects, it is important for the parties involved in the project to collaborate in the implementation of these activities.

(3) Closer information sharing between JICA and SPREP

[3] Programs to promote 3R initiatives in elementary and junior high schools

There is an opinion that it is difficult to see the involvement of SPREP in the field of activities in each country. Therefore, it is important to communicate SPREP's activities to the field level through further information sharing between JICA and SPREP as well as among JICA officials to avoid duplication of activities and to achieve more effective collaboration.

2. Outline of the Evaluation Study

2.1 External Evaluator

Keisuke Nishikawa, Japan Economic Research Institute Inc.[4]/ Hisae Takahashi, Ernst & Young ShinNihon LLC.[5]/ Atsuko Orimoto, Japan Economic Research Institute Inc.[6]

2.2 Duration of Evaluation Study

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

Duration of the Study: September 2019 – January 2022

Duration of the Field Study: January 21 – 24[7], 2020 and February 2 – 29[8], 2020

2.3 Constraints during the Evaluation Study

In response to the global spread of COVID-19 while the first field survey was being conducted, strict entry restrictions were imposed in many countries in the Pacific region. Although it was planned to conduct two field surveys in each of the ten countries except Tuvalu, the evaluators actually visited only seven countries (PNG, Fiji, Solomon, Vanuatu, Palau, Kiribati, and Tonga) once. Therefore, the field research assistants in each country collected additional information, while the evaluator remotely directed the research and conducted online discussions with relevant parties from Japan. As a result, discussions with relevant parties were significantly reduced compared to the plan. Therefore, the information collected was not necessarily comprehensive, and judgments on some matters, such as the level of achievement of project outputs, were based on indirect information.

3. Results of the Evaluation (Rating: B[9])

3.1 Relevance (Rating: ③[10])

3.1.1 Consistency with the Development Plan

JICA cooperated in the formulation of the “Pacific Regional Solid Waste Management Strategy 2010-2015 (RS2010)” (see Table 1), a strategy for the entire Pacific region, through

[4] Joined as a member from Qunie Corporation. Responsible for the entire region, PNG, Fiji, Kiribati, Tuvalu, Tonga, Samoa, and from November 2020, Palau, FSM, and RMI.
[5] Responsible for Palau, FSM, and RMI until October 2020.
[6] Joined as a member from Japan Development Service, Co., Ltd. Responsible for Solomon and Vanuatu
[7] Field study in PNG
[8] Three evaluators each conducted a field survey in their assigned countries. (Nishikawa: Kiribati, Fiji, Tonga, Takahashi: Palau, Orimoto: Solomon, Vanuatu)
[9] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[10] ③: High, ②: Fair, ①: Low

the “Solid Waste Management Project in Oceania Region”, which was based in Samoa and was implemented in the Pacific region from 2006 to 2010. This strategy was a single sector policy for waste management in the Pacific region, with nine priorities set as common issues for the region.

At the time of the project planning, the target countries had developed or were in the process of developing national waste management plans in line with the strategy, and it was confirmed that waste management was a major issue emphasized in the development policies of each country.

Table 1: Priority issues and expected outputs in the “Pacific Regional Solid Waste Management Strategy 2010-2015 (RS2010)”

Priority areas	Outputs
Sustainable Financing	Solid waste management systems and programmes in Pacific Island Countries and Territories are financially self-sustaining
Integrated Solid Waste Management	Reduce the amount of waste generated and landfilled through involvement of all sectors and local initiatives. Solid waste that cannot be avoided, reused, recycled or composted are disposed of using acceptable methods that have no negative impacts on human health and the environment Well-managed, efficient, and self-sustaining waste collection systems introduced or upgraded in Pacific Island Countries and Territories
Legislation	Solid waste management activities in Pacific Island Countries and Territories are supported by practical, effective, enforceable, and culturally-sensitive legislation
Awareness Communication & Education	An informed and aware population who support and participate in waste management activities
Capacity Building	Skilled and trained people available in-country, who effectively manage solid waste management systems
Environmental Monitoring	The environmental impact of solid waste is assessed to provide accurate data on performance and provide information for planning and decision-making
Policy, Planning, and Performance	Pacific Island Countries and Territories implement national waste management policies and strategies, which are based on accurate data, with monitoring systems established to report on performance
Solid Waste Industry	Solid waste management in Pacific Island Countries and Territories is supported by a thriving and competitive solid waste industry involved in reuse, recycling, collection, and disposal activities
Medical Wastes	Medical wastes are managed in an environmentally-sound manner without adverse impact on human health and the environment

Source: Prepared based on the “Pacific Regional Solid Waste Management Strategy 2010-2015”

At the time of completion of the project, RS2010 was still effective as the solid waste management strategy for the entire Pacific region[11], and each country, with the support of

[11] At the time the project was completed, the Pacific Regional Waste and Pollution Management Strategy "Cleaner Pacific 2025" (as described later), the successor to RS2010, was being developed.

this project, developed a waste management strategy that was consistent with RS2010. As shown in Table 2, while each country indicated the importance of waste management in their national development plans, they also had more specific waste management strategies in their sector plans[12].

In the 2000s, before implementing this project, many countries were aware of the importance of waste management and had started or were considering the formulation of waste management plans. Still, concrete progress was made during the implementation of this project. It was confirmed that the importance of waste management was positioned more clearly in all countries at the time of project's completion than of planning.

Table 2: Outline of national plans (waste management sector) and sector plans of each country at the time of project completion

Country	National/Sector	Name and contents of plan at project completion
Fiji	National Plan	"Roadmap for Democracy and Sustainable Socio-Economic Development 2010-2014" and "A Green Growth Framework For Fiji" Both plans were essentially national plans that were in effect at the time of project completion, and both identified waste management as a priority area to be addressed from an environmental perspective.
	Sector Plan	"Fiji National Solid Waste Management Strategy 2011-2014" With a vision of a commitment to sustainable solid waste management by an informed and responsible community, the goal is to increase the percentage of solid waste that is cost-effective, financially sustainable, legally compliant, and managed in an environmentally sound manner. This strategy was supposed to cover the period up to 2014, but it remained an effective strategy at the completion of the project.
PNG	National Plan	"Papua New Guinea Development Strategic Plan 2010-2030" Better and more comprehensive waste management is described as the output. "Medium Term Development Plan 2011-2015 of Papua New Guinea" Improvement of waste management through improved disposal methods is described as a course of action.
	Sector Plan	Waste Management Plan of the National Capital District Commission District 2016-2025 It is the waste management plan developed under this project and approved on November 26, 2016 (delayed due to lack of approval by the time of completion). Specific activities and timelines have been developed with an emphasis on the expansion of collection services, intermediate treatment and waste reduction, hygienic landfill management, and public awareness.
Solomon	National Plan	National Development Strategy 2011-2020 It states the strategy to protect people's health and the

[12] As for Palau, the national plan was a long-term plan formulated 20 years before the completion of the project, and there was no specific reference to waste management, but the policy and strategy for waste management was clearly positioned in the sector plan.

Country	National/Sector	Name and contents of plan at project completion
		environment through proper solid waste management and to not only enforce the laws and regulations that are already in place but also to take further measures following the 3R principles.
	Sector Plan	National Waste Management and Pollution Control Strategy 2017-2026 The strategy was developed and supported by this project and approved and tested one year later than originally planned. The major wastes are solid and liquid, hazardous and chemical, and medical and electrical wastes. It provides comprehensive waste and pollution management through research, education, awareness-raising activities, PPP, infrastructure development, and strengthening of stakeholder relationships.
Vanuatu	National Plan	Vanuatu 2030: the people's plan A stable, sustainable and prosperous Vanuatu is the pillar of the project, and environmental issues are included in the "Sustainable Vanuatu". The goal is to avoid harming future generations and the environment, and waste management is included in the environmental sector.
	Sector Plan	National Environment Policy and Implementation Plan 2016–2030 The Plan is a comprehensive policy for the protection, development and management of the environment, which includes waste management and pollution control among its key objectives. As for waste management, it reflects the achievements and challenges of this project. National Waste Management, Pollution Control Strategy and Implementation Plan 2016-2020 The waste management policies of the “National Environment Policy and Implementation Plan 2016–2020” are further embodied. Pollution control is added from the “National Waste Management Strategy and Action Plan 2010-2015”, and the need for awareness raising and community involvement is further emphasized. The project's contribution to disaster waste and domestic coordination is clearly mentioned.
RMI	National Plan	National Strategic Plan 2015-2017 It states that improved waste management is important for the protection of people's health and the environment.
	Sector Plan	National Waste Management Strategy (Draft) The project supported the formulation of the plan, but it did not come into effect during implementation, and support is being provided by a subsequent project.
FSM	National Plan	Strategic Development Plan 2004-2023 It was indicated that measures should be taken to achieve environmental protection and sustainable development, including enforcement of laws and regulations. In addition to improving waste disposal and management, Strategic Target 2 also indicated the importance of public awareness.
	Sector Plan	National Waste Management Strategy 2015-2020 This is the waste management plan finalized in this project. It set out to tackle the problem of waste through an integrated approach of waste reduction, recycling, and composting. Waste management strategies in each state Each state has also developed a strategy for appropriate waste management.

Country	National/Sector	Name and contents of plan at project completion
Palau	National Plan	National Development Plan 2020 This is a long-term plan formulated in 1996, two years after independence, and there is no specific reference to policies on waste management.
	Sector Plan	National Solid Waste Management Strategy (Draft) The goal is to achieve sustainable waste management through 3R-based reduction policies, selection of appropriate technologies and promotion of stakeholder participation.
Kiribati	National Plan	Kiribati Development Plan 2012-2015 Waste management is one of the issues in the field of human health and environment, and its proper management is considered to be an important matter.
	Sector Plan	National Waste Management Strategy It describes people's awareness and recycling of organic waste as priorities.
Tuvalu	National Plan	National Strategy for Sustainable Development 2016-2020 It identifies issues related to solid waste management, among which is the importance of extending the life of disposal sites through waste control.
	Sector Plan	At the time of the completion of the project, the waste management plan had not been developed. Still, the "Tuvalu Integrated Waste Policy and Action Plan 2017-2026" was under development with the support of the EU and SPREP. (Completed in July 2016)
Tonga	National Plan	Tonga Strategic Development Framework II, 2015–2025 One of the five pillars of the National Goals is environmental improvement, and it targets to improve waste management, reduction, and recycling.
	Sector Plan	Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications Plan Ministry of Health National Strategic Plan Waste Authority Limited Management Plan The importance of proper waste management is emphasized in each plan by the relevant waste management agencies.
Samoa	National Plan	Strategy for the Development of Samoa 2012-2016 In Strategic Area 9 of Priority 4 "Environment", it states the importance of "effective waste management strategies to support sustainable development".
	Sector Plan	Although a sector plan had not been developed at the time of completion, the Waste Management Act of 2010 clearly states that the Ministry of Natural Resources and Environment is responsible for waste collection, landfill management, and promotion of 3Rs.

Source: Compiled from each county's national and sector plans and responses to questionnaires from national waste management agencies.

In light of the above, this project was consistent with the importance and direction of waste management in the regional strategy, national plans and sector plans, both at the time of planning and completion.

3.1.2 Consistency with the Development Needs

At the time of project planning, it was recognized that waste management was the most urgent but difficult problem to be solved in many of the Pacific island countries, where it was difficult to secure appropriate waste disposal sites due to the geographical conditions of small land area and social background such as the traditional land ownership system. Therefore, the final disposal of waste was often open dumping. There were also problems of inadequate leachate treatment facilities, lack of technical maintenance capacity, lack of quality and quantity of human resources engaged in waste management, and the impact on tourism and industrial resources as well as public health. Moreover, the rapid modernization of lifestyles and the concentration of the population in urban areas have led to a marked increase in the variety and diversity of waste, and how to properly dispose of waste has been one of the major issues common to island regions.

As a result of cooperation in waste management in each country under this project, there were improvements in some areas. However, at the time of completion of this project, the amount of waste in each country was increasing with economic development, urbanization, and modernization of lifestyles; therefore, the management of waste needed to be further strengthened. Although there were improvements in waste collection in some areas of each country, the following issues were found to be common to all countries: the inability to provide similar services in various areas, including rural areas and remote islands; issues related to coping with the increase in waste due to population growth and economic activity and the development of final disposal sites; and low recycling rates. The specific issues were as shown in Table 3.

Table 3: Major issues in waste management in each country at the time of project completion

Country	Needs in waste management in the region at the time of project completion
Fiji	Although the collection of household waste in urban areas had improved, issues such as proper enforcement and monitoring of industrial waste management in accordance with the Environmental Management Act, waste management in rural areas, and littering of waste still existed.
PNG	(1) Inadequate waste collection and transportation, (2) Lack of intermediate treatment, (3) The need to improve the operation of final disposal sites, (4) Institutional issues (absence of laws specific to waste management, inadequate hazardous waste management), and (5) The need to improve financial aspects.
Solomon	(1) Lack of funds and manpower for waste management (at the national and provincial levels), (2) Increase in the volume of waste due to population growth and the resulting lack of space for disposal sites (at the national and state levels), (3) Increasing complexity in terms of types of waste, (4) Absence of disposal site supervisors (at the provincial capital), (5) Absence of heavy machinery for use at disposal sites, (6) Low recycling rate (limited number of items, people's awareness), and (7) High transportation cost of recyclables were the main issues.
Vanuatu	(1) Lack of funds and manpower to manage waste, (2) Lack of leadership and management support for waste-related activities, (3) Rapid increase in waste due to population growth, and (4) Delay in improving the landfill due to

Country	Needs in waste management in the region at the time of project completion
	layoffs of key counterparts at Port Vila City Council.
RMI	For RMI, an atoll nation with a small land area, solid waste management was an urgent issue in the following aspects. (1) Lack of proper education and communication information on waste management, (2) Lack of enforcement of laws, regulations and ordinances, (3) Lack of budget, (4) Lack of capacity building of human resources, (5) Lack of legislation on limited recycling programs and waste minimization, (6) Consideration of disposal sites, (7) Lack of disposal management by the ministry managing chemical and hazardous wastes, and (8) Challenges in medical waste management.
FSM	(1) Management of final disposal sites (Chuuk State), (2) Waste collection and disposal systems in line with the expansion of target areas (each state of Pohnpei, Yap, and Kosrae), (3) Establishment of recycling systems to revive the law on container deposit system (Chuuk State)
Palau	The capacity of the final disposal site was approaching its limit. A new final disposal site was being constructed.
Kiribati	Most of the waste is a mixture of organic and inorganic materials, which has been a major barrier to the progress of recycling and waste reduction.
Tuvalu	The following issues were raised: the high cost of collecting waste from remote islands, the cost inefficiency of transporting recyclables to foreign countries, the lack of land for a new disposal site while the capacity of the disposal site in Funafuti Island is nearing its limit, capacity building of waste management officials, and availability of appropriate waste disposal equipment.
Tonga	There was some improvement in the condition of waste collection and disposal sites by the communities, but the improvement in collection was only about half of that of Vava'u Island. It was also mentioned that there was a need to further improve awareness on waste dumping.
Samoa	There were still challenges in the areas of new types of waste, combating illegal dumping, and capacity building of stakeholders in policy and strategy development, including the need to establish financial mechanisms for waste management.

Source: Country development plans and sector plans, responses to questionnaires for each country, and results of interviews

As mentioned above, it was observed that in the countries of this project, the importance and necessity of dealing with the challenges of small land area and increasing waste, in other words, waste management, was high both at the time of planning and at the time of completion. Therefore, this project, which aimed to develop human resources and institutions for waste management, met the development needs of the countries in the Pacific region.

3.1.3 Consistency with Japan's ODA Policy

At the PALM5 held in 2009, Japan announced the development and continuation of cooperation in the field of waste to support the efforts of countries in the Pacific region in line with RS2010, promote semi-aerobic sanitary landfills, and promote the effective use of resources through 3Rs. In addition, to strengthen the strategic nature of its cooperation with the Pacific region, JICA has narrowed down the focus of its assistance to three areas, one of which is the environment and climate change. This project was positioned as part of the programme to support the development of a recycling-oriented society on the islands.

Therefore, it was confirmed that this project was in line with Japan's ODA policy for the Pacific region at the time of planning, and that it was highly consistent with the direction of providing assistance, especially in the areas of environment and climate change.

In light of the above, this project was highly relevant to the development plan and development needs of the Pacific region as a whole and of the 11 countries of this project, as well as Japan's ODA policy. Therefore, its relevance is high.

3.2 Effectiveness and Impacts[13] (Rating: ③)

In order to promote sustainable waste management in the Pacific region, this project set three pillars of cooperation: (1) human resource development, (2) institutional development, and (3) sharing of technology and experience. In cooperation with SPREP, this project provided support for improving waste management in 11 target countries using the framework of RS2010. Specifically, each of the 11 countries individually addressed issues in the domestic waste sector, while at the same time, efforts were made to build a collaborative system that would enhance sustainability throughout the Pacific region. Therefore, while the Overall Goal and Project Purpose were common among the countries, each country set outputs according to its own challenges.

In this ex-post evaluation, while the level of achievement for the collaborative efforts of the entire region is described in the main text, the level of achievement for each country is organized in detail in a separate sheet, and then the overall level of achievement is judged.

3.2.1 Effectiveness

3.2.1.1 Project Outputs

In this project, it was expected that the Project Purpose would be achieved through the achievement of the following five outputs of regional cooperation. The main points of the achievement of each output[14] are shown in Table 4.

[13] Sub rating for Effectiveness is to be put with consideration of Impact.
[14] The degree of achievement of the outputs set for the regional cooperation activities and for each country was determined through the verification of all the achievement of the indicators of each output.

Table 4: Status of achievement of outputs at the completion of the project related to regional cooperation

Output	Degree of Achievement
1. Human capacity of SWM is strengthened through trainings and workshops.	Achieved ・It was observed that trainings on 3Rs and landfill management were conducted every year, and the number of good practices reported on these areas exceeded the target value. In addition, various training programs were conducted by participants from various countries in the region under this project, and the number of such programs also achieved the target value. ・Although it was not clear whether there was any actual improvement in occupational health and safety, the workshops provided opportunities to improve knowledge and skills, and it was generally considered to have been achieved.
2. Waste management options for atoll are studied.	Partly achieved ・A waste plan for the lowlands of the atoll was developed by RMI and activities were based on it. ・No target was set for the number of waste management plans, but in Kiribati and Tuvalu, which are also atoll nations and supported by this project, no plans were developed as a result of this project, and only one study was conducted for the entire project.
3. Knowledge experience and lessons through the project and the past assistance are shared among PICs.	Partly achieved ・The original goal of the project was to develop a methodology for waste survey, but the goal was revised upward to share knowledge and lessons learned on waste management within the region, and the guidebook (Practical Guide to Solid Waste Management in Pacific Island Countries and Territories) was developed. However, the guidebook was not completed and distributed (shared) by the end of this project.
4. Regional network among PIC countries is strengthened.	Mostly achieved ・Although a database of experts for use in the region was developed, it was not organized in a form that could be fully utilized, nor was it shared with other countries. On the other hand, information sharing through the establishment of a website and the publication of newsletters was carried out as planned.
5. Regional system to monitor the RS2010 is established.	Partly achieved ・It was difficult to collect information and data from each country on waste management, and the monitoring system in the region was not fully established. However, the regional strategy (Cleaner Pacific 2025), the successor to RS2010, has been developed and approved, and it can be said that the status of achievement and issues faced by each country through this project have been understood to some extent.

Source: Results of judgment by evaluators

The status of achievement of the outputs (at the time of completion) in each of the target countries was also captured as well as in the regional collaborations. The main points (ratings) are as follows and are organized according to the RS2010 strategy.

Table 5: Status of achievement of outputs in each country[15]

Priority issues of the Regional Strategy (RS2010)			Fiji	PNG	Solomon	Vanuatu	RMI	FSM					Palau	Kiribati	Tuvalu	Tonga	Samoa
								Whole country	Kosrae State	Pohnpei state	Chuuk State	Yap State					
1	Sustainable Financing												③				
2	Integrated solid waste management	2-1. 3R/4R	③		③	②	②			②				①	①		③
		2-2. Landfill management		③	②	②	③		③	③	③	③	③			②	③
		2-3. Waste collection		③			③		③	③	③					③	
3	Legislation																
4	Awareness Communication & Education				②		③	③	③			③	③	③			
5	Capacity Building		③			③	③						③				③
6	Environmental Monitoring																
7	Policy, Planning, and Performance			③			②	②	②	②	②	③	③			③	
8	Solid Waste Industry																
9	Medical Wastes																

Note: ③: High, ②: Fair, ①: Low

Source: Judgments made by evaluators based on survey results in each country

The project included initiatives on capacity building in five of the nine regional priority areas. In addition to supporting the formulation of policies and plans and the establishment of financial systems, human resource development of relevant stakeholders, and supporting environmental education and awareness raising efforts in the region, each country emphasized capacity building on integrated waste management. Although there were some challenges in the level of achievement at the time of completion, with 25% of the outputs receiving a rating of ② and 5% of the initiatives receiving a rating of ①, it was confirmed that overall, 70% of the outputs set had been fully achieved. In particular, the degree of achievement was high in the areas of improvement of waste collection services, human resource development, and awareness-raising and education.

3.2.1.2 Achievement of Project Purpose

Although different outputs were set for each country in the project, the Project Purpose was the same for the entire region and each country: "Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation of the Pacific Regional Solid Waste Management Strategy". As

[15] Since the outputs for each country were not set for all of the priorities of the regional strategy, only those items for which outputs were set are described in terms of achievement.

shown in Table 5, the outputs for each country are set in a way that is tied to the regional strategy, RS2010, and their achievement is linked to the specific implementation of RS2010. Indicators to measure the degree of achievement of the Project Purpose were set for the entire region and for each country according to individual circumstances. In the following, the degree of achievement for the region as a whole is first analyzed, followed by the degree of achievement for each country in tabular form.

For the region as a whole, the project has achieved the promotion of waste management and capacity building of stakeholders in various areas of the regional strategy set out in RS2010 through daily support by experts and the organization of trainings and workshops throughout the period. In addition to the four new good practices devised and implemented under the project, fourteen initiatives that had been implemented in some countries before the project were disseminated through the regional training programs of the project by the end of the project. As for the achievement of results, some issues were observed, but as for the achievement of the Project Purpose, the project played a significant role in the implementation of the regional strategy and the development of each country's initiatives in the region, and the regional purpose were achieved.

Table 6: Achievement level of the indicators for the Project Purpose (whole region)

<table>
<tr><th>Project Purpose</th><th>Indicator</th><th>Actual</th></tr>
<tr><td rowspan="2">Project Purpose: Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation of the Pacific Regional Solid Waste Management Strategy</td><td>1. Degree of contribution of this project to RS2010 to be verified by RS2010 review</td><td>Contributed to the implementation of RS2010 in the areas of 3R, waste management, waste collection, awareness-raising and communication, human resource development and capacity building, and planning and implementation.</td></tr>
<tr><td>2. Through the implementation of this project, good practices (GPs) will be obtained that can be applied in other target countries.</td><td>Through this project, the following four GPs were devised and implemented.
1) Community-based waste collection system on Vava’u Island, Tonga (The community-based waste collection system was also spread to Gizo, Solomon during the project period.)
2) Home Collection System in Chuuk State, FSM
3) Fiji's Household Composting Support Program
4) Financial support for Fiji's Clean School Program
These four GPs were devised and implemented in this project, but the following GPs, which had been observed before the implementation of this project, spread to other Pacific island countries during the project period.

<GPs spread in the region through this project>
<table>
<tr><th>Examples of GPs</th><th>Place of origin</th><th>Number</th><th>Newly introduced areas</th></tr>
<tr><td>Clean School Program</td><td>Fiji (Nadi)</td><td>4</td><td>Kiribati (Tarawa), Solomon (Honiara, Gizo), Tonga (Vava'u), FSM (Ebeye)</td></tr>
<tr><td>Eco-bag</td><td>Fiji (Nadi)</td><td>1</td><td>Solomon (Honiara)</td></tr>
<tr><td>Vehicle weighing system</td><td>Fiji (Lautoka)</td><td>1</td><td>Samoa</td></tr>
<tr><td>Market Compost</td><td>Fiji (Lautoka)</td><td>2</td><td>Vanuatu (Port Vila)</td></tr>
<tr><td>Semi-aerobic landfill</td><td>Samoa</td><td>4</td><td>Tonga (Vava'u), FSM (Yap, Pohnpei), PNG (Port Moresby)</td></tr>
<tr><td>Container deposit system</td><td>FSM (Kosrae, Yap) Palau</td><td>2</td><td>FSM (Pohnpei), Samoa</td></tr>
<tr><td colspan="2">Total</td><td>14</td><td></td></tr>
</table>
Note: FSM - Federated States of Micronesia, PNG - Papua New Guinea</td></tr>
</table>

Source: Completion reports, answers to questionnaires for each country, results of evaluators' decisions

The degree of achievement of the Project Purpose by each country was ③, which was judged to be sufficiently achieved in 8 of the 11 countries (including regional collaboration, there were 16 Project Design Matrices (PDMs), and the Project Purpose was ③ in 13 of them). In each country, indicators to measure the degree of achievement of Project Purpose have been set individually, and the results have been achieved at a

generally high level. In consideration of this, the degree of achievement can be said to have been high in many countries.

Table 6: Degree of achievement of Project Purpose in each country

	Fiji	PNG	Solomon	Vanuatu	RMI	FSM					Palau	Kiribati	Tuvalu	Tonga	Samoa
						Whole country	Kosrae State	Pohnpei state	Chuuk State	Yap State					
Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation of the RS2010	③	③	③	②	③	③	③	③	③	③	③	①	②	③	③

Note: ③: High, ②: Fair, ①: Low
Source: Judgments made by evaluators based on survey results in each country

Through the implementation of the Pacific regional waste management strategy, this project aims to strengthen the overall infrastructure for the priority issues set forth in the strategy. The achievement of the Outputs for the region as a whole and for each country will lead to the achievement of the Project Purpose. The Outputs and Project Purpose for each country are considered to have been achieved as a whole, as indicated above, although some challenges were observed, especially in terms of regular data collection and reporting to SPREP.

Based on the above, the Project Purpose was largely achieved.

3.2.2 Impacts

3.2.2.1 Achievement of Overall Goal

The Overall Goal of the project, 'Sustainable management of solid waste in the Pacific Region is enhanced', was very broad. This goal was set based on the assumption that the Project Purpose of strengthening the comprehensive infrastructure (human resources and institutions) for waste management through the implementation of the project would be further developed in the region after the completion of the project, and a close relationship between them was observed. The indicators were that, for the region as a whole, the waste management GPs obtained through the project would be applied, and that each country's waste management issues would be solved within the region, either independently or with the cooperation and support of other countries. In addition, country-specific indicators were set as well as Outputs and Project Purpose.

Table 7: Degree of achievement of Overall Goal

Overall Goal	Indicator	Actual
Overall Goal: Sustainable management of solid waste in the Pacific Region is enhanced	(Regional Cooperation) The good practices in waste management obtained through the implementation of this project will be applied so that waste management issues in the target countries can be solved within the region, either by the target countries themselves or with the cooperation and support of other target countries. (Each country) Nationwide development of 3Rs, promotion of waste reduction, expansion of GPs, implementation of independent training, proper management of landfills, expansion of waste collection activities, etc. (See attached document for details)	By the completion of this project, areas of waste management to be solved in the region with the cooperation of one or other island countries, such as "final disposal sites using semi-aerobic methods," "clean school program," "waste quality survey," "composting," and "disaster waste management," had been identified. After the completion of the project, in addition to the continuation of the activities undertaken in this project, the following efforts have been made in each country regarding waste management. ・ Fiji: Introduction of a fee-based garbage collection system ・ PNG: Further improvement of the Baruni landfill (introduction of weighing platforms, etc.) ・ Palau: New final disposal site completed in November 2020 (JICA cooperation). Separate collection of recyclable waste ・ RMI: Introduction of a container deposit system ・ Tuvalu: Promotion of recycling programs through the construction of recycling centers. Introduction of a pay-as-you-go system for garbage collection ・ Vanuatu, Samoa, RMI, Tuvalu, FSM (Yap): Introduction of legislation to ban the use of single-use plastics

Source: Completion report, answers to questionnaires for each country, results of evaluators' judgments

After the completion of this project, JICA has been implementing Phase 2 of this project, and other donors have been providing various kinds of support in the field of waste management in several countries. As a result of such support, as shown in the table above, there have been many examples of new initiatives, and it can be said that the efforts for self-sustaining waste management have been progressing in general. It can be seen that the project has led to effective waste management mainly by the staff of the implementing agencies in each country whose capacity has been enhanced by the project.

In addition, this project was implemented in 11 countries in the Pacific region at the same time, and the project promoted "mutual learning among countries," which had not been common before. Expert guidance was provided in each country, and as a result, proper management of semi-aerobic landfills, clean school programmes, and separate collection of recyclable waste were improved in several countries, and proper management was still in place at the time of the ex-post evaluation. While the efforts for mutual leaning among the countries have also been supported in Phase 2 of this project, SPREP and the countries in the region have established a regional conference called Clean Pacific Roundtable in 2016 to exchange views on waste management issues and solutions, which was also supported by the project[16]. The fact that such a regional

[16] As described below, to support the establishment of this regional conference, the project period of this project was extended to October 2016. After the first meeting, the second meeting was held in 2018 and the third meeting in 2021 (the third meeting was held online).

framework for learning from each other has been maintained after the completion of this project is also considered to be a beneficial initiative for self-sustaining waste management in each country.

Based on the above, the Overall Goal was largely achieved.

3.2.2.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

In this project, the promotion of 3Rs, composting of market waste, improvement of waste collection, and improvement of the sanitary environment of disposal sites have been carried out, and it can be said that the project has led to the realization of a more hygienic and safer environment as a whole. However, in some countries where the improvement of disposal sites was carried out in this project, monitoring and considerations were considered necessary as odours, water pollution, and smoke pollution from fires in the existing disposal sites, as well as the impact on waste pickers had been expected.

The situation at the time of the ex-post evaluation of the disposal facility developed in this project was mainly as follows.

- In PNG, 41 Environmental Impact Assessment (EIA) requirements were met in the upgrading of the Baruni landfill, the main final disposal site in Port Moresby, the capital of PNG, and the site has been positioned as a model landfill for landfill upgrading in the country. Through this project, it has been confirmed that there is no longer pervasive odours or smoke generated by the ignition of waste. In addition, some of the waste pickers, who have been making a living by extracting metals and other materials from the waste brought to the landfill, have been employed by the landfill maintenance and waste hauling companies for many years, and this has had a certain positive effect on their livelihood.
- In Solomon Islands, the status of monitoring implementation and recorded data could not be fully ascertained, although the disposal site was partially improved and some examples of employment of waste pickers were observed.
- In Tonga, according to the Department of Environment on Vava'u Island, where the project was implemented, the natural environment monitoring associated with the improvement of landfills was conducted in cooperation with the Vava'u Environmental Protection Association (no data were identified).
- Samoa had the first semi-aerobic landfill in the region, which was upgraded in the early 2000s, and the maintenance work was effectively outsourced to a private contractor, which kept the landfill odour and flies drastically reduced. In addition, the number of

waste pickers was limited and controlled, and the system was designed to monitor children and pregnant women to prevent them from engaging in activities.

As mentioned above, monitoring and data preparation of the natural environment were not sufficiently carried out and the situation was not always comprehensively understood. However, the EIA required in some countries for the improvement of the landfills was carried out in accordance with the requirements of each country and all permits were obtained. There was no negative impact on the natural environment due to the implementation of the project, and no particular problems were found as a whole.

(2) Resettlement and Land Acquisition

It was reported that no resettlement or land acquisition had occurred in any of the countries in this project. At the landfill in PNG, there was a situation where waste pickers were practically living on the site before the implementation of this project, but it was confirmed during the ex-post evaluation that such problems had been resolved.

Therefore, it is judged that there were no problems related to resettlement or land acquisition.

(3) Other Indirect Effects

In the ex-post evaluation, it was not always possible to collect and analyze sufficient information. However, as shown in "1.2 Project Outline", many projects and equipment were provided under the schemes of grass-roots technical cooperation and grass-roots human security financing cooperation in addition to this project in the Pacific countries. This project has made it possible to utilize the capacity building efforts and equipment from those projects to effectively support overall activities that led to improved overall waste management, especially 3R, waste collection, and disposal site management. In this regard, there was a coordination and synergy observed among the various JICA support programs.

Regarding the development of waste management related activities after the completion of the project, at the time of the ex-post evaluation, the counterparts in each country were gradually being transferred, as about five years had passed since the completion of the project. However, Phase 2 of this project and other donor-supported waste management projects were still underway, and activities based on the outputs of this project or derived from this project continued in many countries. In particular, the effects of the project being implemented as a regional project spanning 11 countries in the Pacific region have already been summarized in the case studies of the project's development within the region as good practices, and since then, as shown in Table 9,

there has been an expansion of activities internationally or domestically.

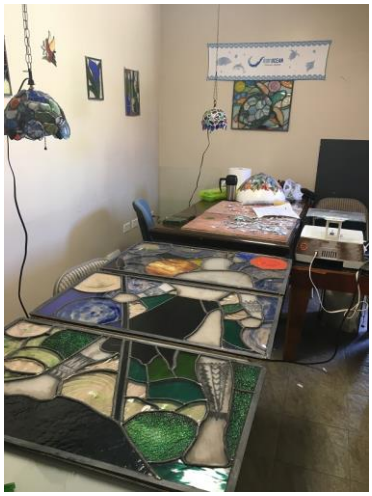
Table 8: Further development of activities related to waste management after completion of the project

Country	Contents
Fiji	・In Lautoka City, several training programs were held for people from various countries in the region, providing many opportunities for stakeholders from other countries to learn about waste collection and landfill management. In addition, the Clean School Program launched in Nadi Town has spread to several countries in the region, contributing greatly to recycling and environmental education.
PNG	・The 3R HEART INITIATIVE, which was launched under the concept of improved health, environment, behaviour (transformation), resource efficiency, and thinking through 3R activities, started with 8 schools during the implementation of this project, but by the time of the post evaluation, it had spread to 22 schools.
Solomon	・The sharing of issues and initiatives related to waste management within the Pacific region and the creation of an international human network led to the strengthening of the capacity of personnel involved in policy and planning development and implementation. As a result, an operational plan including a realistic budget was formulated for Honiara City, and it was decided that the Waste Management Department would be established and start allocating budget in 2020, and the system was expected to be strengthened. ・In Honiara and Gizo, where efforts to reduce waste through the 3Rs were the subject of pilot projects, projects such as composting and processing of recyclables made from food waste were created, not only by communities and schools, but also by women's associations, the private sector, NGO programs, and the YWCA.
Vanuatu	・A waste management consultancy firm in New Zealand has started to dispatch counterparts who have been strengthened by this project as instructors for training and other purposes. In the future, there is a possibility that the project will include people who have been strengthened by the project, even if they are not registered in a governmental organization, and it is expected that the capacity of the trained waste management personnel will be utilized in the region regardless of their affiliation. ・The ban on disposable plastic bags and plastic containers and straws from 2018, in accordance with the Waste Management Act drafted and passed in 2014, has led to a significant reduction in the amount of plastic waste brought to landfills (although this has not been measured quantitatively).
FMS	・On Ebeye Island, the new waste collection started by the project has continued after its completion, and the environment at the disposal site (wild fires and gas generation) has improved significantly. Household waste is also being sorted, and the overall waste management on the island is improving.
RMI	・Kosrae state: There have been amendments to the Recycling Law, as well as changes such as the relocation of recycling centers including the container deposit system. The environment of the city (streets, households, etc.) has been significantly improved by the correct disposal of waste, which is recognized as the impact of this project. ・Yap state: In order to improve garbage collection, experts have been advising on the planning of the expansion of activities. The target area is expected to be expanded from the central part of the island to other areas.
Palau	・The container deposit system can be regarded as a successful example with a fund mechanism. The fund has been a source of funding for sustainable waste management activities and has hosted field missions from Tuvalu and Saipan. ・The scope of activities to reuse waste materials is also expanding, with a

Country	Contents
	workshop to produce glass artifacts using recycled glass to be expanded in 2020. ・The strengthening of the domestic communication system contributed to the effective functioning of the Fund mechanism. By communicating and providing the necessary information to the various relevant agencies, a system has been put in place to compile monthly data based on correct information.
Kiribati	・Intra-regional trainings on composting and recycling of organic waste have deepened knowledge and led to some implementation, but no further impact was identified. In addition, the waste management situation has been improving through the waste collection and disposal site improvements that New Zealand has supported specifically in Kiribati since the 2010s.
Tuvalu	・Thanks to the cooperation of the EU, the island of Funafuti has seen a change in the attitude of its residents and initiatives that have not been seen before, such as the reduction of waste and the separation of waste at disposal sites.
Tonga	・The Clean School Program, which was initiated by the Japan Overseas Cooperation Volunteers (JOCV) in 2012, had been suspended for a while, but gradually spread, and at the time of the ex-post evaluation, the program had been implemented in all of Vava'u Island. The program has led to increased awareness at school sites.
Samoa	・Drawing on the experience of the Tafaigata landfill, which was the first repository in the region to be constructed using the quasi-aerobic method, physical improvements have been made in this project as well as in other repositories in PNG and Tonga. After the completion of the project, the same method has been adopted in the "The Project for the Construction of National Landfill" (grant aid) implemented in Palau from 2018 to 2020.

Source: Responses to questionnaires for each country and results of interviews during field surveys

From the above table, it can be seen that there are many cases where the results of the activities supported by this project have spread even further after the completion of the project, such as the spread of 3R and other activities started in some areas to other areas, the expansion of the semi-aerobic disposal system, and the further regional expansion of the Clean School Program and the container deposit system. In addition, JICA has been providing various kinds of cooperation on waste management to island countries in the Pacific for many years, but prior to the implementation of this project, it was only an effort in a few countries and territories. Through this project, support for waste management has been connected as a "line" instead of a "dot", and has spread as an "area". This has led to the recognition of "waste management" as an important issue for governments and other donors, which had not always been emphasized, and has stimulated efforts and support in this field. This is a very significant impact that this project has indirectly created. At the time of the ex-post evaluation, it was confirmed that



Glass Artifacts produced from empty bottles (Palau)

other donors were continuing or starting new support, and that waste management itself was improving, such as reducing waste and expanding collection.

This project has mostly achieved the Project Purpose of "Sustainable management of solid waste in the Pacific Region is enhanced," and the Overall Goal in terms of various efforts being made to achieve self-sustaining waste management. Therefore, effectiveness and impact of the project are high.

3.3 Efficiency (Rating: ②)

3.3.1 Inputs

The planned and actual inputs of this project are shown in Table 10.

Table 10: Planned and Actual Input of the project

Inputs	Plan	Actual (at the time of completion)
(1) Experts	3 Long-term 3 Short-term	5 Long-term, 13 Short-term 1 Local expert (Total 369 MM)
(2) Trainees received	Not described	19 people
(3) Training in the third countries	Not described	29 times
(4) Equipment	Not described in detail	Weighbridge data base system, Shredder, Glass Cutter, Copiers, etc.
Japanese Side: Total Project Cost	A total of approximately 800 million yen	A total of 1,086 million yen
Pacific Side: Total Project Cost	Construction/improvement of facilities such as disposal sites and material storage facilities necessary for the implementation of activities, deployment of equipment and budget	A total of 4.67 million US dollars (Approx. 562 million yen) Facility maintenance, transportation, purchase of goods, and food and beverage expenses, etc.

Source: Detailed design survey report, completion report, and materials provided by JICA

3.3.1.1 Elements of Inputs

<u>Inputs from Japanese Side</u>

At the time of planning, the project was planned to be supported by a total of six experts: three long-term experts (one Chief Advisor, one Project Coordination/Training, and one local consultant) and three short-term experts (two in waste management and one in project coordination/waste management).

The actual number was 19, exceeding the plan, and the number of short-term experts in particular was significantly higher than the plan. This is largely due to the fact that the teams were divided into sub-regions (Melanesia, Micronesia and Polynesia), and different

short-term experts were involved, and the actual number was the total number of people involved. On the other hand, the number of experts at the time of planning, three long-term and three short-term, was also very small for a project that would cover the entire region and 11 countries. Therefore, after the project started, the number of experts was increased in line with the actual situation, and as a result, it was appropriate.

With regard to the trainees received, there was no initial plan regarding the number of trainees. As a result, a total of 19 trainees participated in the counterparts training held in Japan (2 in 2012, 2 in 2013, and 15 in 2015). In addition, training programs in third countries were held 29 times in various countries during the project period, which led to information sharing and accumulation of knowledge on advanced approaches in the region.

In terms of equipment, the project provided the equipment necessary for efficient waste management, such as weighbridge at disposal site and attachments for tractors, as well as copiers, printers, computers, projectors, and other equipment necessary for project activities.

Inputs from Pacific Island Countries Side

The number of counterparts in this project was very large, totalling 176 in 11 countries, including 2 from SPREP. Only PNG had a dedicated waste management department, and most of the counterparts were not dedicated solely to waste management, so few were able to work throughout the project period. However, the number of counterparts in each country seems to have been reasonable as a whole, since the activities continued with the communication with the expert team throughout the project period. For SPREP, a total of two counterparts were assigned, but this was due to a change of counterparts during the course of the project, so there was only one counterpart for the entire project period. Therefore, the SPREP counterparts always played a very important role in overseeing the entire region.

In addition, plans were made to construct and improve facilities, such as offices for experts, disposal and material storage areas, the deployment of equipment, and the securing of budgets. These inputs were generally provided without any problems.

3.3.1.2 Project Cost

The actual project cost was 1,086 million yen against the planned 800 million yen, higher than planned (136% of the plan). The reasons for the increase in the project cost were: additional work due to many changes in the Project Design Matrix (PDM) for regional cooperation and each country (FSM as a whole and each state) as the project

progressed; additional support activities for disaster waste management[17]; increased costs for regional training due to the increase in the number of human resources to be trained; and the need to strengthen the project structure to cover a large number of countries (more experts were assigned than in the beginning). Since this was a large-scale regional project with a total of 16 PDMs, it can be said that costs exceeding the initial assumptions were incurred in various aspects in order to achieve the Project Purpose.

3.3.1.3 Project Period

The project was supposed to be 61 months (5 years and 1 month) from January 2011 to January 2016, but actually it was 70 months (5 years and 10 months) from January 2011 to October 2016.

By January 2016, activities in all countries had been completed, but the project period was extended until October of that year due to the need for one of the long-term experts based at SPREP to carry out additional activities to support the launch of a regional conference on waste management in the Pacific (Clean Pacific Roundtable). This extension of the project period for additional cooperation with SPREP was considered to be a reasonable extension from the perspective of ensuring sustainability through the establishment of cooperation among countries at the regional level. Therefore, in the ex-post evaluation, it was judged that the project period was as planned (100% compared to the plan).

Based on the above, although the project period was within the plan, the project cost exceeded the plan. Therefore, efficiency of the project is fair.

3.4 Sustainability (Rating: ②)

3.4.1 Policy and Political Commitment for the Sustainability of Project Effects

The successor strategy to RS2010, "Pacific Regional Waste and Pollution Management Strategy (Cleaner Pacific 2025)," is positioned to cover the period 2016-2025, and incorporates "3R + Return" and regional cooperation and collaboration as basic principles. In line with this regional strategy, as shown in Table 11 below, it was confirmed that each country in the region has also provided a direction for waste management in their waste management plans or national development plans. In addition, the ministries and public corporations in charge of waste management have been clearly defined, and as a whole there is no concern about the sustainability of policy and political commitment.

[17] Cyclone Pam, which occurred in March 2015, caused extensive damage, especially in Vanuatu.

Table 9: Policy and political commitment, institutions and systems of each country (at the time of ex-post evaluation)

Country	Features
Fiji	・National development plans were developed in 2017 (a 20-year plan through 2036 and a five-year plan through 2021), and both plans identify waste management as critical to achieving a sustainable environment. ・The departments responsible for waste management are the Department of Environment and the Department of Local Government.
PNG	・"Waste Management Plan of the National Capital District 2016-2025" formulated under this project continues to be effective. Based on the experience of the Capital District, a National Waste Management Policy (Changing Our Ways) was also under development at the national level.
Solomon	・The National Waste Management and Pollution Control Strategy (2017-2026) remains in effect. ・In Honiara City Council, the Waste Management and Control Division (WMCD) was still in transition and the structure was insufficient at the time of the ex-post evaluation. However, some staff members of Works (waste collection unit) and Environmental Health Division have moved across to WMCD, and most senior positions were recruited between 2020 and 2021. The WMCD has been established as an independent division with 6 units and 65 staff members. ・There are systemic issues such as aging heavy equipment at the disposal site and insufficient number of collection vehicles to handle the expanding scope of waste collection services. However, the collection of charges for rubbish brought in started in March 2020 and maintenance of heavy machinery started.
Vanuatu	・The National Environment Policy and Implementation Plan (NEPIP) 2016-2030 and the National Waste Management Plan (2021-2025) are effective policies and waste management is promoted. ・In the implementing agencies, almost all counterparts of the project were laid off or transferred. The implementing agencies have been permanently understaffed, and although the number of staff members was scheduled to increase from FY2020, the number of staff members has not increased due to the global spread of COVID-19.
RMI	・In its National Environmental Management Strategy 2017-2022, the country has identified recycling, waste segregation, and proper management of hazardous and medical waste as areas for action. The Majuro Atoll Waste Company also has a Solid Waste Management Plan 2019-2028, which aims to establish a sustainable solid waste management system using appropriate technology. ・In the capital city, Majuro, the number of personnel needed to provide waste management services is sufficient, but due to a lack of budget, they have not been able to hire electrical engineers. On Ebeye Island, it does not have enough staffs, as there is only one person each in charge of operations and maintenance.
FSM	・The "National Waste Management Strategy 2015-2020" continues to be an effective waste management strategy. ・In terms of structure, there is a shortage of personnel in the federal government, Chuuk and Yap states (only one equipment operator). In Kosrae State, other staff from the Department of Transportation, Communication and Infrastructure assist when the team in charge is short in numbers. In Pohnpei state, waste collection and disposal services are outsourced to a waste management service company.
Palau	・In the National Solid Waste Management Strategy 2017-2026, the government is committed to achieving a clean and safe Palau through a comprehensive waste management system based on the 3Rs plus return policy. ・The shortage of personnel engaged in waste management has been recognized as a systemic issue.
Kiribati	・The Kiribati Waste Management and Resource Recovery Strategy 2020-2030 has been developed, and one of the strategic areas is to promote recycling activities

Country	Features
	based on the concept of 3Rs plus return. ・ The agency in charge of waste management is the Environment and Conservation Division, Ministry of Environment, Land and Agricultural Development. The system is not always adequate in terms of number of people and expertise, including for hazardous wastes.
Tuvalu	・ The Tuvalu Integrated Waste Policy and Action Plan 2017-2026 has been developed and is aligned with Cleaner Pacific 2025. ・ At the time of the ex-post evaluation, with the financial support of the EU, it has been able to secure staff, but there are concerns about whether the Tuvalu government's budget alone will be able to continue to provide the necessary staff after 2023.
Tonga	・ Both the national and sector plans have not changed since the completion, and there has been no change in the policy to emphasize waste management. ・ There is no change in the fact that the Department of Environment is the main administrator, but the collection entity has been changed to Waste Authority Limited (WAL) as in Tongatapu Island, and waste collection for the entire island has been conducted since April 2018. No particular problems in the system were observed.
Samoa	・ After the completion of this project, the Samoa National Waste Management Strategy 2019-2023 was developed to guide waste management in Samoa, which is also aligned with Cleaner Pacific 2025. ・ The Solid Waste Management Division of the Department of Environmental Conservation, Ministry of Natural Resources and Environment is responsible for waste management, but the number of staff members is inadequate and no staff is assigned to Savai‘i island.

Source: Responses to country questionnaires, results of interviews during field surveys, country plans and strategy documents

Overall, compared to the period when the project was initiated, the importance of waste management has been more emphasized and mainstreamed in the countries of the region instead of being perceived as a costly and economically unprofitable area. As a result, recycling and plastic waste reduction efforts have become more widespread, and the degree of policy and political involvement has increased significantly. In response to this trend, other donors have recently begun to cooperate more fully in waste management than before.

3.4.2 Institutional / Organizational Aspects for the Sustainability of Project Effects

In terms of regional cooperation on waste management, as mentioned above, the Clean Pacific Roundtable was established and has been meeting regularly since 2016 to develop a framework for sharing information on waste management in the region. In addition, at the time of the ex-post evaluation, a certain level of sustainability at the regional level was observed, as collaboration within the region continued through Phase 2 of this project and projects supported by other donors. On the other hand, there has been no change in the role of SPREP, which is responsible for intra-regional cooperation, but the number of personnel in charge of waste management (the counterpart of this project) is limited to one, and the increase in the number of recycling officers has not been realized. In terms of staff shortage, there are some challenges in continuing intra-regional cooperation.

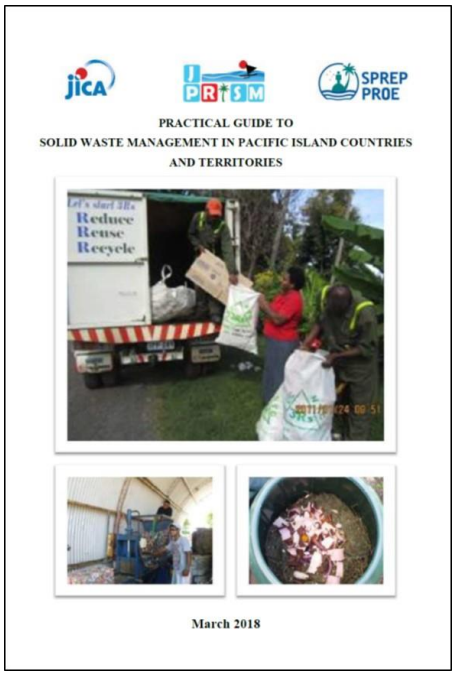
Regarding the situation in each country, the ministry or department in charge of waste management was clearly positioned, and waste collection services were provided in many places as a basic social service provision. However, as shown in Table 11, many countries faced the challenge of not having enough personnel in charge of waste management. This is a common problem in sparsely populated island countries, where the officer in charge has to take on not only waste management but also various other duties.

Therefore, although certain institutions and organizations necessary for sustained effectiveness are in place, they are not necessarily sufficient.

3.4.3 Technical Aspects for the Sustainability of Project Effects

Through the implementation of the project, the capacity, knowledge and technology for waste management have been improved, and as a result, the regional guidebook "Practical Guide to Solid Waste Management in Pacific Island Countries and Territories" was completed in 2018 after the completion of the project, mainly by the national counterparts of the project. The guidebook has been shared and partially implemented in each country, and through the guidebook and manuals developed in this project, mutual learning among countries in the region and the implementation of the contents in each country have been observed. In addition, several projects have been developed by other donors, including the EU-supported Pac-Waste Project, the Australia-supported Pacific Ocean Litter Project, and the France-supported Sustainable Waste Actions in the Pacific. Through these supports, the capacity of the people involved continues to be improved.

On the other hand, as shown in Table 12, there are several countries in the region that have generally been able to implement adequate management, but there are also chronic situations where there is not enough technical capacity in addition to insufficient personnel, such as loss of transfer technology due to turnover, frequent transfers and vacancies of counterparts, insufficient capacity to utilize data analysis results in waste management operations, and insufficient capacity and experience in operation and monitoring based on manuals.



Regional guidebook on waste management

Table 10: Technical capacity of waste management in each country (at the time of ex-post evaluation)

Country	Features
Fiji	・Due to the Fijian government's policy that civil servants cannot continue to stay in the same position, there is a lack of transfer of skills and experience due to the frequent transfer of personnel. On the other hand, this is not the case for municipalities that are engaged in waste management activities, and thus, accumulation of knowledge has been observed.
PNG	・It was observed that the capacity of aspects such as data collection and analysis, understanding of issues, repository management and waste collection has been significantly improved through this project and applied in Phase 2 of the project according to the developed plan.
Solomon	・An operation manual at disposal sites has been completed and is being followed, but the people involved lack experience in waste management and their capacity needs to be strengthened.
Vanuatu	・Almost all of the counterparts in the project were either laid off or transferred, so there was a serious loss of technical skills, especially in terms of operation of disposal sites, and the staff had difficulties at the time of ex-post evaluation.
RMI	・Capacity for disposal site's management and segregation has improved, and the landfill is actually well maintained. The safety and efficiency of daily maintenance activities have also improved.
FSM	・Federal government: Theoretical understanding exists, but it is not practiced on a daily basis. There is a lot of turnover, and there is a need to consider what to do after participation in training (how to have them contribute and how to transfer knowledge). ・States: While the capacity of waste collection and disposal plant operators has improved significantly, there were some cases where there was no improvement at the recycling centers or where the operators were not sufficiently handed over from their predecessors.
Palau	・The operation and maintenance capacity of the staff has been improved through the training provided by the project and the support of advisors hired in Koror State. 3R activities, landfill management, waste collection, and recycling operations are being continued appropriately.
Kiribati	・Some of the trainees of this project have retired and some issues have been observed in terms of skill transfer, but with the support of New Zealand in the 2010s, the capacity for waste collection (introduction of a fee-based waste bag system) and disposal site management (improved sorting, prohibition of bringing in hazardous waste, etc.) has improved. There has also been an improvement in the awareness of residents through educational activities.
Tuvalu	・Waste management skill has improved in terms of waste collection and disposal site management.
Tonga	・The collection system has been changed to the one by the Waste Authority, and trucks provided by Japan are being used for collection, while the monitoring sheets for security operations are being used for disposal site's management based on the manual prepared for this project. It is assessed that there is no problem with the technical capability.
Samoa	・Waste collection and landfill management are outsourced, and the staff of the Solid Waste Management Section continues to use the knowledge acquired in this project, as well as the manuals and regional guidelines developed in this project. Although two staff members have been replaced since the implementation of this project, hands-on training has been conducted and their capacity is being further improved through Phase 2 of this project.

Source: Responses to questionnaires sent to each country, interviews during field surveys, and results of site surveys

Overall, some countries showed further improvement of their waste management capacity and continuity of technical aspects through their own efforts and implementation of other projects, but many countries with fewer staff members showed problems in transferring knowledge when the staff in charge changes. Also, when donor support is ended, there are concerns about the continuity of efforts depending on countries and the significant loss of opportunities to improve technical skills through mutual learning within the region. However, it is notable that even if the person in charge changes in one country, it is now possible to receive advice and other support from the person in charge in another country through the network among countries that has been established through this project.

From the above, it seems that there are some issues in terms of sustainability of the technical aspects.

3.4.4 Financial Aspects for the Sustainability of Project Effects

Proper management of waste, including collection and disposal, is a basic social service, for which a certain amount of budget is allocated in each country. To this end, many countries have also taken initiatives to increase revenues, such as charging for garbage collection bags, more efficient collection of fees (e.g., combined collection with electricity charges), measured waste fee systems at disposal sites, and container deposit systems (Table 13). On the other hand, there are several countries that have not been able to secure sufficient budgets. There are also many countries that have been able to come up with budgets for waste collection and disposal, but find it difficult to secure their own budgets for human resource development and the purchase of waste collection vehicles. Further improvements are required in the medium and long term.

As for the region as a whole, neither SPREP nor the countries in the region have budgets to continue the "intra-regional learning" supported by this project, and the organization of the Clean Pacific Roundtable is dependent on EU support. Intra-regional collaboration is likely to be highly dependent on the availability of donors to support it.

Therefore, the overall financial sustainability is judged to be fair.

Table 11: Financial status of waste management in each country (at the time of ex-post evaluation)

Country	Features
Fiji	・While central government subsidies are being provided for garbage collection in rural areas, at the municipal level, budgets for regular garbage collection are not always sufficient and garbage collection fees are not fully collected. In urban areas, garbage is appropriately collected, but there are some budgetary challenges.
PNG	・Annual budget is about 16 million Kina per year for 2017~2019 (Capital District Office). The budget has been significantly reduced due to the hosting of APEC (2018) and other factors and is perceived as inadequate. Several programs have been suspended accordingly. Improving the toll collection rate is an issue, and since the Weighbridge was established in Phase 2 of this project, it is expected that it will be used to ensure toll collection.
Solomon	・Although the budget shortage for waste management was an issue, at the time of the ex-post evaluation, the collection of fees for bringing in waste at the Ranadi landfill began in March 2020. As a result, heavy equipment is now being maintained, and there were signs of improvement in the budget shortage for waste management, as it was realized that the collection fees were being used for waste management at the field.
Vanuatu	・The Department of Environmental Protection and Conservation does not have a budget specifically for waste management. Port Vila City Council is lobbying the council to allow the waste management department to become self-financing and use the revenue from the current garbage collection bags as Luganville City Council does.
RMI	・In both Majuro and Ebeye, the budgets are secured and there are no serious concerns.
FSM	・Each state acquires own budget from the Compact Fund (a fund contributed under the Compact of Free Association with the United States), but they also need to get support from their respective state legislatures. Low garbage fee collection rates and uncollected fees have resulted in significant overspending, which poses a challenge to the overall budget.
Palau	・The revenue from the container deposit system levy and recycling business has secured a certain amount of the national budget to cover the operation and maintenance costs of the Division Solid Waste Management under Bureau of Public Works, Ministry of Public Infrastructure and Industries and the new national landfill.. It is recognized that it is necessary to secure a budget to support private recycling companies and to hire staff.
Kiribati	・The budget is inadequate, and waste collection and disposal sites are not being adequately managed. The creation of an environmental fund is being considered, but no concrete action had been taken at the time of the ex-post evaluation.
Tuvalu	・The Waste Management Authority's budget has increased substantially in recent years (budget of 2020 is 1.52 times that of 2016) and is sufficient for service delivery; with the introduction of the Waste Management (Levy Deposit) Regulation in 2019, there has also been an increase in tax revenue.
Tonga	・The Waste Authority Limited has been profitable in both FY2017/18 and FY2018/19, with a surplus amount of 166% in FY2018/19 compared to the previous year and an operating margin of 13%.
Samoa	・The overall policy budget of the Division of Environment Conservation is less than 200,000 tala (about 8.8 million yen). This is divided among five units in the division (the Waste Management Unit is one of them), and in terms of waste management, policies and projects are implemented under an inadequate budget.

Source: Responses to questionnaires for each country and results of interviews during field surveys

With regard to waste management, a certain degree of sustainability was observed in terms of policy and political commitment, institution and organisation, and technology, as policies have been formulated at the regional level and in most countries and states, and a mechanism for sharing information and knowledge within the region has been established. On the other hand, some countries (4 out of 11) faced challenges in terms of knowledge and technology transfer due to staff shortages and changes in personnel. In terms of budget, most of the countries (8 out of 11) had budgets for waste collection, and basic services were provided, but no budget was secured to continue mutual learning within the region. Also, some challenges were observed in terms of the aspect on whether the countries can continue to improve their technical capabilities through mutual learning after each aid project in the waste management field is completed.

In light of the above, some minor problems have been observed in terms of the institutional/organizational, technical, financial aspects. Therefore, sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed to improve the capacity (human resources and institutions) for waste management in the Pacific island countries through the implementation of a regional waste management strategy as a regional project for 11 countries in the Pacific region. The project was consistent with the waste management policies and needs of the entire region and each country at the time of planning and completion. It is also highly consistent with Japan's ODA policy for the Pacific region at the time of planning. Therefore, the relevance is high. With regard to the achievement of the Project Purpose for the region and for each country, some issues were observed, but it was achieved as a whole. After the completion of the project, in addition to the activities in this project, such as the development of a final disposal site using a semi-aerobic method and the investigation of waste quality, further improvements in waste management, namely waste reduction, promotion of recycling, and the prohibition of the use of disposable plastics, have been observed. The Overall Goal was generally achieved accordingly. Therefore, the effectiveness and the impact of this project is high. Concerning efficiency, although it was judged that the project period was within the plan, the project cost exceeded the plan; therefore the efficiency is fair. The sustainability of the effects generated by this project was evaluated to be fair because of the issue on the transfer of technical skills due to the shortage of human resources and transfer of personnel in charge of waste management, and the issue of maintaining and improving technical skills, especially through continued mutual learning among countries.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

Establishment of a waste management system that includes securing sources of income, such as a container deposit system and charging for waste collection

Through the various intra-regional training courses conducted under this project, each country had the opportunity to share information and learn from each other's efforts. For example, the container deposit system, which was originally implemented in Palau, was expanded to other countries in the Micronesian region, resulting in a reduction of plastic waste such as plastic bottles in the streets and the establishment of recycling systems in each country. With regard to waste collection, several countries have implemented initiatives such as collection using pay-as-you-go bags and collection of fees by weighing at weighbridges for waste brought in at disposal sites, and some countries have improved collection rates through a combined collection of waste collection fees and electricity fees, thus supporting budgets for waste management. Thus, by introducing a mechanism for increasing income, municipalities will be able to secure and manage their financial resources, rather than relying entirely on government allocations for the budget for activities necessary for waste management, leading to independent waste management and improved sanitation. Therefore, for countries and municipalities that have not yet introduced these initiatives, it is recommended that they similarly promote activities that other countries have introduced with some success in order to establish mechanisms for the implementation of sound waste management, including approaches from a financial perspective. It is also important for the Pacific Island region as a whole to continue to cooperate with each other, as there are countries in the region that have been successful in these efforts.

4.2.2 Recommendations to JICA

Policies and institutions for waste management were developed in each country, and the guidebook was developed through mutual cooperation among countries in the region. It is important to maintain the collaborative relationship with SPREP and continue to utilize the outcomes of these efforts for human resource development and capacity building. In fact, Phase 2, the successor to this project, has been underway since 2017, with cooperation focused on strengthening the human, organizational, and institutional infrastructure for sustainable waste management through monitoring of waste management activities and overseas export (return) of valuable and difficult-to-dispose recyclable waste. It is essential to ensure that the outcomes of Phase 2 are realized by 2022, when the project is to be completed, through cooperation within the region through regional meetings and in collaboration with other donor projects.

4.3 Lessons Learned

Usefulness of awareness-raising and education components in cooperation in the field of waste management

In this project, the Clean School Program, which had been started in Nadi town in Fiji, was introduced in many countries in the region. Fostering an understanding of waste reduction and the importance of resources through the 3R in schools will, in the long run, lead to an increase in environmental awareness in society as a whole and, ultimately, to appropriate waste management. Cooperation and implementation by waste management agencies and related national governments in each country would be cost effective in achieving long-term benefits. In planning similar projects, it would be beneficial to include awareness-raising activities for the entire community through schools, etc., in addition to capacity building of counterparts.

Introduction of financial mechanisms in cooperation in the field of waste management

This project has revealed that activities such as waste collection and recycling have been facilitated in the countries and municipalities that have introduced mechanisms to increase revenues from waste collection and disposal. In a situation where there is excessive dependence on government budgets, budget cuts can lead to a decline in activities. In order to ensure the smooth implementation of activities, it is important to accumulate lessons learned from the good practices observed in this project and utilize them in the formulation of support projects in the field of waste management in other countries and regions.

Effects of implementing the project as a regional project

This project targeted 11 countries in the Pacific region to improve their waste management capacity according to the challenges of each country under a common strategy. In each country, under the guidance of experts, activities were carried out in line with the PDM to solve problems. In the process, officers from countries with similar problems visited other countries in the region that were making advanced efforts, and instructors were sent from countries that were making advanced efforts to other countries to provide guidance. In these regional learning opportunities, direct guidance from officials of countries within the region in charge of advanced initiatives and exchange of opinions among participants from different countries were observed, and not all of the input was necessarily provided by Japanese experts.

As a result of the related projects conducted prior to this project, counterparts with leadership knowledge already existed in several countries, which made it possible for the countries in the region to cooperate in this project. For countries that lack sufficient public services and human resources for waste management, the human network established through this project has made it possible to receive advice and other support from officials in charge of this field in other countries. In addition, at the completion of this project, a regional cooperation framework called

the Clean Pacific Roundtable, which was initiated by SPREP and supported by this project, was established and continued. In other words, a systematic framework for the continuation of cooperative relations across the region has been established, based on the human networks among the people in charge in each country that have been cultivated through the intra-regional meetings of this project.

The fact that the project has been able to build a relationship that enables the exchange of information and opinions, as well as the provision of advice and guidance, among human resources in the region to a certain extent is an outcome that could not be achieved through projects implemented individually country by country. In a country with a small population and difficulty in securing human resources, it was particularly beneficial to work on a regional project through mutual cooperation. For projects that can be expanded in stages, it would be desirable to develop human resources with a view to building cooperative relationships among neighbouring countries in the future.

End

[Attachment: Achievement level of effectiveness and impact indicators in each country]

1. Fiji

		Indicator	Achievement Level of Indicators at the Time of Completion / Ex-post Evaluation	Analysis of Differences
Overall Goal / Impact	Sustainable management of solid waste in the Pacific Region is enhanced	(1) 3R is practiced nation-wide.	<u>Overall Goal</u> [At the time of Ex-Post Evaluation] It was confirmed that the three municipalities where the field survey was conducted continue to carry out activities related to the 3R after the completion of this project. The expansion of the activities was also promoted nationwide by the Department of Environment (DOE).	While the information is not necessarily sufficient, the Overall Goal is considered to have been achieved.
			<u>Impact</u> [At the time of Ex-Post Evaluation] A subsidy program for the composting of organic waste from households has been rolled out to promote 3Rs, and a budget has also been allocated to promote 3R. It is inferred that the 3R activities have had a certain effect in terms of waste reduction, as people have commented that organic waste from markets and households has decreased. It was observed that there are some activities that require further efforts, with some municipalities saying that recycling is not yet sufficiently effective, and some saying that there are issues with efforts to reduce plastic waste.	Through the implementation of this project, the 3R has been promoted and are gradually spreading, which is considered to have a certain positive effect on the natural environment. However, further reduction of waste is possible, and it is important to promote the necessary activity items in each region to achieve this.
Project Purpose	Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is	(1) 15 of experts (Trainers) in the SPREP inventory (2) Regional training program organized by Fiji is established.	[At the time of Completion] (1) Already achieved at the time of Terminal Evaluation. (2) Gained experience as a trainer for regional trainings and strengthened their capacity [At the time of Ex-Post Evaluation] (1) Already achieved at the time of Terminal Evaluation (2) Even after the completion of this project, training has been	Through this project, it was confirmed that the Western District Municipality and Suva City are generally implementing the 3R activities in Fiji. In addition, guidelines on solid waste management and other related issues have been developed and are being used

	strengthened through implementation of the Pacific Regional Solid Waste Management Strategy (2010-2015) (RS2010)		provided at regional meetings, etc., and it has been fully achieved.	in domestic and international training programs. As a result, the Fijian C/Ps have improved their capacity as trainers and more than the target number of experts have been registered in the SPREP expert database. Therefore, the overall achievement of the Project Purpose can be said to be high.
Output1	National 3R strategy has been widely implemented in Fiji.	(1) 100% of councils have been implementing the 3R promotion in the Western Division. (2) Targeted components of 3R promotion for each council have been steadily progressed.	[At the time of Completion] (1) The 3R activities have been continued in the six Councils in the Western Division and Suva City Council. (2) Some activities, such as composting and monitoring, were inadequate, but activities were generally implemented. [At the time of Ex-Post Evaluation] (1) Awaiting information from DOE) (2) Some municipalities saw an increase in the amount of composting, while others were unable to set up disposal sites, and others saw a decrease in the collection of sorted waste, so the situation varied, but generally the efforts are continuing.	Achievement Level of Output 1 [At the time of Completion] Mostly achieved [At the time of Ex-Post Evaluation] Mostly achieved
Output2	Fiji 3R model is disseminated to the Region/Country through training program.	(1) Training manuals/material (2) Number of training conducted and number of participants	[At the time of Completion] (1) Achieved as at the time of the terminal evaluation. Lautoka and other Fijian C/Ps have made significant contributions to the development of the Regional Practical Guide to SWM in PICs, etc. (2) Achieved. A total of 109 Fijian C/Ps have been trained 6 times in Japan and 16 times for staff from other countries, for a total of 131 people. [At the time of Ex-Post Evaluation] (1) It was confirmed that the guidebook developed in this project continues to be used and that the 3Rs are being	Achievement Level of Output 2 [At the time of Completion] It can be said to have been achieved. [At the time of Ex-Post Evaluation] It can be said to have been achieved.

			promoted in each municipality. (2) Continued to provide training at regional meetings such as the Clean Pacific Roundtable meeting in the Pacific region.	

2. Papua New Guinea（PNG)

		Indicator	Achievement Level of Indicators at the Time of Completion / Ex-post Evaluation	Analysis of Differences
Overall Goal / Impact	Sustainable management of solid waste in the Pacific Region is enhanced	(1) The importance of waste minimization is understood and more than one waste minimization scheme is practiced in National Capital District Commission (NCDC).	Overall Goal [At the time of Ex-Post Evaluation] It was confirmed that efforts were being made to manage disposal sites, expand waste collection, and reduce waste in accordance with the waste management plan of the NCDC. In terms of waste reduction, organic waste was being reduced, but it seemed necessary to strengthen efforts to separate waste at collection points.	It is judged that Overall Goal has been mostly achieved.
			Impact [At the time of Ex-Post Evaluation] The necessary steps were taken to obtain an EIA and it was confirmed that the permit was granted on December 12, 2013. A total of 41 conditions were set for the approval of the EIA in the areas of general matters, construction, operation, waste disposal and monitoring. According to the Conservation and Environment Protection Authority, the conditions were complied with and the improvements at the Baruni Landfill are a success story that can be applied nationally. Before the implementation of the project, the disposal site was just a dumping ground where smoke was always rising, but through this project, it was confirmed that the smoke has disappeared and the smell has been greatly reduced. However, the collection method of the waste picker was considered to be dangerous without adequate protective gear. Another issue is that although it is desirable to cover the waste with soil in a shorter period of time after it is transported, it must be left until the waste pickers finish their work. (The number of waste pickers has also doubled to	This project has significantly improved the sanitation environment at the Baruni landfill site. There were no problems in the EIA related procedures for the implementation of the improvement project, and it can be said that it is a model for waste disposal sites in PNG. Although problems related to waste pickers still exist, they have contributed to a certain level of livelihood accounting and have maintained their relationships, leading to smooth operation of the disposal site.

			about 1,000 since the start of this project.) Six of the waste pickers were employed by NCDC to operate the disposal site, and about 15 to 20 of them were also employed by waste haulers, which had some positive effect on their livelihood. There was no particular change in their living conditions, and they have formed several communities around the disposal site. Efforts to expand the measures taken in Port Moresby to provincial cities and to strengthen waste management capacity were underway in Phase 2 of the project.	
Project Purpose	Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation of the Pacific Regional Solid Waste Management Strategy (2010-2015) (RS2010)	(1) Four Experts (Trainers) are listed in the SPREP inventory (2) Landfill management/ collection services are implemented according to the SWM plan. (3) The Capital District Office is ready to implement disposal site operations and waste collection services in accordance with the waste management plan. (←The waste management plan was developed in the project, but this indicator was added because the period covered was 2016-2020.)	[At the time of Completion] (1) Three experts were registered. (2) Excluded from the evaluation (3) The organizational structure was ready. [At the time of Ex-Post Evaluation] (1) The number of experts in the area of "planning" decreased to two. (2) Being implemented in accordance with the plan. (3) Being implemented in accordance with the plan. (Integrated into (2))	Through this project, PNG has seen the enhancement of human resource capacity such as operational capacity through facility improvement and improved waste collection. In addition, plans for waste management have been developed and institutions have been strengthened. Therefore, it was confirmed that outcomes 1 to 3 are closely linked to the Project Purpose. Although the indicators did not reach the target in terms of registration in the SPREP database, it was confirmed that the operations of disposal site and waste collection services were implemented at a satisfactory level in accordance with the plan, and overall, the Project Purpose is highly achieved.

Output1	Solid waste disposal facility and operation is improved	(1) Baruni upgrading plan is prepared and implemented. (2) Operation and maintenance manual is prepared and implemented	[At the time of Completion] (1) Designs for improvements to the Baruni landfill were made and construction proceeded. Although there were delays in the construction of the access road and site office, the disposal space has been improved. (2) An operation and maintenance manual had been developed and activities were being carried out based on it. [At the time of Ex-Post Evaluation] (1) By 2018, all planned facilities had been completed and were being utilized. (2) The manual was reviewed in 2019 and a revised version was used.	Degree of achievement of Output 1 [At the time of Completion] Mostly achieved [At the time of Ex-Post Evaluation] Achieved
Output2	Waste collection in Port Moresby is improved	(1) Collection coverage is increased to 70% (2) Number of complaints is reduced by 30% (3) One time and motion study conducted by NCDC itself annually	[At the time of Completion] (1) Coverage was about 65%. Although the coverage has increased, it did not reach 70% due to the expansion of Port Moresby itself. (2) According to the Registry of Household and Business Waste Complaints of NCDC, the number of complaints was 410 in 2013, 277 in 2014, and unknown in 2015. (3) Achieved [At the time of Ex-Post Evaluation] (1) No detailed data was available, but NCDC said that the coverage area had expanded further. (2) 70 complaints in 2016, 51 complaints in 2017, 106 complaints in 2018, 148 complaints in 2019 (3) It depends on the budget situation, but trying to implement it once a year.	Degree of achievement of Output 2 [At the time of Completion] It is considered that the number of complaints has been decreasing with the implementation of the project, and this indicator is estimated to have been achieved. [At the time of Ex-Post Evaluation] The number increased in 2018 and 2019, but significantly less than during the project period, and is still considered to be achieved at the time of the ex-post evaluation.

Output3	Capacity of planning and monitoring of Solid Waste Management in Port Moresby (National Capital District: NCD) is increased.	(1) Solid Waste Management (SWM) plan is adopted (2) Solid waste management budget is prepared and SWM expenditure is analyzed for FY2015	[At the time of Completion] (1) Developed in the project. (2) The budget was secured and analyzed. [At the time of Ex-Post Evaluation] (1) It was adopted in November 2016 and is being utilized. (2) The amount of budget secured is not sufficient, but the analysis is done every year.	Degree of achievement of Output 3 [At the time of Completion] Mostly achieved [At the time of Ex-Post Evaluation] Achieved

3. Solomon Islands

		Indicator	Achievement Level of Indicators at the Time of Completion / Ex-post Evaluation	Analysis of Differences
Overall Goal / Impact	Sustainable management of solid waste in the Pacific Region is enhanced	(1) In 2018, proportion of recyclables and green waste disposed of at the central market is decreased by 50% (compared to 2015). (2) In 2018, proportion of aluminum cans exported is increased by 5% (compared to 2015).	Overall Goal [At the time of Ex-Post Evaluation] - For indicator (1), although there is a correlation between the logic of the Project Purpose and the Overall Goal, the target achievement level is considered to be too high. - As for indicator (2), the source of the baseline value and the clear calculation method were not indicated, and it was difficult to confirm them in the ex-post evaluation. (1) The green waste from the central market is not being sorted properly, and the goal of reducing the amount of waste brought to the disposal site by 50% has not been achieved. (Interview with the Department of Environment) (2) According to the Can Deposit System Feasibility Study Report issued in April 2019, it is estimated that about 150 tons per year, or roughly 50% of the imported aluminum cans, are exported. ADB's Oceanic Solid Waste Management (Solomon Islands Snapshot, June 2014) states that about 50% of aluminum cans are (already) exported, and no data was available to confirm the 5% increase.	[At the time of Ex-Post Evaluation] For the Overall Goal, the degree of achievement could not be confirmed, partly due to unclear baseline values and calculation methods for the logic and indicators of Project Purpose and Overall Goal. With regard to aluminum can exports, attempted to compare the volume of aluminum can exports (the number of containers on which export taxes were applied) in 2015 with the value in 2018, but the data were not available. In addition, interviews with the country's largest aluminum can exporters indicated that they had not observed any particular increase in export volume from 2015 to 2018 or 2019, so exact figures could not be obtained, but the indicator of a 5% increase in export volume is likely unachievable However, it is likely that the indicator of a 5% increase in exports has not been achieved. However, exports of aluminum cans are continuing, and since the export tax was withdrawn, the volume of such exports is on the rise, and in the long term, the trend is in a positive direction.

				Regarding the issue of the higher level targets set after the terminal evaluation being too high compared to what the Project Purpose have achieved, the level is considered appropriate. New indicators were assumed: "1) Waste reduction initiatives already in place continue and new initiatives are launched by other communities and institutions"; "2) Government budget for waste management is allocated"; and "3) Collection and export of aluminum cans continues and is on the rise. For 1), it has been achieved; for 2), the waste management budget has stabilized due to the start of fee collection at disposal sites, although not in the form of a government budget; for 3), the collection and export of aluminum cans continues, although it was not achieved in 2018 due to the removal of export taxes and an increase in the number of companies participating in the process. As for 3), aluminum can collection and export continued, although it was not achieved in 2018 due to the removal of export tax and the increase in the number of participating companies.
			Impact [At the time of Ex-Post Evaluation] The environmental impact of the Ranadi landfill has been greatly improved by the improved access roads and drainage system of the project. At the Ranadi landfill, the waste pickers living in the landfill were evicted for the improvement of the landfill, but their registration has made them aware that they are the waste pickers of the landfill, and their understanding	Although the Solomon Component did not include "policy, planning and implementation" among its outputs, the National Waste Management and Pollution Control Strategy (2017-2026) and the Honiara Municipal Waste Management Plan (2018-2027) have come into effect, as well as the revision of the Environmental Law 1998 Regulation 2008, including the 3Rs, which has

			of the landfill management has increased. In addition, at the time of the ex-post evaluation, one of them was still employed as a waste picker at the landfill site, and their livelihood situation improved from before the project was implemented (interview). Interviews conducted with the general public in Honiara revealed that the majority considered waste collection and disposal to be an important issue, and all respondents understood what the 3Rs entailed. · There was no particular progress on the return policy. Most of the technology transfer recipients in this project were still involved and active in waste management, but the supervisor of the Ranadi landfill had left the project. Of the impacts that have already been recognized, all but Gizo's aluminum can collection system are still in effect.	strengthened the capacity of human resources involved in policy, planning and implementation.From the above, it is concluded that although the numerical values of the indicators changed and set after the terminal evaluation have not been achieved, they are inappropriate as the Overall Goal because in setting the numerical values, sufficient consideration was not given and the baseline was not confirmed. The indicators that were assumed to be appropriate as the Overall Goal were almost achieved and many other positive impacts were generated, and almost no negative impacts were observed, so the impact of this project is considered to be high.
Project Purpose	Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation of the Pacific Regional	(1) Experts (Trainers) listed in the SPREP inventory. (2) 5 initiatives on waste minimization introduced. (3) Ranadi and Gizo landfill are managed as planned in the Annual Operation Plans. (4) Provincial officers recognize the importance of 3R and SWM and are willing to promote 3R and SWM in their respective provinces.	[At the time of Completion] (1) Not evaluated (2) Achieved (3) Partially achieved (4) The indicator was deemed inappropriate and has not been evaluated. [At the time of Ex-Post Evaluation] (1) Not evaluated (Four people have been identified as potential trainers.) (2) Achieved. As school activities continue, various projects such as women's associations, private sector, Tsuragi NGO program, YWCA, BIT, etc. (described in Impact) are further developed. (Explained in the "Impact") (3) N/A In Ranadi, the project is managed according to the annual operation plan and manual, and the	The implementation of the project has strengthened the capacity of human resources in the relevant areas of waste management (3R/4R, landfill management, awareness raising). It was also confirmed that Outputs 1 to 3 are closely related to the Project Purpose, especially the implementation of waste volume surveys and the formulation of waste management plans based on the results. As for the indicators, although they were not registered in the SPREP database, human resource development has been carried out, and the indicators (2) and (4) were also Achieved. As for management of disposal sites, the situation has regressed due to the departure of the supervisor, but considering the criteria in (1) above, it can be

	Solid Waste Management Strategy (2010-2015) (RS2010)		Department of Environment responded that this has been achieved, but in reality the situation is worse than when the project was completed due to the lack of access to heavy equipment and the departure of the supervisor. (4) Achieved. Workshops have been held and support for SWM planning has been provided, and it would be meaningful to confirm the interest and promotion of 3R/SMW in each state. According to the interviews, there is a high level of interest and need for 3R and SWM from each state, and Honiara City is still taking the lead in following up with them, including sharing lessons learned.	said that the project objectives in this project have been largely achieved.
Output1	3R (Reuse, Reduce and Recycle) activities are practiced in Honiara and Gizo	(1) National Solid Waste Management Strategy and Action Plan (NSWMS 2009-2014) is reviewed andNSWMS (2015-2019) is developed (2) A national waste management communication strategy for 3R is developed (3) More than 50% of general public in Honiara and Gizo, who are interviewed randomly, can answer what 3Rs mean (4) One draft legislation for 3R is drafted (5) Ten schools in Honiara develop 3R	[At the time of Completion] (1) Achieved. The final draft of NSWMS 2015-2019 was confirmed. (2) Achieved (3) Not confirmed (4) Not confirmed changes from the terminal evaluation) (5) Not confirmed (6)-(9) Achieved. [At the time of Ex-Post Evaluation] (1) Achieved. The next version (NSWMPCS2017-2026) is already in effect. (2) Achieved. (3) Achieved. All of the 10 people interviewed in Honiara understood the meaning of the 3Rs. It is not confirmed in Gizo, but according to the Western Province government representative, the 3Rs are expected to have been achieved since the response indicated a high level of penetration of the 3Rs among Gizo citizens.	Achievement Level of Output 1 [At the time of Completion] Achieved [At the time of Ex-Post Evaluation] Achieved - As for 4) One draft legislation for 3R is drafted, it was out of scope and unassessed as an outcome achievement indicator in the terminal evaluation. Since it is not included in the activities, this indicator will be included in the impact.

		action plans (6) Three schools in Gizo develop 3R action plans (7) Three 3R pilot projects are implemented in Honiara (8) Two 3R pilot projects are implemented in Gizo (9) Analytical reports of waste audit, time-and-motionstudies, and incoming waste surveys are available for utilization in waste minimization/3R in Honiara and Gizo	(4) Achieved. The final draft of environmental laws and regulations, including matters related to waste management (3R), is under review by the Attorney General. (5) Achieved. Activities are ongoing. (6) Achieved. Activities are ongoing. (7) Achieved. Activities have been suspended, but are scheduled to resume in 2020. (8) Achieved. Activities are also conducted outside the target schools. (9) Achieved. The content of the analysis report was reflected in the Honiara Solid Waste Management Plan. This indicator was added at the time of the terminal evaluation, and was considered appropriate given the nature and necessity of the activity.	
Output2	Waste disposal system is improved in Honiara and Gizo.	(1) Different types of waste materials are disposed at appropriate cells (2) Annual operation plan is developed (3) 10 officers and operators are trained for landfill operation in Honiara (4) 5 officers and operators are trained for landfill operation in Gizo (5) Management of leachate is established	[At the time of Completion] (1) Achieved (improvement required) (2)-(5) Achieved. (6) Partially achieved. (7) Generally achieved（Not completed in Gizo） (8) Generally achieved (improvement required in Gizo) [At the time of Ex-Post Evaluation] (1) Achieved. Same issues as at the time of completion (e.g., delivery of oversized waste, medical waste, and resource waste to disposal sites) (2) Achieved. In Honiara, the establishment of a waste management department will be approved and budget allocation will be made starting in 2020. (3) Once achieved, there is a need for training as officers are changed and increased in number.	Achievement Level of Output 2 [At the time of Completion] Mostly achieved（with some issues in Gizo） [At the time of Ex-Post Evaluation] Partial achievement continues.（Gizo remains unfinished, while Ranadi needs to be strengthened again with new personnel and equipment.） As for Indicator (2), Annual operation plan is developed, budget allocation is out of scope and will be moved to Other Impacts.

		(6) Waste pickers are registered and managed properly (7) Rehabilitation of disposal sites is completed in Honiara and Gizo according to the respective rehabilitation plans (8) Operation manual is utilized in Honiara and Gizo	(4) Once achieved, but due to staffing changes or increases, training needs to be provided. (5) Once achieved, further improvements to the landfill leachate ponds are needed. (6) Partially achieved. New waste pickers not registered. (7) Generally achieved (with some issues). The rehabilitation of the Gizo repository is not yet complete. Honiara has been completed, but the repository supervisor has changed and the capacity needs to be strengthened. (8) Generally achieved (with some issues). In Honiara, the disposal site is being operated in accordance with the manual. Follow-up is needed in Gizo.	
Output3	Lessons and experiences learnt are disseminated in Solomon Islands.	(1) Good practices on 3R and landfill management identified through the project activities are available in all provincial centers (2) Officers from each provincial government learn good practice on 3R and landfill management (3) National Solid Waste Management Strategy and Action Plan (NSWMS 2009-2014) is reviewed and NSWMS (2015-2019) is developed.	[At the time of Completion](1) Partially achieved. Not yet available in all states. (Available states: Guadalcanal, Isabel, Malaita, Western, Choiseul) (2) Almost achieved. (3) Achieved. [At the time of Ex-Post Evaluation](1) Partially achieved（same as at the time of Completion）(2) Almost achieved, but practical capacity building is needed.(3) Achieved. The NWMPCS (2018-2027) is already in effect.	Achievement Level of Output 3 [At the time of Completion] Mostly achieved [At the time of Ex-Post Evaluation] Mostly achieved (Gizo remains unfinished, while Ranadi needs to be strengthened again with new personnel and equipment.)

4. Vanuatu

		Indicator	Achievement Level of Indicators at the Time of Completion / Ex-post Evaluation	Analysis of Differences
Overall Goal / Impact	Sustainable management of solid waste in the Pacific Region is enhanced	(1) 60% of the registered experts (trainers) on the SPREP list will participate as trainers at least one workshop and/or training in region and/or in-country should there be an opportunity for them to do so. (2) Amounts of waste disposal at Port Vila & Luganville landfills are decreased by at least 7% respectively.	<u>Overall Goal</u> [At the time of Ex-Post Evaluation] (1) Although not included in the evaluation, an expert (landfill management technology) has served as a workshop instructor after the completion of the project (the expert was downsized). In addition, a waste management consultancy in NZ has started to utilize the human resources strengthened by this project (by dispatching them as instructors for training, etc.). (2) For the Luganville landfill, the response was that it had been achieved, but no data was provided to support this. For the Bouffa landfill, since the dismissal of the main C/P, the method of counting the amount of waste brought to the landfill has changed, and it is possible that the waste has not been weighed/recorded consistently since the completion of the project. Due to the ban on plastic bags and plastic containers starting in 2018, plastic waste brought to the landfill is believed to have been greatly reduced, but it should be noted that the waste collection area has been expanded.	As Indicator (1) is not subject to evaluation and the information for Indicator (2) is not sufficient, it cannot be said that the Overall Goal has been achieved. Among the Project Purpose indicators, (1) is considered to be directly related to capacity building, and (2) is considered to be directly related to attempts to reduce waste, so there is a correlation between the logic of the Project Purpose achievement indicator and the Overall Goal achievement indicator. In Vanuatu, the main C/P in Port Vila was laid off. Therefore, for the indicator (1) of achieving the Overall Goal, it may be possible to realize the utilization of human resources for waste management by including not only the current C/P but also examples of human resources who have been strengthened by this project and are making use of their abilities in the region, even if they are not registered within the government agency. Regarding achievement indicator (ii), for the Luganville disposal site, the interviewee answered that it had been achieved at the time of the ex-post evaluation, but no data was provided, and for the Bouffa disposal site, the interviewee did not answer that it had been achieved, not only because no data was available, but also because the collection area had been increased.

				Therefore, it is judged that the Overall Goal have not been achieved, although some of them may have been achieved.
			Impact [At the time of Ex-Post Evaluation] Based on the Waste Management Law drafted and passed in 2014, Waste Management Decree No. 15 came into effect in 2018, which includes a ban and penalties on the use of disposable containers, single-use plastic bags, and plastic straws. As for returns, no progress has been made except for aluminum cans. Although the project was effective in terms of capacity building, the results of the project were set back by the layoffs and transfers of key C/Ps prior to the completion of the project. While some of the dismissed C/Ps were able to find jobs that utilize the skills strengthened by the project, there are still some C/Ps who are still unemployed. In order to cope with the super cyclone that occurred during the project, space at the disposal site was secured and the readiness to receive the disaster was strengthened. With regard to the impacts already recognized, the termination of the main C/P of the project may have had a negative impact on the management status of the Buffa landfill and the continuation of the pilot project, among other things. - Eleven laws have been successfully developed, including the Ozone Layer Conservation Act 22 (2019). Work on revision of NWMS is also in progress and NWMS 2021-2025 will be updated soon.	Vanuatu's component did not include "policy and plan formulation and implementation" among its outputs, but as the C/P's capacity was strengthened, it began with the enactment of the Waste Management Act in 2014, followed by the National Environmental Policy and Action Plan (NEPIP) 2016-2030, the National Waste Management and Pollution Control Strategy and Implementation Plan (NWMPCS) (2016-2020) (in 2021, NWMS 2021-2025 will come into effect), the implementation of the Waste Decree in 2018, and the Ozone Layer Protection Act 22 of 2019, and more than 11 other "policy and plan formulation and implementation" and "legal developments". The above indicates that waste management has been mainstreamed in the Department of Environment and its capacity for waste management policy formulation, legislation and enforcement has been strengthened.

Project Purpose	Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation of the Pacific Regional Solid Waste Management Strategy (2010-2015) (RS2010)	(1) Three experts (Trainers) are listed in the SPREP inventory. (2) Bouffa and Luganville landfill are managed as planned in the Annual Operation Plans (3) One or more provinces implemented their respective action plan to promote minimizations and composting in respective provinces.	[At the time of Completion] (1) Out of the scope of evaluation. (2) The Bouffa Landfill was not operating according to the operational plan and was not achieved due to the termination of the C/P. (The Luganville landfill is operating as planned (although it is proposed to be removed from the indicator in the terminal evaluation). (Achieved) (3) Achieved [At the time of Ex-Post Evaluation] (1) Out of the scope of evaluation (2) Partially achieved. The Bouffa landfill was ready to be operated according to the operational plan. The Luganville landfill is operating according to plan (although it is proposed to remove it from the indicators in the terminal assessment). (3) Once achieved.	Through this project, the landfills have been operated according to the annual operation plan, but although human resources in the relevant areas of waste management (3R/4R, repository management) have been developed, almost all the key C/Ps whose capacities have been strengthened have been laid off, and the external condition of the activity level "counterparts continue to be engaged in the solid waste management area" has not been met. - Since indicator (2) is partially achieved and indicator (3) is still under confirmation, the status of achievement of Project Purpose at the time of ex-post evaluation will be determined after waiting for the content of the responses. - Indicator (3) is judged to have been achieved, but indicator (2) is judged to have been partially achieved at the time of ex-post evaluation, since the operational status of Buffas has regressed from the time of project completion.
Output1	The amount of waste in and around urban areas is reduced through waste reduction activities.	(1) Amount of organic waste generated from market is reduced by 20% (Port Vila) (2) National Waste Management Strategy (NWMS) is established. (3) Collection system for cans is established	[At the time of Completion] (1) On progress: By the time the MOU between the organic farming company and PVMC was signed and completed, the reduction was 7%. (2) Achieved (3) Achieved [At the time of Ex-Post Evaluation] (1) Not achieved：The project was aborted due to the termination of the main C/P of the project. In addition, the project was not functioning at the time of the ex-post evaluation due to problems with the transportation method and cost burden of food waste, as well as conflicts with	Achievement Level of Output 1 [At the time of Completion] 70% achieved [At the time of Ex-Post Evaluation] Partially achieved For (2), a ban on plastic containers, plastic bags, and straws was issued, derived from the Waste Management Act.

			other companies. (2) Achieved (3) Partially achieved: Although collection is continuing, some collection points are now giving up on aluminum can separation because private companies are now charging lower rates for purchasing aluminum cans and charging a fee for picking up the collected cans.	
Output2	Existing waste disposal sites (Bouffa and Lugaville) are improved.	(1) Manual Data management system is established in Bouffa landfill (2) Operation and management master plan for Bouffa landfill is utilized (3) Closure plan for Luganville disposal site is established	[At the time of Completion] (1) Achieved (2) Not achieved. The firing of the supervisor worsened the operational situation of the disposal site. (3) Not evaluated(same as at the time of the terminal evaluation) [At the time of Ex-Post Evaluation] (1) Partially achieved：Once achieved, the same data as during the implementation of the project will no longer be collected, and will be resumed during 2020. (2) Generally achieved: One of the dismissed landfill staff has been reinstated; in 2016, the access road to the landfill was blocked due to fire, etc., but at the time of the ex-post evaluation, this had been resolved and the landfill has been operating according to the manual since 2018. (3) Not evaluated (The Lurganville landfill will continue to be used as is. Not "closed," but "operating as planned," which means the goal was met.)	Achievement Level of Output 2 [At the time of Completion] Partially achieved [At the time of Ex-Post Evaluation] Partially achieved For the Bouffa landfill, the layoffs of key C/Ps had a particularly large impact, but for the Lurganville landfill, the situation has improved significantly as there were no changes in C/Ps and the revenue from prepaid garbage bags was used as the waste management budget.
Output3	Capacities for waste management at the local government level are	(1) More than one provincial officer recognizes the importance of waste minimization and SWM.	[At the time of Completion] (1) Achieved (2) Achieved [At the time of Ex-Post Evaluation] (1) Achieved (Achievement status continued) (2) Achieved (Waste management plans are being	Achievement Level of Output 3 [At the time of Completion] Achieved [At the time of Ex-Post Evaluation] Achieved

	enhanced.	(2) Manual for developing Solid Waste Management master plans at province level is prepared.	developed in each state based on the manual for the development of annual waste management plans at the state level)	

5. Republic of the Marshall Islands (RMI)

		Indicator	Achievement Level of Indicators at the Time of Completion / Ex-post Evaluation	Analysis of Differences
Overall Goal / Impact	Sustainable management of solid waste in the Pacific Region is enhanced.	(1) Good practices developed in Marshall Islands is implemented in other island countries tackling with common issues. (2) At least one training/workshop in the region which is conducted by facilitators/trainers from Marshall Islands	<u>Overall Goal</u> [At the time of Ex-Post Evaluation] (1) There were some domestic cases (environmental education, paper fuel) (Majuro to Ebeye), but no cases of transfer outside RMI were confirmed. (2) There have been cases of sending personnel to conduct training between Majuro and Ebeye, but there have been no cases of transfer outside RMI.	Logic of Project Purpose and Overall Goal: The indicators of Project Purpose is considered appropriate from the perspective of effectively utilizing the good practices and human resources in the RMI in the Pacific region and contributing to the promotion of waste management in the region. Status of achievement: No significant progress was made from the status achieved at the time of completion.
			<u>Impact</u> [At the time of Ex-Post Evaluation] In Ebeye, with the cessation of incineration, there has been virtually no generation of hazardous substances, and garbage collection is proceeding smoothly, maintaining the surrounding environment in good condition. In RMI, a container deposit system has been introduced, and the amount of bottle and can waste has been greatly reduced.	The impact identified at the time of completion continued to be confirmed during the ex-post evaluation, and a container deposit system was also introduced to improve the environment in town.

Project Purpose	Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation of the Pacific Regional Solid Waste Management Strategy (2010-2015) (RS2010)	(1) 6 experts (Trainers) listed in the SPREP inventory (2) Good practices and experience are shared among Majuro and other Atoll Local Governments.	[At the time of Completion] (1) Two counterparts were registered. However, one of them retired in 2015. (2) A Majuro counterpart has been dispatched to Ebeye, and teacher training has already been conducted by the Majuro counterpart and the lecturer invited from Fiji.	The Indicator（1）was partially achieved as the number of people registered in the expert list was limited and the target was not reached; (2) Training was conducted in Majuro and Ebeye C/Ps, Fiji, and it was judged to have been achieved as participants reported increased motivation.
Output1	National Solid Waste Management Strategy (NSWMS) is implemented.	(1) NSWMS is finalized. (2) Implementation of Action plan is monitored and reviewed by the Monitoring Committee 3 times a year. (3) Progress report is issued annually.	[At the time of Completion] (1) Generally achieved. The final draft was submitted to the Assistant to the President in September 2014. However, it has not been signed. (2) Partially achieved As the NSWMS has not been formally issued, the regular monitoring committee has not been held. Counterpart meetings for monitoring have been held. (3) Partially achieved Materials for monitoring have been prepared by the C/P, but the report has not been completed.	(1) At the time of completion, the NSWMS signature had not been reached, and the achievement was not yet completed. For both (2) and (3), the Monitoring Committee was not held and the report was not yet completed, although related work had been done at the time of completion. Therefore, Output 1 was partially achieved.

Output2	Recycling system is improved in Majuro.	(1) Recycle products is increased year by year. (2) Collected and exported materials are increasing year by year.	[At the time of Completion] (1) Generally achievedThe recycling volume of aluminum cans increased until 2013. However, due to the breakdown of the press machine, the amount decreased in 2014 and the rated capacity is still not achieved. (2) Not achievedGains from the export of recyclables have decreased since 2012 due to fluctuations in the export volume caused by external factors.	·The status of achievement at the time of completion was generally achieved.
Output3	Composting system is improved in Majuro.	(1) Volume of compost production are increased in Majuro	[At the time of Completion] (1) Mostly achieved Compost production volume has increased since 2011. Although there was a drop in 2014 due to the poor performance of the crusher, a sharp decline has been avoided due to inventory.	·The status of achievement at the time of completion was generally achieved.
Output4	School-based recycle system is introduced in Majuro.	(1) Manual/material of awareness raising is developed. (2) Campaign activities are conducted on a regular schedule. (3) Recycle programs are implemented in over 80% of elementary schools in Majuro.	[At the time of Completion] (1) Generally achieved. Educational materials have been prepared and are being used for awareness-raising activities at high schools and elementary schools. (2) Generally achieved Efforts such as sorting, cleanup, summer camp, radio publicity, etc. have been implemented by EPA and MAWC, although not directly. (3) Partially achieved Separate awareness-raising activities are conducted by EPA and MAWC, and future integration is an issue.	·The status of achievement at the time of completion was generally achieved.
Output5	Solid waste management system is improved in	(1) Plan for improvement of waste	[At the time of Completion] (1) Achieved	·The activities in the Ebeye area were implemented smoothly and were accomplished

	Ebeye.	collection is drafted. (2) The burning in the open dumping decreased to 0. (3) The waste is located separately and adequately in dump site. (4) Bulky waste collection is separated from the common household waste. (5) Education on 4R promotion is conducted for all school classroom. (6) Teacher training on 4R promotion is conducted for all teachers. (7) Plan for paper fuel is drafted	A draft has been prepared and new garbage collection has started. (2) Achieved The problem has been solved, partly as a result of the transfer of the disposal site improvement method. (3)(4) Achieved Separation of metals and bulky waste has been implemented, partly as a result of the transfer of disposal site improvement methods. (5) Achieved The number of school visits increased from once or twice a quarter to every month. (6) Achieved A total of 69 teachers participated in the teacher training held with C/Ps from other countries as lecturers. (7) Generally achieved A waste paper fuel plan has been drafted and is in the process of being finalized.	by the time of completion except for the finalization of the draft plan for waste paper fuel, which means that Output 5 was generally achieved. ・Although some information (awareness-raising and training activities, plans for waste paper fuel) is lacking, the situation of waste collection, waste disposal at the disposal site, and waste separation has continued to improve since the completion of the project.

6. Federated States of Micronesia (FSM)

		Indicator	Achievement Level of Indicators at the Time of Completion / Ex-post Evaluation	Analysis of Differences
Overall Goal/ Impact	Sustainable management of solid waste in the Pacific Region is enhanced.	(1) Good practices developed from one state of FSM are implemented in other states and/or other island countries tackling with common issues (2) At least more than 2 trainings/workshops in the region which is conducted by facilitators/trainers from FSM	Overall Goal [At the time of Ex-Post Evaluation] (1) During the implementation of J-PRISM, a collection of good practices from each state was prepared and distributed to all states to share information. On the other hand, even after the completion of J-PRISM, there were no cases of official transfer or implementation to other states. In addition, a collection of good practices has not been prepared after the completion of J-PRISM, and information will be collected and compiled through J-PRISM Phase 2. (2) Communication between waste management staffs in different states has been continued after the completion of J-PRISM, and when necessary, they discuss solutions together. The training for J-PRISM Phase 2 has been conducted. The proposed training and WS using the FSM Environmental Conference has not been realized, but the waste management training has been conducted in conjunction with the JCC.	<u>Logic of project goals and high-level objectives:</u> The Project Purpose was to improve the disposal sites and share GPs of the FSM states as indicators, which was considered meaningful in terms of improving waste management and recycling, which was the main issue of waste management in the FSM, and contributing to the promotion of waste management by building cooperation within the FSM among the states that did not have coordination. <u>Achievement Status:</u> There were no reported cases of GPs being formally implemented in other states, and no details of the planned CDL implementation in Chuuk or intra-regional training were available. Judged to be partially achieved.

			Impact [At the time of Ex-Post Evaluation] Relationships (communication and cooperation) among the states have been expanded and improved through the implementation of J-PRISM. There were no reports of impacts other than those mentioned above that were observed from the time of completion to the time of the ex-post evaluation.	There was an increase in communication between the states, but no other significant changes were reported.
Project Purpose	Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation of the Pacific Regional Solid Waste Management Strategy (2010-2015) (RS2010)	(1) Four experts in the field of integrated solid waste management are listed in the SPREP inventory. (2) Improvement of State landfill in each state. (3) Good practice developed from one state is shared with all the states of FSM.	[At the time of Completion] (1) Generally achieved: A total of 5 counterparts (4 in Yap and 1 in Pohnpei) have been registered. (2) Achieved: Disposal sites in each province have been improved by introducing Fukuoka method. (3) Achieved: Good Practices for SWM in the FSM 2015 prepared by OEEM and distributed to each state.	Indicators (1) through (3) had been largely achieved at the time of completion.

FSM Federal Government - OEEM	Output1	The NSWMS in FSM is finalized.	(1) NSWMS is developed. (2) Monitoring of the Action Plan is conducted once a year	[At the time of Completion] (1) Achieved: NSWMS formally issued and dispatched with official letter to each state. (2) Generally achieved: the first monitoring based on the developed NSWMS was scheduled for the end of 2015.	・In terms of finalizing the NSWMS, Output 1 has been achieved, but the achievement of this Output includes the implementation of AP monitoring (Indicator (2)). Therefore, Output 1 was judged to be partially achieved. ・There is no problem with the logic of the NSWMS, as it is the foundation of waste management in the country and can be said to be necessary to achieve the Project Purpose.
	Output2	Information sharing of SWM is enhanced among states.	(1) Set up a meeting for SWM at least once year. (2) Document is distributed to 4 states. (3) Guideline is developed and distributed to states.	[At the time of Completion] (1) Achieved: OEEM invited CPs from each state to share their progress and GPs at JCCs in 2014-15; OEEM CPs also participated in JCCs in Yap and Chuuk. (2) Achieved: A collection of good practices was published in April 2015 and distributed to each state. (3) Achieved: Leachate management guidelines were published in April 2015 and distributed to the states.	Indicators (1), (2), and (3) were both achieved, and the responses to the questionnaire also reported that the relationship between the states had improved, so Output 2 has been achieved. ・The fact that a relationship has been established among the relevant agencies in the country to share the necessary information in the FSM, where there was no communication among the states, contributes to the improvement of the waste management capacity of the FSM and thus to the achievement of the Project Purpose.
Kosrae	Output1	The SSWMS in Kosrae is finalized and Action plan is developed.	(1) SSWMS in Kosrae is submitted to the State for approval. (2) The progress is evaluated according to the policy of SSWMS. (3) Monitoring is conducted 3 times per year by Monitoring committee. (4) Progress report is	[At the time of Completion] (1) Achieved: The waste management strategy for Kosrae Province was signed in 2011. (2) Generally achieved: Progress assessment was conducted twice, in 2014 and 2015. (3) Partially achieved: One monitoring committee meeting was held in each of 2014 and 2015. (4) Partially achieved: No report has been prepared. Some relevant items are included in the waste management report submitted to the Governor by the Kosrae Resource Management Authority and	The State Waste Management Strategy and AP have been developed and revised, and Indicator (1) has been achieved. In the FSM, the State Waste Management Strategy is the basis for waste management in the State, and is necessary to achieve the Project Purpose. There is no problem with the logic.

			issued by Monitoring committee.	Public Works and Transportation Authority.	
	Output2	Collection of General Waste is improved.	(1) Improvement plan on Waste collection system in each municipality is drafted.	[At the time of Completion] (1) Achieved: an improvement plan for collection and transportation was drafted in May 2015.	Outputs 2 to 4 have been achieved at the time of completion. In all cases, improvements have been reported through the implementation of J-PRISM. Improving waste collection, landfills, and awareness-raising activities are activities that will strengthen the foundation of waste management in the state. Therefore, the logic of the Outputs and project objectives is reasonable.
	Output3	Waste Disposal is improved.	(1) Operation and maintenance of landfill is regularly conducted.	[At the time of Completion] (1) Achieved: Good maintenance practices are being implemented, including the stationing of personnel and recording of waste delivery volumes.	
	Output4	Awareness Raising is improved	(1) Educational material for 4R is developed and education for 4Rs is is conducted in schools. (2013-: For a pilot school, 2015-: Expand for other less than 3 schools)	[At the time of Completion] (1) Achieved: Educational materials were produced in 2012 and started to be used in 6 schools in 2015. The number of schools where the education was provided has increased.	
Pohnpei	Output1	The SSWMS in Pohnpei is finalized.	(1) SSWMS in Pohnpei is submitted to the State for approval. (2) Monitoring is conducted 3 times per year by Monitoring committee. (3) Progress report is	[At the time of Completion] (1) Achieved: The State Waste Management Strategy was signed by the Governor of the State in February 2014. (2) Partially achieved: Monitoring of the strategic action plan was done only by EPA and no monitoring was done as a committee. (3) Not achieved: no progress report was issued.	State waste management was finalized, but monitoring of AP progress was not done by the Monitoring Committee, so Output 1 was deemed partially achieved.

			prepared by Monitoring committee annually.		
	Output2	Action plan is developed.	(1) Plan for improvement of waste collection including fee system, collection method and cooperation with multi municipality, is developed in Sokehs and Kitti, pilot project municipality.	[At the time of Completion] (1) Achieved: Garbage collection using garbage collection vehicles provided by the Grassroots Grant Aid was started in both autonomous regions while improving the garbage collection plan with advice from experts.	Outputs 2 and 3 have been achieved. The cooperative relationship among local governments fostered through the implementation of J-PRISM and the improved waste collection plan have contributed to the improvement of waste collection in Pohnpei. In addition, the introduction of the Fukuoka system has improved the situation of the final disposal site. ・The improvement of waste collection and final disposal is also the basis of waste management in the region, which confirms the consistency between the output and the achievement of the Project Purpose.
	Output3	Collection of General Waste is improved.	(1) Operation under Fukuoka method is introduced for existing dumpsite.	[At the time of Completion] (1) Achieved: A pilot project to improve the existing disposal site has been implemented. The pilot project to improve the existing landfill site has been carried out, and although there are difficulties in securing soil cover and budgetary environment, improvements such as the installation of leachate treatment have been carried out based on the results of CP's training in Japan.	

	Output4	CDL system is improved.	(1) The Recycle Center is operating at least once a month. (2) The Recycling Law is amended. (3) Financial system on CDL is improved.	[At the time of Completion] (1) Not achieved: The Center operated only 12 times since the start of operations. The reason for this is that the operating funds were not break even, and this problem were not resolved. (2) Not achieved: Proposed amendments were under discussion within the state government. (3) Partially achieved: Data was being shared between the finance department and the EPA to identify the causes of the problem.	Although the recycling law was revised after the completion of the project, the operation of the recycling center was limited at the time of completion due to financial issues. Therefore, the achievement of Output 4 can be said to be limited.
Chuuk	Output1	Capacity to prepare the State Solid Waste Management Strategy of Chuuk and Action plan is developed	(1) Chuuk SSWMS is submitted to the State for approval (2) Monitoring on the progress of Action Plan is conducted annually	[At the time of Completion] (1) Achieved: The State Waste Management Strategy (2012-2016) was developed and approved by the State Government in 2012. (2) Conducted twice. The third monitoring was scheduled for December 2015, but was not carried out.	・The waste management strategy and AP have been developed and some capacity has been strengthened. On the other hand, as in other states, there is a high possibility that progress is not being properly monitored, and in consideration of the capacity to formulate the strategy based on progress, it is generally considered to be achieved.
	Output2	Capacity to improve and manage the final disposal site is enhanced	(1) Boundary of the existing dumpsite is identified and separated from other area. (2) Operation of compacting waste is conducted at least once a week. (3) Operation is recorded and submitted to PW and EPA	[At the time of Completion] (1) Achieved: As a result of consultations with the relevant parties, the boundary of the disposal site was clarified, a weir was built on top of the boundary to prevent waste from crossing the boundary, and the waste brought in was reclaimed inside the weir. (2) Achieved: Work has continued once a month in 2011 and twice a week in 2015. (3) Generally achieved: Submitted to the Office of Public Works and Transportation, but not yet submitted to EPA.	At the time of completion, the environment and appearance of the disposal sites and its surroundings were improved due to clearer demarcation inside and outside the disposal site and improved frequency and techniques of compaction operations. In addition, since records of the work at the disposal site were submitted, and management tasks were carried out at the abandoned disposal site, it can be said that Output 2 was achieved.

	Output3	Capacity to improve the collection of general waste is enhanced.	(1) Monthly collection record is submitted to PW and EPA. (2) More than 5 villages receive regular collection service. (3) More than 10 workshops are conducted to improve the waste discharge of the people.	[At the time of Completion] (1) Partially achieved: Brief entries in notebooks (not yet submitted to the office), but not recorded on designated work record forms. (2) Achieved: 8 out of 10 villages on Weno Island provide garbage collection service by home collection. The remaining two villages are in areas where it is difficult to expand the service due to poor road conditions. (3) Achieved: 19 WS conducted in schools, etc. Clean-up campaign conducted and signs installed to prohibit illegal dumping and littering; garbage collection on Weno Island greatly improved.	The number of service areas for garbage collection has been expanded, and educational activities on how to dispose of garbage have been continued, and the situation of garbage collection has greatly improved through the activities of J-PRISM. However, the work records for waste collection were not properly made, and Output 3 was judged to be generally achieved.
Yap	Output1	Capacity to prepare the State Solid Waste Management Strategy of Yap State and Action Plan is developed.	(1) Yap SSWMS is submitted to the State for approval. (2) Action Plan is distributed to the stakeholders. (3) Monitoring on the progress of Action Plan is conducted annually.	[At the time of Completion] (1) Achieved: State Waste Management Strategy (2012-2017) developed and submitted to the Governor in March 2014, and approved by the Governor in November 2015. (2) Achieved: Shared with stakeholders, progress of the plan has been reported in JCC. (3) Achieved: Plan monitored twice (2014, 2015).	By the time of completion, the state waste management strategy has been developed, shared with stakeholders and progress monitored as planned, and Output 1 can be said to have been achieved.

	Output2	Capacity to improve and manage the final disposal site is enhanced.	(1) New landfill design is developed. (2) More than 10 counterparts get certificate in the training of operation and maintenance of landfill. (3) The upgrade of the existing dumpsite to semi-aerobic is completed. (4) Operation of new landfill is monitored by EPA monthly according to the new landfill management plan.	[At the time of Completion] (1) Achieved: The Department of Public Works and Transportation received technical assistance from EPA staff, J-PRISM experts and JICA SVs to prepare drawings for the new disposal site. (2) Achieved: 26 CPs participated in the training and 3 staffs from Palau, 2 from Pohnpei, 2 from Kosrae, 2 from Chuuk and 17 from Yap were awarded certificates. (3) Generally achieved: Covering soil has been purchased, but due to problems with heavy equipment, it could not be transported and has not been completed. (4) The status of the disposal site was monitored regularly by the C/P.	By the time the project was completed, improvements had been made, such as the introduction of a semi-aerobic landfill at the existing landfill and the development of a plan for a new landfill. Although the operation of the landfill was hampered by the breakdown of heavy machinery, the C/Ps gained knowledge and experience in the operation and maintenance of the landfill, and their capacity was strengthened. Therefore, it can be said that Output 2 was generally achieved.
	Output3	Capacity to conduct awareness activities for SWM is raised.	(1) More than 10 workshops are conducted at schools and communities using the awareness materials developed. (2) Awareness of SWM through a questionnaire result is raised by 25%.	[At the time of Completion] (1) Achieved: A total of 20 WS were conducted. In addition, EPA designed and distributed posters and stickers. Recycling bins were handmade and distributed to each school. (2) Generally achieved: 2 surveys conducted in total in 2013 and 2015. 25% were not achieved (but 15% showed improvement in waste awareness and knowledge; 28% to 43%).	By the end of the project, more workshops were held than the number of times set as the target, and the posters and other materials created were used. In addition, the project developed its own activities to promote the creation and purchase of reusable shopping bags. Although the understanding of residents was slightly lower than the target, a certain level of improvement was confirmed, and Output 3 can be said to have been generally achieved.

7. Palau

		Indicator	Achievement Level of Indicators at the Time of Completion / Ex-post Evaluation	Analysis of Differences
Overall Goal / Impact	Sustainable management of solid waste in the Pacific Region is enhanced.	(1) Good practices conducted in Palau are implemented in other island countries tackling with common issues.	Overall Goal At the time of Ex-Post Evaluation] At the time of the ex-post evaluation, Palau was implementing various projects such as CDL, glass making, scrap metal, composting, plastic to oil, E-waste (exporting collected waste materials for recycling), etc., which are listed as good practices. Among the above projects, CDL, scrap metal, composting, plastic to oil, E-waste (export of collected waste materials for recycling), etc. are implemented. Of the above projects, the C/P from Palau was dispatched to Samoa as a lecturer during the implementation of the CDL project, and later received inspection missions from Tuvalu and the Commonwealth of the Northern Mariana Islands. As for Samoa and Tuvalu and the Northern Mariana Islands, advice has been provided by e-mail in response to questions, but implementation has not yet been completed. The NWWMP has developed action plans for each of the six goals of waste management, and actions are underway to implement them.	Logic for Project Purpose and Overall Goal： The Project Purpose is to use "percentage of containers reimbursed to imported beverage containers" as an indicator. This is an essential element to support the Redemption Center, the fund system that provides the financial basis for waste management in Palau, and the logic is reasonable. Achievement Level： Palau's CDL is shared with Samoa, Tuvalu, and the Northern Mariana Islands, but since the possibility of implementation is under consideration and has not yet been implemented, it was judged to be largely achieved.

			Impact [At the time of Ex-Post Evaluation] ・There are no reports of "other impacts" that have occurred or been confirmed since the completion of the project until the time of the ex-post evaluation. However, each of the other impacts reported at the time of completion has been largely sustained. ・The JCCs held at J-PRISM and the involvement of experts have contributed greatly to ensuring the sustainability of CDL by creating a system where information on waste management, especially recycling activities, is shared among relevant organizations.	・By the time of the end of the project, various recycling activities had been conducted in the country as shown on the left. These activities were started before the implementation of J-PRISM, and J-PRISM is considered to have contributed to the sustainability of these activities.
Project Purpose	Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation of the Pacific Regional Solid Waste Management Strategy (2010-2015) (RS2010)	(1) 5 experts (Trainers) in the field of 3R/beverage container deposit fee program/landfill operation are listed in the SPREP inventory (2) % of amount of containers redeemed out of imported beverage containers maintained 90% or above.	[At the time of Completion] (1) Mostly achieved.4 C/Ps registered. (2 from SWM-BPN, 2 from Waste Management department, Koror State) (2) AchievedThe average percentage of containers refunded (recovered containers) by 2015 was 89.76%, almost 90%. [At the time of Ex-Post Evaluation] (1) (Reference) No progress since completion. (2) The ratio at the time of ex-post evaluation was 87.5%.The human resources who were the C/P of the project are playing a central role in the KSG-SWM and BPW-SWM, which are responsible for the waste management in the country and Koror State, through collaboration. In addition, the revenue generated from the CDL is mainly used to fund the activities related to waste management in Koror State.	[Project Purpose] (1) The number of registered C/Ps was four, which was one short of the target, but it can be said that the target was generally achieved as the C/Ps concerned are the key personnel to promote waste management in the country. (2) The establishment of the CDL system has become an indispensable source of funding for the operation and implementation of waste management in Koror, and is considered to be contributing to the strengthening of waste management in the country.

Output1	Capacity to manage the beverage container deposit fee program (sustainable financing system) is enhanced.	(1) Division of Solid Waste Management, Bureau of Public Works (SWM-BPW) will monitor the amount of containers collected on a regular basis. (2) SWM-BPW will monitor the amount of containers exported on a regular basis.	[At the time of Completion] (1) Achieved The average collection rate for all containers from April 2011 (when deposit collection started) to FY2015 was 89.8%. (2) Generally achieved SWM-BPW keeps track of the weight of containers handed over to private recycling companies. However, the actual export volume has not been captured. [At the time of Ex-Post Evaluation] (1) Monitoring is still ongoing during the ex-post evaluation. Average recovery rate is 87.5% (2019). (2) At the time of ex-post evaluation, continue to monitor the amount of containers collected as the amount exported, rather than the amount exported itself. After the start of J-PRISM, the importance of information sharing was pointed out through the JCC and other organizations. After the start of J-PRISM, the importance of sharing information was pointed out through the JCC, etc., and a mechanism for regular reporting and sharing by the Customs Bureau, MOF, SWM-BPW, and KSG-SWN was established.	Indicators (1) and (2) have been largely achieved upon completion. Through the implementation of J-PRISM, the SWM-BPW has been able to obtain necessary information (e.g., information on imports and funds) from the Customs Department and the Ministry of Finance on a regular basis, which has enabled the SWM-BPW to manage the CDL project with an overall picture of the project and to improve its management capacity. In the country, CDL has become a fundamental source of funding for overall waste management, and the strengthening of the management capacity of the SWM-BPW, the supervisory authority for waste management, has contributed to the achievement of the Project Purpose.
Output2	National Solid Waste Management Plan (NSWMP) is finalized and Action Plan is revised.	(1) NSWMP is finalized. (2) Action Plan is revised.	[At the time of Completion] (1) Achieved Approved by the Minister of MPIIC at the 1st JCC. (2) Achieved AP revised with SPREP. [At the time of Ex-Post Evaluation] (1)(2) After the completion of J-PRISM, it has been revised to NSWMP (2017-2026) and AP has also been formulated.	Both indicators (1) and (2) have been achieved by the time of completion, and Output 2 has been achieved. The formulation and revision of the NSWMP and AP, which will serve as the basis for waste management in the country, will serve as a contribution to the system for waste management and contribute to the achievement of the Project Purpose.

Output3	Capacity to conduct Awareness raising on3R is enhanced.	(1) Materials are delivered to 50% of schools in the Earth day activity. (2) Number of school presentations/ visits & conducted workshops	[At the time of Completion] (1) AchievedMaterials were distributed at Earth Day. As most of the schools participated, 50% was achieved. (2) Generally achieved17 workshops have been held. 17 workshops have been held, and activities are now being conducted actively. [At the time of Ex-Post Evaluation] (1) Earth Day continues to be held after its completion, with most of the participants participating every year, and activities to raise awareness of the 3Rs have been carried out during the event. (2) At the time of the ex-post evaluation (2019), 11 workshops, talk shows, clean-up activities, etc. were conducted at elementary and junior high schools to raise awareness of the 3Rs. KSG-SWM is working with Coastal Management & Conservation Department to conduct awareness raising activities in schools.	As both indicators (1) and (2) had been generally achieved by the time of completion, Output 3 had also been generally achieved by the time of completion. In order to strengthen the comprehensive infrastructure for waste management, it is essential to increase people's understanding of the issue, and this contributes to the Project Purpose. At the time of the ex-post evaluation, it was also confirmed that awareness-raising activities have been continued to a certain extent.
Output4	Training program on 3R /SWM is developed.	(1) A period of operation for M-Dock is extended for 3 years. (2) The existing closure plan for M-dock landfill is revised. (3) Conceptional Plan of the waste disposal is developed.	[At the time of Completion] (1) Achieved: Weirs were added in 2012-2013, extending the remaining life by 3 years. (2) Achieved: Closure plan has been developed and finalized. (3) Achieved: Basic concept of the repository including its structure and leachate treatment method has been formulated. Surveys have been carried out and the boundaries have been clarified. [At the time of Ex-Post Evaluation] (1)(2) At the time of the ex-post evaluation, the M-dock repository is still in use, and preparations are expected to be made for its closure after the completion of the new final disposal facility (November 2020).	Indicators (1), (2) and (3) have all been achieved by the time of completion, and Output 4 has also been achieved by the time of completion. M-dock is the country's main final disposal site, but its capacity will soon reach its limit, so the finalization of the closure plan for M-dock to make way for the opening of a new disposal site is essential for waste management in the country, and a significant contribution to Project Purpose.

			(3) Basic concept for M-dock has been developed and addressed; construction of the new landfill in the Aimeliik State was completed.	
Output5	Training program on 3R /SWM is developed.	(1) Training manual / materials is developed. (2) Number of training conducted and number of participants	[At the time of Completion] (1) Mostly achieved Manuals on CDL, composting, and waste management in Koror State have been prepared through training conducted in the country in 2013. (2) Generally achieved: Two training sessions were held (33 participants in total). * Although the specific number of trainings and the number of participants were not stated in the indicator, the PO planned two trainings and the number of participants reached the expected number, so it was judged to be "largely achieved". [At the time of Ex-Post Evaluation] (1)(2) Training was expected to continue through the implementation of J-PRISM Phase 2. In addition, a (Japanese) advisor has been assigned to KSG-SWM, and necessary training is being conducted in the form of OJT as appropriate."	Both indicators (1) and (2) have been largely achieved by the time of completion, and Output 5 has been achieved. A series of recycling activities at the Redemption Center has been playing a central role in the country's waste management, and the implementation of the training has been helpful in sustaining the activities. The implementation of recycling activities is essential for waste management in the country, and the establishment and implementation of a training system for this purpose has been very helpful in achieving the Project Purpose.

8. Kiribati

		Indicator	Achievement Level of Indicators at the Time of Completion / Ex-post Evaluation	Analysis of Differences
Overall Goal / Impact	Sustainable management of solid waste in the Pacific Region is enhanced.	(1) 80% of household engaged in the green waste recycling	<u>Overall Goal</u> [At the time of Ex-Post Evaluation] People's awareness of recycling had generally increased, and some collection and utilization of organic waste was continuing, but the percentage of households recycling organic waste was not known, and the status of waste reduction at the final disposal site was unknown. <u>Impact</u> [At the time of Ex-Post Evaluation] It was reported that the awareness of waste reduction was raised, and recycling of organic waste and improvement of the school environment were observed. The improvement of the school environment has an educational effect and also leads to the improvement of waste management at home. However, specific details of the improvements could not be confirmed.	Although changes in people's awareness were observed to some extent, especially in schools, the effect and impact of this project in terms of recycling rate and reduction of the amount of waste is considered to be limited.
Project Purpose	Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation	(1) 2 of experts (Trainers) in the field of 2 listed in the SPREP inventory (2) Volume of disposal waste at Landfill sites is reduced by 5%	[At the time of Completion] Both indicators did not change from the time of the terminal evaluation. [At the time of Ex-Post Evaluation] (1) No changes (2) It was reported that organic waste has decreased, but this is unknown as no data was taken.	As for the decrease in the number of outcomes (from three to two), this was the result of changing the content to be more realistic while the support for this project was limited, and the initial plan was considered to be somewhat excessive. [At the time of Completion] There was a slight decrease in CSP activities and organic waste, but improvements were limited, including in terms of systems. [At the time of Ex-Post Evaluation] Although CSP had been incorporated and

	of the Pacific Regional Solid Waste Management Strategy (2010-2015) (RS2010)			continued as part of the NZ support activities and some organic waste had been collected, the status of waste reduction at the disposal site could not be monitored, and the disposal site was approaching its capacity limit. It cannot be said that the Project Purpose of this project had been further improved after completion.
Output1	Household waste, especially green waste is recycled through waste separation and chipping.	(1) 5% of households (of South Tarawa) using compost (2) The amount of green waste for recycling (compost, firewood, etc.) is increased at Betio landfill site. (5% of recycling rate)	[At the time of Completion] (1) Not achievedThe prevalence of composting remained unknown. (2) Partially achievedThere was no significant change from the time of the terminal evaluation, and the exact recycling rate was unknown. [At the time of Ex-Post Evaluation] (1) Not achievedActivities related to composting were conducted in the NZ supported project, but it is difficult to distinguish them from this project, and the situation is not accurately understood. (2) Partially achievedSome recovery efforts have been made, but they have not spread significantly.	[At the time of Completion]Partially achieved[At the time of Ex-Post Evaluation]As for the recycling of organic waste, it can be said that it was only partially achieved, although there was some differentiation from general waste and some continuation of recycling activities through the NZ support project.
Output2	Community awareness on solid waste is improved through Clean School Program.	(1) Seven schools of South Tarawa are implementing the Clean School Program	[At the time of Completion] (1) Generally achieved Since the terminal evaluation, one of the remaining schools did not complete the activity due to a change in the staff member in charge. [At the time of Ex-Post Evaluation] (1) Achievement status continued After the completion of this project, CSP has become a part of other activities and is being continued.	Since the achievement of the only indicator leads to the achievement of the outcome, it can be said that Output 2 has been mostly achieved at the time of completion and ex-post evaluation.

9. Tuvalu

		Indicator	Achievement Level of Indicators at the Time of Completion / Ex-post Evaluation	Analysis of Differences
Overall Goal / Impact	Sustainable management of solid waste in the Pacific Region is enhanced	(1) Waste Management service is appropriately provided in Funafuti	<u>Overall Goal</u> [At the time of Ex-Post Evaluation] In Funafuti Island, the distribution of garbage containers to households and the establishment of a weekly collection system, as well as the introduction of a waste deposit taxation system in 2019, have led to a reduction in the amount of waste and recycling. <u>Impact</u> [At the time of Ex-Post Evaluation] No specific impact was identified after the completion of this project.	The establishment of the waste collection system and the introduction of the deposit system were realized through the project funded by the EU and implemented by SPREP, and it can be said that the direct effect of this project was very limited. However, it is believed that regional efforts have led to the improvement of waste management in Tuvalu through SPREP.
Project Purpose	Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation of the Pacific Regional Solid Waste Management Strategy (2010-2015) (RS2010)	(1) Improved operation of waste collection	The level of achievement at the time of completion was as follows. (1) On Funafuti Island, a system of sequential waste collection by dividing the residential area into several districts was introduced by the island office staff.	Although the degree of quantitative improvement is not known, some improvement was observed in the collection and disposal operations. The sharing of knowledge by the training participants has been utilized in the classification of collection areas, etc., and in this respect, it is considered that the training has made a certain contribution to the Project Purpose.

Output1	Capacity of instructors is increased through training.	(1) Duration time for waste collection in Funafuti Kaupule has reduced after training in Fiji. (2) At least one training conducted in-country by the trained personnel in Fiji	The level of achievement at the time of completion was as follows. (1) A mechanism for measuring time required and collecting data was not established, and no data was available. A qualitative response was obtained that the time was slightly shortened in Funafuti Island. (2) Knowledge was shared, but one of the participants in the Fiji training left the company and no training was provided to his colleagues.	Although there seems to have been some improvement, (1) cannot be evaluated due to lack of data, and (2) cannot be said to have been achieved. Therefore, Output cannot be said to have been achieved.

10. Tonga

		Indicator	Achievement Level of Indicators at the Time of Completion / Ex-post Evaluation	Analysis of Differences
Overall Goal / Impact	Sustainable management of solid waste in the Pacific Region is enhanced	(1) Kalaka landfill has been properly operated. (2) All households in Vava'u have access to garbage collection system.	<u>Overall Goal</u> [At the time of Ex-Post Evaluation] (1) The Kalaka landfill was operated and managed in accordance with the operation manual and maintained in good condition. (2) It was confirmed that all households on Vava'u Island had access to the collection service.	Efforts were made for independent waste collection, and smooth transfer of the waste collection was realized when the public corporation started collecting it later. The regular collection of garbage throughout the island and the management of the disposal site by the Corporation have been carried out appropriately, and it can be said that the Overall Goal has been fully achieved.
			<u>Impact</u> [At the time of Ex-Post Evaluation] In Phase 2 of J-PRISM, similar efforts have been made in the Ha'apai Islands, and other islands in Tonga are also showing signs of improved waste management. (The capital island of Tongatapu has been supported by the ADB and other donors for many years.) Through the improvement of the disposal site and the regular collection of garbage (weekly), issues such as abandonment and scattering of garbage have been resolved. The land for the disposal site is under a land lease agreement with the owner, and no specific problems were observed.	The implementation of the project has improved the sanitation environment at the Kalaka landfill and also improved the living conditions of the community through regular collection of garbage. There has been no resettlement and no problems with land acquisition, so it can be said that the overall impact of the project has been positive.

Project Purpose	Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation of the Pacific Regional Solid Waste Management Strategy (2010-2015) (RS2010)	(1) 6 experts (Trainers) listed in the SPREP inventory (2) More than 50 % of target communities operate and maintain the garbage collection system with a minimum support from the government.	[At the time of Completion] (1)(2) No change from the terminal evaluation [At the time of Ex-Post Evaluation] (1) Unknown as it was not possible to track the current status of each person (2) Garbage collection is being implemented sustainably throughout the island.	[At the time of Completion] Generally achieved [At the time of Ex-Post Evaluation] Fully achieved Although the refuse collection system has been changed, it can be said that the smooth transfer from this project, which introduced the collection system, has been possible.
Output1	The existing solid waste disposal facility and operation in Vava'u is improved.	(1) The existing dumpsite is rehabilitated (2) Rehabilitated landfill is operated in accordance with operation manuals	[At the time of Completion] (1) The same as at the terminal evaluation, the Kalaka landfill on Vava'u Island has been sufficiently rehabilitated. (2) Operations such as the covering of soil after the delivery of waste and the segregation of waste were not always sufficient, and some issues remained in the operation and management. [At the time of Ex-Post Evaluation] (1) The landfill renovated under this project continued to be the only landfill in use. (2) Security and fee collection systems were established, monitoring sheets were used, and no major concerns were found in the operational status.	[At the time of Completion] Generally achieved The Kalaka repository is the only repository in Vava'u and has been fully rehabilitated under the project. On the other hand, it can be said that there were some challenges in its operation. [At the time of Ex-Post Evaluation] Achieved Since the operation was transferred to WAL after the completion of this project, the operation has been managed without depending on the budget from the Ministry of Health, and sufficient management including monitoring has been done. (It is expected to reach the limit of the allowable amount by the end of 2021, and

				the governor is currently considering alternative sites.)
Output2	Solid waste collection service in Vava'u is improved.	(1) Collection service is provided according to the schedule (plan) (2) More than 80% of total households in Vava'u have access to garbage collection system	[At the time of Completion] (1)(2) No change from the status achieved at the time of the terminal evaluation. [At the time of Ex-Post Evaluation] (1) The garbage collection system has been replaced by an island-wide collection by the Waste Management Authority (WAL), instead of a voluntary community initiative, and all 26 communities are now covered. Collection services are provided on a regular basis. (2) Almost 100% of the households on the main island of Vava'u have access to the collection system.	[At the time of Completion] Achieved [At the time of Ex-Post Evaluation] Achieved With the provision of garbage collection service by WAL, the fee has increased from TOP10/month (in 2018) to TOP15/month (in 2020) (collected together with electricity fee), but regular garbage collection is now provided throughout the island. (Some small households have complained about the flat rate set for each household.)
Output3	Framework and system for long-term Solid Waste Management in Vava'u is established.	(1) Solid waste management plan (2) Meeting or Workshop for Vava'u Solid Waste Management Committee is held annually at least.	[At the time of Completion] (1) The draft plan was finalized by January 2016. (2) There has been no change since the terminal term evaluation. [At the time of Ex-post Evaluation] (1) The waste management plan is still valid and continues to be achieved. (2) The committee continues to meet once or twice a year after the completion of this project.	[At the time of Completion] Achieved [At the time of Ex-Post Evaluation] Achieved

11. Samoa

		Indicator	Achievement Level of Indicators at the Time of Completion / Ex-post Evaluation	Analysis of Differences
Overall Goal / Impact	Sustainable management of solid waste in the Pacific Region is enhanced	(1) 70% of household of town area continue the 3R practices and segregation of recyclable materials at source. (2) At least 3 PPP activities are implemented.	<u>Overall Goal</u> [At the time of Ex-Post Evaluation] (1) Efforts are being made to install separate garbage cans in public areas and recycling garbage cans in supermarkets. (Data not available) (2) PPP project is expected to be implemented at Tafaigata disposal site.	Although the percentage of households is not known, it was confirmed that efforts are being made to reduce and recycle waste, such as sorting in public areas and supermarkets, and a country-wide ban on the use of disposable plastic bags and Styrofoam. PPP projects have not yet been fully implemented, and the Overall Goal can be said to be partially achieved as a whole.
			<u>Impact</u> The Tafaigata landfill was the first one in the Pacific to use the Fukuoka method, and has been managed in generally good condition for many years. The Vaiata landfill has been upgraded to be similar to the one of Tafaigata and is operated and managed by a contractor. The environment of the disposal site has been improved. The site is owned by the government and no resettlement has occurred.	The sanitary environment at the disposal site has been improved and no land acquisition or resettlement has occurred. In addition, awareness-raising and educational activities on waste reduction and recycling have been conducted, and it can be said that efforts for better waste management are continuing in various aspects.

Project Purpose	Human and institutional capacity base for sustainable Solid Waste Management in the Pacific Region is strengthened through implementation of the Pacific Regional Solid Waste Management Strategy (2010-2015) (RS2010)	(1) Two experts (Trainers) are listed in the SPREP inventory (2) Amount of waste disposal is decreased by at least 5%	[At the time of Completion] (1) (2) No change from the evaluation at the time of completion. [At the time of Ex-Post Evaluation] (1) No change (2) It was reported that the amount of waste disposed increased slightly, but the survey was not fully conducted, and in some aspects, the use of disposable plastic bags was banned, which led to a reduction in waste.	[At the time of Completion] Although the data is not sufficient, it is generally considered to have been achieved. [At the time of Ex-Post Evaluation] Although it cannot be evaluated due to insufficient data, judging from the status of the operation and management of the disposal facility and the efforts to reduce the amount of waste, it is considered that the project has generally been achieved.
Output1	Waste Minimization measures and practices are introduced and implemented at the urban areas.	(1) Four Waste Survey Reports are produced (2) Four communities and nine businesses participated in waste segregation / minimization (3) Amounts of recyclable waste collected increase 10%. (4) Four public consultation/hearing meeting/workshop for waste minimization regulations/strategy	[At the time of Completion] (1) Achieved. (2) Achieved. No change from the terminal evaluation. (3) Not evaluated. No change from the terminal evaluation. (4) Achieved. In addition to the information provided during the terminal evaluation, a waste reduction competition was organized for some schools during the National Environment Week in 2015. [At the time of Ex-Post Evaluation] (1) No updated information since the Completion. (2) No updated information since the Completion. (3) A study on the amount of recycling was started in 2020, but has been suspended due to widespread concerns about the COVID-19 infections, and no data has been collected.	[At the time of Completion] Data on the amount of recyclable waste collected was not available, but other indicators were achieved, and overall, the project was generally successful. [At the time of Ex-Post Evaluation] Data on the amount of recyclable waste collected is still unclear, but some progress has been made, such as the ban on the use of plastic shopping bags and Styrofoam, and this is generally considered to have been achieved.

			(4) No updated information since the completion.	
Output2	Tafaigata is operated as a regional wastedisposal facility with improvements at Vaiaata in place	(1) Tafaigata Land use and Development Plan produced (2) Incoming waste data are recorded and periodically reported (monthly) using the weighbridge system at Tafaigata (3) Improved quality of leachate at Vaiaata landfill (4) Management and control of waste pickers are checked daily.	[At the time of Completion](1) Achieved. No change from the terminal evaluation.(2) Achieved. No change from the terminal evaluation.(3) Partially achieved. No change from the terminal evaluation.(4) Partially achieved. No change from the terminal evaluation.[At the time of Ex-Post Evaluation](1) Achieved. The plan has not been changed since its completion and continues to be used.(2) Achieved. Data recording and reporting is continuing.(3) Partially achieved. Continued efforts to improve the quality of leachate through monitoring.(4) Generally achieved. Due to the regular occurrence of fires, the activity of the waste picker was reported to be limited and controlled.	[At the time of Completion]Although there were some issues with the improvement of the Vaiata landfill and the management of the waste picker at the Tafaigata landfill, it can be said that the project was generally achieved.[At the time of Ex-Post Evaluation] While the improvements at the Vaiata landfill is not necessarily considered sufficient, as a whole they are considered to have been largely achieved.
Output3	Experiences and lessons learnt are shared in both national and international levels	(1) Newsletters are produced twice a year and at least one relevant document is produced. (2) Four overseas missions of PIC counterparts and national stakeholders are hosted. (3) At least five regional and international workshops participated to present Samoa's experiences	[At the time of Completion] (1)(2)(3) Achieved. All were achieved beyond the plan. [At the time of Ex-Post Evaluation] (1)(2)(3) As this is an indicator for the project period, no evaluation of achievement will be conducted during the ex-post evaluation.	[At the time of Completion] Learning from each other through the publication of newsletters and personal exchanges went beyond what was planned, and the sharing of experiences and lessons learned was well done. Learning about case studies of initiatives in other countries in order to improve our own efforts is highly appreciated. [At the time of Ex-Post Evaluation] In Phase 2 of the project, the sharing of knowledge and experience is continuing in a wide area.