

Country Name Solomon Islands	The Project for Improvement of Non Revenue Water Reduction Capacity for Solomon Islands Water Authority (SIWA)
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I. Project Outline

Background	Solomon Islands Water Authority (abbreviated as "SIWA" at the time of ex-ante evaluation and currently as "SW"), in charge of water supply and sewerage services in urban areas, was operating in the red. One of the reasons was a high non-revenue water (NRW) ratio reaching 56% in 2011. In order to improve the financial conditions, "SIWA Short Term Recovery Strategy and Action Plan" (2011-2013) was developed, which declared to realize the improvement of water supply services and the increase of revenues as its main purposes and the Australian Agency for International Development (currently the Australian Department of Foreign Affairs and Trade: DFAT) concluded a Memorandum of Understanding with SIWA to promote the implementation of RAP. However, with regard to NRW, no plans for the reduction were established. SIWA only repaired leakage on the ground after complaints or reports from customers and did not perform planned leakage detection. SIWA was short of engineers who could plan NRW reduction strategies and conduct countermeasures against leakage and illegal connections. (Figures at the time of ex-ante evaluation.)										
Objectives of the Project	<p>The project aimed to assist SW to achieve its target of reducing the NRW ratio in Honiara to 30% by 2015 by way of (i) systemization of planning process of SW for NRW reduction, (ii) establishment of the procedure for NRW reduction through the pilot areas and leakage control zones (LCZs)¹, (iii) implementation of NRW reduction in accordance with the procedure in pilot areas and/or LCZs in the selected District Metered Areas (DMAs)² and monitoring and maintenance of the improved NRW ratio³, and (iv) improvement of water meter reading and billing process management, thereby improving SW's service levels and increasing SW's revenue.</p> <ol style="list-style-type: none"> 1. Overall Goal: SW's service levels are improved and SW's revenue is increased. 2. Project Purpose: SW is assisted to achieve its target of reducing the NRW ratio in Honiara to 30% by 2015. 										
Activities of the Project	<ol style="list-style-type: none"> 1. Project Site: Honiara City 2. Main Activities: (i) systemization of planning process of SW for NRW reduction; (ii) establishment of the procedure for NRW reduction through the pilot areas LCZs; (iii) implementation of NRW reduction in accordance with the procedure in pilot areas and/or LCZs and monitoring and maintenance of the improved NRW, and (iv) improvement of water meter reading and billing process management 3. Inputs (to carry out above activities) <table> <tr> <td>Japanese Side</td> <td>Solomon Side</td> </tr> <tr> <td>1) Experts: 10 persons.</td> <td>1) Staff Allocated: 27 persons.</td> </tr> <tr> <td>2) Trainees Received: 12 persons.</td> <td>2) Building and Facilities: Office for the expert team.</td> </tr> <tr> <td>3) Equipment: Portable ultrasonic flow meter, water leak detectors, bulk flow meters, etc.</td> <td>3) Local Cost</td> </tr> <tr> <td>4) Local Cost</td> <td></td> </tr> </table>	Japanese Side	Solomon Side	1) Experts: 10 persons.	1) Staff Allocated: 27 persons.	2) Trainees Received: 12 persons.	2) Building and Facilities: Office for the expert team.	3) Equipment: Portable ultrasonic flow meter, water leak detectors, bulk flow meters, etc.	3) Local Cost	4) Local Cost	
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Project Period	October 2012-June 2016 (Extension: October 2015-June 2016)	Project Cost	(ex-ante) 259 million yen, (actual) 284 million yen								
Implementing Agency	Solomon Islands Water Authority (SW) * *Abbreviation was changed from SIWA to SW during the project implementation.										
Cooperation Agency in Japan	Yachiyo Engineering Co., Ltd. & Yokohama Water Co., Ltd										

II. Result of the Evaluation

<Constraints on Evaluation>

- Due to spread of COVID-19, site visits could not be conducted. Information was collected through a face-to-face interview, questionnaires and follow-up interviews by email. Also, it was difficult to collect additional information to confirm the initial survey results sufficiently from SW because some of the key NRW members were on job rotation or on leave because of COVID-19.

<Special Perspective Considered in the Ex-Post Evaluation>

- Continuation status of part of the Project Purpose indicators (i.e., continuation status of level of NRW ratio in the pilot areas and target DMAs) could not be verified as the monitoring data of the pilot areas was not available. The pilot areas, established for the project, were integrated as part 6 out of 24 DMAs created after the project completion, and NRW reduction activities, including monitoring and maintenance, were carried out based on the DMAs. Thus, the NRW ratio in the 2 target DMAs was used to verify continuation status of the Project Purpose indicators. In addition, continuation status of selected Output indicators was used to verify the continuation status of the project effects.
- The target year of the Overall Goal was set to be 2019 as the ex-post evaluation was planned 3 years after the project completion (i.e., 2019) according

¹ "Leakage Control Zone (LCZ)" introduced specially in SW is defined as a discrete zone of a distribution system tentatively created for implementation of countermeasures against leakage such as active leakage control.

² "District Metered Area (DMA)" is defined as a discrete area of a distribution system permanently created by isolation or the complete disconnection of pipe work in which the quantities of water inflow and outflow are metered. Total of 28 DMAs were identified and demarcated by the project.

³ Capacity development in DMA based monitoring and maintenance of the improved NRW was added to Output 3 from the viewpoint of preventive maintenance through the Minutes of the Meeting (M/M) for Amendment of the Record of Discussion (R/D) (30 October 2015) based on the recommendation of the terminal evaluation (Output 3 was changed from "NRW reduction is implemented in accordance with the procedure in pilot areas and/or LCZs" to "NRW reduction is implemented in accordance with the procedure in pilot areas and/or LCZs in the selected DMAs, and then improved NRW ratio is monitored and maintained"). Some activities were also added to reflect the additional capacity development.

to the ex-ante evaluation sheet.

- As for the Overall Goal (i.e., SW's service levels are improved and SW's revenue is increased), the initial indicators on the NRW ratio in Honiara City and the ratio of operational revenue-to-expenditure (i.e. "The NRW ratio in Honiara City is reduced to 20% by 2018" and "Ratio of operational revenue-to-expenditure is sustained at greater than 100%") were deleted respectively for their technical infeasibility and the existence of factors which positively affected the achievement other than the project effects⁴, and a new indicator (i.e. "A NRW reduction activities are carried on by Task Force composed of relevant Departments or Units") was added based on the agreement at the time of terminal evaluation, which was approved through the M/M for the Amendment of R/D (20 October 2015). Although the continuation of NRW reduction activities does not directly reflect the achievement status of the Overall Goal, it was justified for its contribution to increase of SW's revenue and to improvement of SW's service according to the above M/M. In order to have the same perspective as that of the terminal evaluation, the current indicator was used in the ex-post evaluation. In addition, whether the NRW reduction activities contributed to the improvement of SW's service level and revenue was checked as Supplementary Information by asking SW's opinion with grounds
- Since the target figure for the Overall Goal indicator is not available, the appropriateness of the number of DMAs in which NRW reduction measures were conducted was confirmed in light of the plan/schedule in the latest Strategic Implementation Plan (SIP) for NRW prepared under the project because its utilization and revision as needed was recommended by the terminal evaluation.

1 Relevance

<Consistency with the Development Policy of Solomon Islands at the time of Ex-Ante Evaluation>

At the time of ex-ante evaluation, the project was consistent with the National Development Strategy 2011 to 2020, which placed "Improving the livelihoods of all the people of the Solomon Islands" as one of its two pillars of the central focus areas and declared "Develop physical infrastructure and utilities to ensure all Solomon Islanders have access to essential services and markets" in its Objective 6, which included water supply facilities.

<Consistency with the Development Needs of Solomon Islands at the time of Ex-Ante Evaluation>

At the time of ex-ante evaluation, the project was consistent with the needs of reduction of the NRW ratio by SIWA as described in <Background>.

<Consistency with Japan's ODA Policy at the time of Ex-Ante Evaluation>

At the time of ex-ante evaluation, the project was included in the "Program for development and maintenance of economic infrastructure" under a development issue of "Revitalization of island economy" of one of the priority area "Enhancement of economic growth base" of the Rolling Plan for the Solomon Islands (2011).

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

<Status of Achievement of the Project Purpose at the time of Project Completion>

The Project Purpose was achieved at the time of project completion. The NRW ratio was reduced by at least 30 points in each pilot area (except for one pilot area where the initial NRW ratio was less than 30%, which is covered by Indicator 2) and the selected /2 target DMAs (Indicator 1). In the pilot area where the initial NRW ratio was less than 30%, the NRW reduction measures were implemented in accordance with its feature. The NRW ratio was reduced from 23% to 4% so that the effectiveness of the NRW reduction measures was validated (Indicator 2).

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects were partially continued at the time of ex-post evaluation. SW used the NRW manuals developed under the project as their bases for NRW reduction and monitoring works⁵ and internal training in 2018 and 2020 for both the existing and newly recruited staff involved in NRW reduction. The standard operation procedure (SOP) on customer meter reading and billing system developed under the project were utilized for the regular work. The SOP and training materials on meter reading were utilized to train newly employed meter readers. In the 2 target DMAs, monthly monitoring was continued and some maintenance works were done. The data and records of DMA-based monitoring and maintenance were continuously accumulated to sustain NRW reduction activities. The NRW ratio in each target DMAs was still lower than the one before the NRW measures but was not maintained at 30% plus or minus 5% because not all newly recruited staff fully understand the monitoring and maintenance process yet (also see <Technical Aspect> of "4 Sustainability")

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

The Overall Goal was /partially achieved in the target year because the indicator was partially achieved and supplementary information was achieved respectively. For reference, it was achieved at the time of ex-post evaluation because both indicator and supplementary information were achieved. The NRW reduction activities were carried on as part of the normal business operation by the task force, consisting of relevant departments of Operation Division and Finance Division. They were conducted based on the 30-year strategic plan and 5-year action plans of SW developed by the Asian Development Bank (ADB) in 2017 and part of the SIP for NRW developed under this project in 2016. Out of 28 DMAs, NRW reduction activities (i.e., primary NRW reduction measures and/or monitoring and maintenance) were introduced in 22 DMAs by 2019 (i.e., the target year) and were introduced in 2 more DMAs and being introduced in the other 4 DMAs as of September 2020. According to the implementation schedule of the SIP (2016), the NRW reduction activities were to be introduced to 28 DMAs by 2017 so that the achievement rate was 79% in the target year (and 86% at the time of ex-post evaluation) although it was behind the schedule⁶ (Indicator). In the DMAs where NRW reduction activities were introduced, the average NRW ratio was decreased from 65% (before the primary measures) to 60% (after the primary measures/monitoring and maintenance) in 2019. According to SW, implementation of NRW reduction activities contributed to increase in revenue to some extent as illegal/un-metered

⁴ As for the first indicator, it became unfeasible due to several incidents that had been hardly expected at the beginning of the project. For example, SW started its policy to disconnect area customers very strictly and thoroughly after 2013, and it negatively affected the NRW ratio. As for the second indicator, its achievement was affected not only by the outcome of the project, but also by other factors. For example, SW's water tariff had been almost doubled since the beginning of the project. and it positively affected the ratio of operational revenue-to-expenditure.

⁵ SW introduced additional equipment for NRW reduction measures after the project completion and felt the need to revise the manual to incorporate it.

⁶ It is noted that the implementation schedule of the SIP was subject to change and, in fact, SW expected that it would take at least 5 years to complete the full program in its annual report (2017). The schedule, however, was not revised by SW. No further details were available.

connection was decreased. It also contributed to improvement of service level of SW. For example, the average water supply hour /day was increased from 22 hours/day in 2016 to in 23 hours/day in 2019 because of decrease in water loss (Supplementary Information).

<Other Impacts at the time of Ex-post Evaluation>

Some other positive impacts were observed. There was a synergetic effects between this project and the Japanese grant aid “Project for Improvement of Water Supply System in Honiara and Auki” (2009-2014). The data on the number of customers, water demand, and leakage obtained through the project resulted in effective utilization of the facilities provided through the grant aid project. There were also synergetic effects between this project and the ADB’s project for “Urban Water Supply and Sanitation Sector Project (UWSSSP)” (2019-2027), co-financed by the ADB, the European Union (EU), and the World Bank, as the equipment procured through the ADB’s project was used by SW applying the skills and knowledge acquired through the project. Meanwhile, no negative impacts were observed.

<Evaluation Result>

Therefore, the effectiveness/impact of the project is fair.

Achievement of Project Purpose and Overall Goal

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No. of DMAs to which DMA-based monitoring and maintenance was introduced	2	12	17	22	24
Total no. of DMAs in which NRW reduction activities were conducted	2	12	17	22	24
Achievement rate of the target indicated in the SIP	14%	43%	61%	79%	86%

*Achievement status in the target year.

Source: Project Final Report; questionnaire and interview survey to SW.

3 Efficiency

The project cost and the project period exceeded the respective plans (ratio against the plan: 110% and 122% respectively). The project period exceeded the plan since mainly because capacity development in monitoring and maintenance activities of the improved NRW ratio was delayed due to delay of completion of the primary NRW reduction activities because of several reasons such as flood, delay of procurement of equipment by DFAT, etc. and additional capacity development in DMA based monitoring and maintenance was incorporated to one of the existing Outputs (see footnote 3 in detail). The Outputs were produced as planned. Therefore, the efficiency of the project is fair.

4 Sustainability

<Policy Aspect>

The National Development Strategy 2011 to 2020 mentioned in “1 Relevance” was effective at the time of ex-post evaluation.

<Institutional/Organizational Aspect>

The organizational setting to promote the NRW reduction activities (i.e., the task force) was continued. Some of the task force members left the organization, but SW recruited the new staff members and allocated to the task force. Although the exact number of staff could not be confirmed, at least the minimum necessary number of staff was allocated because NRW reduction activities were introduced/being introduced to all DMAs and the NRW ratio was decreasing gradually as stated in “Effectiveness/Impact”.

<Technical Aspect>

As mentioned above, some of the staff trained by the project left SW after the project completion. The trained staff who were still with SW maintained the acquired skills and knowledge through applying them in their daily operation and joint training with the newly recruited staff. The NRW manuals were shared to the newly recruited staff and the internal training on NRW reduction was given to them. According to SW, however, they were still building their capacity and understanding about the monitoring and maintenance process and more training would be necessary so that they could understand the NRW reduction process fully. Also, refresher training to the existing staff was important so that they could work more effectively. The concrete plan for internal training could not be confirmed, however. Meanwhile, SW hired an NRW expert from November 2019 to April 2020 and was considering making a two-year contract for another expert as soon as possible. Most of the provided equipment was used in good condition. It is noted that the bulk flowmeters installed in 10 field sites were already replaced by SW due to malfunction.

<Financial Aspect>

Necessary budget to promote NRW activities in 28 DMAs, including operation and maintenance of the provided equipment, was secured by SW. For example, it secured the budget to build 20 flow meter chambers and to procure 28 magnet flow meters, 7,000 cash water meters (pre-paid customer meters), materials for pipe replacement, leakage detection equipment, etc. after the project completion. In addition, it secured the budget to hire the NRW expert as mentioned in <Technical Aspect>. Some equipment was procured through UWSSSP as stated in “2 Effectiveness/Impact”. According to SW, it may be possible to use some part of budget of UWSSSP for NRW reduction in the future as well.

<Evaluation Result>

Some problems were observed in terms of the technical aspects of the implementing agency. Therefore, the sustainability of the effect through the project is fair.

5 Summary of the Evaluation

The project achieved the Project Purpose (“SW is assisted to achieve its target of reducing the NRW ratio in Honiara to 30% by 2015”). The effects of the project partially continued because the level of the NRW ratio of the target DMAs was not maintained at 30% plus or minus 5% due to insufficient understanding of the newly recruited staff about the monitoring and maintenance. The Overall Goal (“SW’s service levels are improved and SW’s revenue is increased”) was partially achieved in the target year (2019) mainly because the introduction rate of the NRW measures in the DMAs was 79% of the target indicated in the SIP developed under the project. Regarding the sustainability, some problems were observed in terms of the technical aspects such as insufficient capacity and understanding of the newly recruited staff about monitoring and maintenance. Nevertheless, no major problems were observed in terms of the policy, institutional/organizational, and financial aspect. As for the efficiency, the project cost and the project period exceeded the respective plans. Considering all of the above points, this project is evaluated to be partially satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- In order to sustain the project effects and enhance sustainability, it is recommended that SW do regular internal training for the newly recruited staff who have just joined SW and internal refresher training for the existing staff on the NRW reduction process. The internal training should be conducted by the remaining staff of the NRW team who were with the project once a year.

Lessons learned for JICA

- In order to ensure proper monitoring and evaluation of a technical cooperation project using the indicators and thus to ensure accountability, it is important to examine whether the indicators are direct measures of the project objectives, including the Overall Goal, and whether or not factors other than the project outputs/outcome which may directly affect achievement of the indicators positively exist at the time of planning. During the project implementation, it is also important to review the indicators, including those

of the Overall Goal, when incidents, which had not been expected at the planning stage and may affect their achievement, happen after the commencement.



Tasahe A, B & C receiving tank in one of the target DMAs



Tahahe A, B & C distribution mains in one of the target DMAs