

Solomon Islands

FY2017 Ex-Post Evaluation of Japanese Grant Aid Project

“The Project for the Improvement of Radio Broadcasting Network for Administration of  
Disaster Prevention”

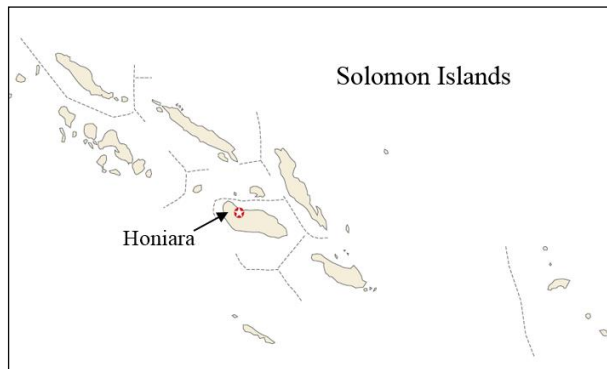
External Evaluator: Hisae Takahashi, Ernst & Young ShinNihon LLC

## **0. Summary**

This project was implemented to provide swift and adequate disaster and disaster-prevention information throughout the Solomon Islands by installing short-wave transmitter systems, thereby helping improve the islanders’ awareness of disaster-prevention and mitigate damage from natural disasters. Its purpose is consistent with the development strategy of the Solomon Islands which has prioritized improving resilience and related measures when disasters occur and development needs frequently impacted by natural disasters, as well as Japan’s aid policy. Thus, the relevance of the project is high. Though the project cost was within the planned budget, the project period largely exceeded the plan due to the extra time needed to respond to land issues and upgrade the transmitter performance. Consequently, efficiency of the project is fair. Implementing the project made short-wave radio broadcasting possible on a 24-hour basis in the event of a disaster and the effect of using weather forecasts obtained through radio broadcasting to prevent damage was confirmed. Conversely, disaster-prevention broadcasting communications radio systems, installed to related agencies handling disaster management information, have not been fully utilized. Accordingly, although this project has achieved its expected objectives to some extent, part of the effect remained limited, so effectiveness and impacts of the project are fair. While the institutional and technical aspect and the condition of the Operation and Maintenance (O&M) for the radio broadcasting system are positive, management and utilization of disaster-prevention broadcasting communications radio system and financial aspect of agencies overseeing operation and maintenance have minor issues. Accordingly, sustainability of the project can be judged as fair.

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

## 1. Project Description



Project Location (Whole Solomon Islands)



Short Wave Antenna Mast

### 1.1 Background

Solomon Islands consist of six major islands and about 100 small islands in the South Pacific. It is always exposed to risks of such natural disaster as eruption, earthquakes, tsunamis, tidal waves, cyclones and floods. Information communications infrastructure was vulnerable except for some urban areas and the sole quick means of communication at the time of planning was radio broadcasting. However, the radio broadcasting service was not sufficiently provided due to frequent suspensions caused by failures of transmitters. Moreover, due to dilapidations of facilities, the coverage was much smaller than it was expected, hindering information provision to islanders. Accordingly, there was an situation in which they could not fulfill their full function in case of emergencies such as natural disasters. Thus, it was a pressing need to improve the short-wave broadcasting network, which made it possible to provide emergency broadcasting service nationwide in time of disasters, to ensure a safe and stable living environment for islanders. In the meantime, Solomon Islands Broadcasting Corporation (SIBC), the organization responsible for distributing national information, had a limited budget to upgrade and repair part of the equipment, but upgrading the entire short-wave broadcasting system was considered difficult. Although SIBC had also no problem in operating and maintaining the regular practice of short-wave broadcasting system, it was deemed technically incapable of planning and implementing a large-scale project for upgrading equipment, including constructing and installing an antenna.

Under such circumstances, the Government of the Solomon Islands requested Grant Aid support and a project to improve their capacity to deliver information was launched, including information on emergency disaster and disaster management.

### 1.2 Project Outline

The objective of this project is to provide the stable radio broadcasting service for disaster-prevention and mitigation throughout Solomon Islands by installing the short-wave

transmitter systems, thereby contributing to the improvement of islander’s awareness to disaster-prevention and to the mitigation of damages from natural disasters.

Grant Limit / Actual Grant Amount	504 million yen / 503 million yen
Exchange of Notes Date/Grant Agreement Date	March 2011 / March 2011
Executing Agency	Solomon Islands Broadcasting Corporation (SIBC)
Project Completion	July 2014
Main Contractors	Kanematsu Corporation (Construction) Hitachi Kokusai Electric Inc., Denki Kogyo Co., Ltd. (Equipment)
Main Consultant	Yachiyo Engineering Co., Ltd.
Basic Design Survey	September 2009 - March 2011
Related Projects	<ul style="list-style-type: none"> <li>• Technical Cooperation “The Strengthening Community-Based Disaster Risk Management Project in the Pacific Region” (October 2010 -September 2013)</li> <li>• The Regional Assistance Mission to Solomon Islands (RAMSI) “The Solomon Islands Media Assistance Scheme ”(2008 -2010)</li> <li>• AusAID “Lata Medium-wave transmitter development” (2003)</li> <li>• Taiwan “Development of Medium-wave transmitters, short-wave transmitter, FM transmitters in Henderson and Gizo” (1999)”</li> </ul>

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Hisae Takahashi, Ernst & Young ShinNihon LLC

### 2.2 Duration of Evaluation Study

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

Duration of the Study: October 2017 – November 2018

Duration of the Field Study: January 22 – February 9 and April 18 - 24, 2018

## 3. Results of the Evaluation (Overall Rating: C<sup>1</sup>)

### 3.1 Relevance (Rating: ③<sup>2</sup>)

#### 3.1.1 Consistency with the Development Plan of the Solomon Islands

At the time of planning this project, the Solomon Islands development policy *Medium-term Development Strategy* (2008 - 2010) cited six priority areas. One of these, “providing effective

<sup>1</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>2</sup> ③: High, ②: Fair, ①: Low

social services”, explained communicating prompt and accurate information to the whole country in emergencies such as natural disasters as its mission. The *Solomon CNURA policy* (Coalition for National Unity and Rural Advancement), a measure for economic rebirth and fiscal support at the time, legislated bills for government-funded public corporations and the *SIBC Corporate Bill* were enacted. Accordingly, SIBC was obliged to broadcast the necessary information nationwide as a fair independent and democratic communication network<sup>3</sup>.

At the time of ex-post evaluation, the *national development strategy* (2016 - 2035) advocates the improvement of national economic and social life. Among the five main objectives of the strategy, target 4 "Resilient and environmentally sustainable development through effective disaster risk management, response, and recovery", improvement of risk management including preparations prepared for disaster and prompt response were shown<sup>4</sup>. Meanwhile, the country's *national disaster management plan* (2017) clearly sets out the institutional framework for disaster management, operations and recovery arrangements. The decision-making body of the operation and the National Disaster Operation Committee described in this plan are expected to play key roles in disseminating information by involving SIBC as a committee member with a telecommunication companies<sup>5</sup>.

As mentioned above, the development strategy of the Solomon Islands has focused on improving risk management and means of information transmission for environmental and climate change from the time of planning until the ex-post evaluation. SIBC also participates as a member of the committee playing a central role in the event of a disaster and the importance of the SIBC role in such event is reconfirmed. Accordingly, the consistency of this project can be confirmed with the country's development strategy; targeting prompt and reliable transmission of disaster prevention information by improving short-wave broadcasting system equipment.

### 3.1.2 Consistency with the Development Needs of the Solomon Islands

The Solomon Islands, which is a nation comprising more than 900 islands, is volcanic, as well as being particularly prone to cyclones and earthquakes and its inhabitants have always been endangered by various natural disasters. However, at the time of planning, the information communication technology infrastructure in the country remained undeveloped except for some cities and there was a reliance on radio broadcasts as an only means of providing information to the public. Meanwhile, short-wave broadcasting networks at the time of planning are limited to overnight (17:00 - 9:00) due to insufficient functions and equipment failure, also stop affected by insufficient power capacity, hindering broadcasting service, resulted in difficult situation for

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<sup>3</sup> Source : Document provided by JICA

<sup>4</sup> Source : *National Development Strategy 2016 to 2035*, pp.1-14, 42-45

<sup>5</sup> Source : *National Disaster Management Plan 2017-Finalized Draft*, pp.38-41

short-wave broadcasting networks to play the role of conveying information in the event of an emergency such as a natural disaster. At the time, given the lack of any effective alternative to disseminate disaster information, improving short-wave broadcasting networks capable of dealing with disasters was considered an urgent task by developing equipment that can make the whole country a service area.

Even after this project got underway, while the country has been damaged by cyclones and various natural disasters (see Table 1), the means of obtaining information, such as mobile phones, the Internet and SNS have all expanded compared to the time of ex-post evaluation and the planning stages. However, such communication networks remain largely inaccessible in rural areas in particular and the communication infrastructure which is possible to transmit information constantly is still limited. Even in urban areas, though the changes to the needs of radio as a means of obtaining daily information has been confirmed, telephone and Internet networks remain vulnerable and there are frequent telecommunication network issues due to insufficient capacity. In the event of a disaster, usage of mobile phones and access to the Internet will soar and it is assumed that servers may well crash. Accordingly, radio is positioned as a key backup tool even in urban areas as means of obtaining information and at the time of ex-post evaluation, the urgent need to improve the radio broadcast network was acknowledged.

Table 1 Natural disaster occurred in the Solomon Islands during the project

Year	Event	Damaged province	Damages
2012	Cyclone(Jasmine)	Isabel province Makira-Ulawa Province	Not clear
	Flooding & landslide	Makira-Ulawa Province	Not clear
2013	Cyclone(Freeda)	Makira, Guadalcanal Province	Not clear
	Earthquake & Tsunami	Temotu Province	Five villages wiped out, damaged cost SBD 38 million
	Flash flood	Malaita Province	Not clear
2014	Cyclone(Ita)	Guadalcanal Province	Not clear
	Flash flood	Guadalcanal province	23people died, 49,000 households
2015	Cyclone(Pam)	Temotu, Malaita, Makira/ Ulawa Province	Not clear

Source: document provided by National Disaster Management Office

### 3.1.3 Consistency with Japan’s ODA Policy

At the 5th Pacific Islands Summit<sup>6</sup> held in May 2009, the Japanese government decided to target efforts to support “environmental and climate change” for the Pacific Islands, including the Solomon Islands, as one of its three pillars. In addition, in light of the dialog on economic cooperation policy in June 2009, key areas of cooperation specified to emphasize in the

<sup>6</sup> The Pacific Islands Leaders’ Meeting (PALM) has been held every three years since 1997 with the purpose of strengthening relations between Japan and Pacific Islands comprising Micronesia, Melanesia and Polynesia. Summit-level dialog is also being explored to resolve various issues for stability and prosperity in the Pacific Islands and other countries.

Solomon Islands<sup>7</sup> included “narrowing the disparities through economic development,” “improvement of social services,” and “strengthening of environmental protection and natural disaster provision.” This project aims to ensure information transmission in disaster and to consolidate transmission capacity, which is consistent with the priority items of Japan’s support to the Solomon Islands.

In light of the above, implementing this project is highly relevant to the Solomon Islands development policy, development needs and Japan’s ODA policy, therefore its relevance is high.

### 3.2 Efficiency (Rating: ②)

#### 3.2.1 Project Outputs

[Japanese side]

The main output of this project comprises the short-wave broadcasting system equipment provided to SIBC and the disaster/disaster-prevention broadcasting communication system (VHF radio equipment) installed at the agencies handling disaster information and consulting service. Table 2 shows the plan and actual output of this project. The output was roughly as planned, except for the removal of the antenna pole of the disaster/disaster-prevention broadcasting communication system, relocation of the installed VHF radio equipment / antenna and a change in the short-wave transmitter frequency.

Table 2 Planned and actual output

Items	Plan	Actual
1. Short wave transmitter system 10kW AM Short wave transmitter, Coaxial patch panel, Directional coupler, Dummy load, Program input equipment	1 set	As planned
2. Short wave antenna system (Wide band dipole antenna) Antenna mast, Antenna element, Antenna feeder, Balun, Earth ground mat	1 set	As planned
3. Power supply equipment for transmitter Isolation and lightning protection transformer, Automatic voltage regulator, Primary Distribution Board	1 set	As planned
4. Disaster/disaster-prevention broadcasting communications radio systems VHF radio transceiver, VHF radio repeater, Power supply for VHF radio transceiver, VHF radio antenna, Antenna pole, Mobile VHF transceiver	1 set	Antenna pole was deleted from procurement of equipment.
5. Program transmission link equipment VHF Audio program transmission link transmitter for short wave broadcasting, Automatic voltage regulator	1 lot	As planned
6. Maintenance equipment and tools Oscilloscope, Spectrum analyzer, Circuit tester, High voltage probe, Linear detector, Distortion meter/oscillator, Audio attenuator, Tool kit, Safety belt	1 set	As planned

<sup>7</sup> Source: document provided by JICA, ODA Country Data book (2009)

7. Spare parts Spare parts for short wave transmitter, Maintenance kit for antenna system	1set	As planned
8. Consumable parts Fan unit for transmitter, Air filter for transmitter, Fuse for transmitter, Surge absorber for isolation transformer, Fuse for PIE, Fuse for Automatic voltage regulator	1set	As planned
9. Consulting service/Capacity building program (Soft component) Plan: Detailed design, Supervision of implementation, Initial trainings for operation and total system of the equipment (manner of equipment operation, measures to damages, initial trainings for operation of daily inspection)		As planned

Source: documents provided by JICA and questionnaire

Note: Training for initial operation was provided to three persons for the short-wave transmitter and antenna and 24 persons for disaster-prevention broadcasting communications radio systems.

The reason for the change and countermeasure are as follows: There is no difference between the achievement expected from planning and the equipment functions and it can be said that there was no issue of imposing these changes.

[Changes of output]

① Delete antenna poles:

(Reason) Although scheduled to be installed on the premises of the National Disaster Management Office (hereinafter referred to as “NDMO”), implementation of this project was delayed due to the antenna pole site problem, and meanwhile the support of the Regional Assistance Mission to Solomon Islands built the multipurpose antenna pole. Overlapping functions of both pieces of equipment were confirmed, thus it was decided not to proceed with the set-up according to the request from the Prime Minister’s Office of Solomon Islands<sup>8</sup> after confirming the possibility of using it as an antenna of this project.

② Installation location of VHF radio communication device of the disaster/disaster-prevention broadcasting communication system, and the VHF radio antenna:

(Reason) To dismantle the Meteorological Agency Building, which was originally planned to be installed and when constructing a new station building, the weather forecast division moved to one room in NDMO, whereupon VHF radio communication device was installed in NDMO<sup>9</sup>.

③ Frequency change of short-wave transmitter

(Reason) Initially, plans involved this project using the frequency of the short-wave transmitter at 6080 kHz. The same frequency was used by ABC Radio Australia at the

<sup>8</sup> Source : interview survey with the consulting company and executing agency

<sup>9</sup> Source : interview survey with the consulting company, executing agency, NDMO and Meteorological Agency

time of planning and its usage rights were scheduled to expire at the end of 2009. However, the rights were extended and the decision was made to continue use by ABC Radio Australia. A request to change the frequency from SIBC was submitted and it was decided to use 5020 kHz, which the Solomon Prime Minister's office had previously owned<sup>10</sup>.

[Solomon Islands side]

The following eight items were carried out as planned by Solomon Islands side's portion<sup>11</sup>

1. Tax exemption and customs clearance procedures at unloading port
2. Providing a temporary storage location near the site
3. Repair of the transmitting station building
4. Removal of mowing and obstacles in new antenna land
5. Securing the disposal site of removed materials
6. Implementation of test broadcasting
7. Fence setting around the new transmitting antenna
8. Exemption from custom duties



Short-wave transmitter  
(Henderson Transmitter site)



Disaster/disaster-prevention broadcasting  
communication system  
(SIBC headquarter)

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Cost

The Japanese side covered a cost of 503 million yen against the Exchange of Notes (E/N) limit of 504 million yen, which was within (99.8% of) the plan. The planned project cost, including a contribution of about 2 million yen from the Solomon Islands side, was 506

<sup>10</sup> Source : interview survey with the consulting company and executing agency

<sup>11</sup> Source : documents provided by JICA, questionnaire responses from Prime Minister's Office and executing agency



million yen, but since it was not possible to confirm the expenditure incurred by the Solomon Islands side in detail, it was difficult to compare the total project cost. As all the responsibility items on the side of the Solomon Islands were implemented as planned without any issues (see “3.2.1 Output”), the money is considered to have been used as planned.

### 3.2.2.2 Project Period

Although the planned period of this project<sup>12</sup> was 19 months, it actually took 40 months from April 2011 to July 2014, which significantly exceeded the plan (211% thereof). The delay occurred mainly due to the land problem concerning the installation site of the short-wave antenna and the response to the upgrade of the short-wave transmitter. Details behind each factor are as follows:

#### **【Delay caused by the land issue related to the short-wave antenna site】**

After concluding E/N, it emerged that the Henderson antenna site, planned as the venue for installing the short-wave antenna, was private, which meant solving the issue would take longer. Consequently, the need emerged to secure land in which to install an antenna in neighboring nationally owned territory and around 18 months were subsequently required to restart the project<sup>13</sup>. In the Solomon Islands, approximately 90% of national land is customary land, most land is not registered for landowners and special circumstances, the use of unregistered customary land without permission which was one of the factors sparking ethnic conflict, exist. The project obtained a letter from the Ministry of Lands, Housing and Surveys to secure and provide Henderson land at the preparatory stage (2010). This letter, however, cited that the necessary procedure would be taken to secure the land before the project started and that securing said land was not assured. Given the many similar land issues occurring in this country, swiftly solving the same kind of issues is considered difficult, unless the project starts under the circumstances where the required land is assured, not only obtaining a letter committing to provide land.

#### **【Delays to respond for upgrading the short-wave transmitter】**

The short-wave transmitter was locally installed after shipping, but the planned contract period (November 2013) had to be extended to ensure its quality could be secured<sup>14</sup>. The short-wave transmitter transmits waves by combining antennas, raising the possibility that

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<sup>12</sup> The project period is defined from the contract with the consultant till the month of completion of equipment installation. The starting month is normally set as the month of E/N unless specifically described otherwise in the ex-ante evaluation report. However, since the starting point of the planned project period was not described in the ex-ante evaluation report of this project, the schedule written in the preparatory survey report was applied. This schedule for the planned project period did not include the E/N or Grant Agreement dates, or specify the commencement of the project period as a detailed design meaning the contract day of the consultant. Accordingly, both the plan and actual project commencements was considered to be from the start of detailed design.

<sup>13</sup> Source : Questionnaire response, interview survey with consulting company

<sup>14</sup> During this period, test operation was started to prepare for disasters.

the design functions could be hindered in the actual environment after installing the antenna, as was done in this project<sup>15</sup>. With this in mind, upgrading was suggested by the manufacturer and implementing the same took nine months in response<sup>16</sup>. This case did not come into the category of design issues, but instead, changes were required to improve the function, so it was a delay accompanied by a required equipment upgrade to ensure quality.

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

### 3.3 Effectiveness and Impacts<sup>17</sup> (Rating: ②)

#### 3.3.1 Effectiveness

##### 3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

###### (1) Available radio broadcasting hours

Before implementing the project, radio broadcasts were limited to nighttime hours (17:00-9 : 00) due to malfunctioning short-wave broadcasting facilities. Accordingly, if disasters were to occur in daytime, the ability to convey information through radio broadcasts were limited in a part of cities such as Honiara, Auki and the others, and doing so would for all the people in the islands proved a challenge.

Implementing this project allowed a system providing a 24-hour short-wave radio broadcasting service to be established after project completion by installing a short-wave radio broadcasting facility including a short-wave transmitter and antenna, power supply equipment for the transmitter and so on. In fact, radio broadcasting is normally provided for 18 hours (5:00 – 23:00) given the limited number of late-night listeners and taking electricity cost and other factors into consideration. The service hours can, however, be extended if disasters or emergencies occur. During the interview with the islanders, it was actually confirmed that radio was broadcast continuously and beyond normal service hours in the event of a downpour in the rainy season to provide information.

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<sup>15</sup> It was clarified that the frequency character and distortion were slightly lower than specified values when test operation ensued with overpower (15 kW) output as compared to the normal 10kW. Since no issues arose when used with the normal 10kW, upgrading this equipment was not mandatory. The consultant, however, prioritized efforts to ensure quality and responded to this upgrading.

<sup>16</sup> Source: Consulting firm and interview survey with executing agency

<sup>17</sup> Sub-rating for Effectiveness is to be put with consideration of Impacts.

Table 3 Available short-wave radio broadcasting hours

	Baseline	Target	Actual	
	2011	2016	2014	2017
		3 Years After Completion	Completion Year	3 Years After Completion
Available Short-wave Radio broadcasting Hours (hrs.)	Night time 17:00~9:00	24 hours	24 hours	24 hours

Source: documents provided by JICA, Questionnaire

## (2) Coverage area of radio broadcasting

Coverage of short-wave radio broadcasting in the Solomon Islands remained 100%, even before implementing the project. However, clear sound quality proved unattainable with SIBC equipment owned at the time of planning over an increasingly wide area due to deterioration of transmitters and others. Installing equipment for the short-wave broadcasting system in this project improved this issue, unless the radio receivers have issues. Conversely, the issue of unclear sound quality of short-wave broadcasting was confirmed, but this was attributable to the quality of the radio receivers rather than any transmitter issue<sup>18</sup> in the interview with the executing agency and the site survey in islands outside the capital city<sup>19</sup>.

Table 4 Coverage area of short-wave radio broadcasting

	Baseline	Target	Actual	
	2011	2016	2014	2017
		3 Years After Completion	Completion Year	3 Years After Completion
Coverage area of radio broadcasting in the Solomon Islands (%)	100%	Not set	100%	100%

Source: document provided by JICA, questionnaire

### 3.3.1.2 Qualitative Effects (Other Effects)

#### (1) Expedited broadcasts for disaster / disaster-prevention

In the Solomon Islands, at the time of planning, means to convey information by related agencies handling the disaster-prevention information included email, telephone and so on. As explained above, the nationwide communications network infrastructure remained poor, even in the capital city of Honiara and mobile phone and email communication frequently failed due to a lack of capacity in the event of emergencies, which meant sourcing

<sup>18</sup> According to the executing agency, more and more cheap radios of poor quality have been imported. Moreover, obtaining high quality radio is difficult outside the capital city.

<sup>19</sup> Group interviews with residents in suburbs of Honiara, Gizo, Temotu and Izabela provinces were conducted to collect information on the qualitative effect and impact. Total of 36 islanders whose areas were outside the mobile network (five each in Tamboco and Gizo, 23 in Lata and three from Isabel) were interviewed and the condition of radio usage, the use of information obtained through radio, the impact on daily life and so on were confirmed. However, it proved impossible to visit Isabel province because the flight was cancelled due to bad weather. Accordingly, interviews with islanders from Isabel province were conducted at a Hotel where evaluators stayed and met people who were visiting Honiara from Isabel province.

information promptly, even among related agencies, was one of the challenges. The project connected to the major stakeholder agencies, including NDMO, the police headquarters, the Ministry of Mines, Energy and Rural Electrification<sup>20</sup> the Meteorological Agency and SIBC with VHF radio. Consequently, it was expected that prompt coordination would be possible in the event of an emergency by utilizing VHF radio as a communication channel.

However, a system allowing swift information communication via VHF radio equipment in the event of an emergency could not be considered established as of the ex-post evaluation. Use of this equipment was limited to a few occasions, as confirmed by policy headquarters<sup>21</sup>. One of the major reasons was explained as the fact that cases involving large-scale disasters did not occur or the number of reportable cases was limited. In addition, NDMO confirmed the operational status through regular test operations by connecting each agency where the equipment was installed right after the project completion, but this was not done since NDMO relocated its office. Circumstances whereby disaster-prevention broadcasting communications radio systems were fully functional and swiftly delivered information in the event of disaster, could not be confirmed, even in other related agencies, for example the equipment was not properly set up (Refer to “3.4.4 Status of Operation and Maintenance ” for the utilization status of installed equipment at each agency).

Although delivering information through email and telephone is normally possible for minor disaster-prevention information, as things stand, the related agencies still have a lack of understanding about the importance and needs of using VHF radio for communicating information. However, in this country, the communication infrastructure remains unstable and mobile phone connection problems abound, even in non-emergency cases, meaning the communication methods normally used are often unavailable due to server breakdowns or antenna collapses when a large-scale disasters occur. In these cases, the VHF radio function which can be used as a means of delivering information must be secured for back up. Agencies where equipment was not yet set up must respond before any major disaster occurs and prepare for the same accordingly.

### 3.3.2 Impacts

#### 3.3.2.1 Intended Impacts

##### (1) Reducing damage from natural disasters

As explained above, there were many cases where people rely on radio in areas outside mobile phone reception even at the time of ex-post evaluation. In such areas, delivering disaster and weather forecast information to islanders via radio broadcasts made advance

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<sup>20</sup> The Ministry of Mine, Energy and Rural Electrification is a government agency with jurisdiction over earthquakes and one of the related agencies dealing with national disaster / disaster prevention information.

<sup>21</sup> According to the police headquarters, when the cyclone occurred in Tomotsu in 2015, an example was given that information and alarms of heavy rain and earthquakes could be disseminated to various places, although not recorded.

measures possible. Even when a river flooded Guadalcanal Island in 2014, an appreciation letter was sent to JICA from the Solomon Islands for short wave radio acting quickly to convey information on the damage. Then, while no such cases of damage being mitigated have since been confirmed, the use and usefulness of disaster-prevention information were introduced through radio during interviews with residents. For example, many islanders, who listen to the radio, accessed information of the weather forecast in the morning and evening and particularly when downpours or storms were expected through radio. Depending on this information, they may rush home faster, prepare a stock of water, food, matches and so on, as part of advance measures taken to mitigate damages.

#### (2) Awareness effect with public broadcasting

It was expected that providing various awareness programs to islanders would be possible through radio broadcasting after implementing the project, which would help improve their awareness of disaster-prevention and health/hygiene and improve their lives indirectly. Awareness programs are actually produced and broadcast not by SIBC independently and have helped promote understanding of disaster prevention among islanders by broadcasting those awareness programs of NDMO, other NGOs and so on to islanders<sup>22</sup>. Islanders also gain insights through awareness activities provided by various organizations such as NGOs as well as awareness programs broadcast through radio. Meanwhile, despite not being awareness activities, it also emerged that many islanders learned about disaster-prevention and ways to react properly through the weather forecast and countermeasures explained in the radio program and practiced the same. For example, according to SIBC listeners, although SIBC used to provide only weather information in forecast earlier, measures to be taken alongside such forecasts have been also broadcast recently and the information is also considered to comprise part of awareness activities.

#### 3.3.2.2 Other Positive and Negative Impacts

##### (1) Impacts on the natural environment

No negative impact on the natural environment was confirmed by implementing the project. A transmitter was installed inside the existing building and an antenna was installed on nationally owned land. Waste soil produced during the construction was limited; construction noise was minimal and very few private residents were around. Accordingly, no negative impact on the natural environment was confirmed during the project, according to interviews with the executing agency and with consultants.

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<sup>22</sup> Source: Interviews with the Red Cross office, provincial police and islanders during the provincial site surveys.

## (2) Resettlement and land acquisition

As described in “3.2.2.1 Project Cost”, the originally planned sites to be acquired was on private land and it took longer to conclude an agreement with the land owner, prompting a shift to neighboring nationally owned land. Accordingly, no land acquisition and resettlement were generated for this project.

Installing equipment such as a short-wave transmitter and antenna and others improved the sound quality of short-wave broadcasting across the entire Solomon Islands and the system to provide information for 24 hours via radio has been arranged when disasters occur. Though no earthquakes or major cyclones have occurred since the project was completed, the effect of utilizing the scope to give weather forecasts such as storms and downpours through radio to prevent damage pre-emptively through preventive measure, particularly in provinces, was confirmed. Conversely, regarding the disaster-prevention broadcasting communications radio systems installed to the major agencies, which deal with disaster-prevention information, half were not in a serviceable condition to be used in emergencies given the lack of any appropriate configuration and so on after relocating offices. In light of the above, this project has achieved its objectives to some extent. Therefore, effectiveness and impacts of the project are fair.

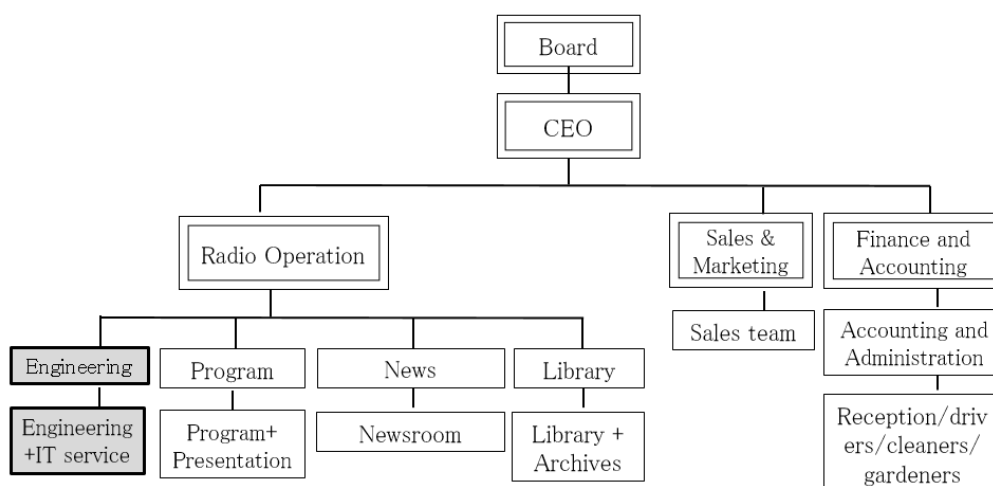
## 3.4 Sustainability (Rating: ②)

### 3.4.1 Institutional / Organizational Aspect of Operation and Maintenance

The SIBC engineering team is responsible for the O&M of procured short-wave broadcasting equipment. Of the 50 SIBC staff members at the time of ex-post evaluation, 40 are technical staff and the remaining ten workers are such as cleaners. Despite the decline in the number of technical staff since project planning due to downsizing in the government sector, there have been no changes in the structure and staff numbers of the team in charge of equipment O&M<sup>23</sup>. Two technical staff are in charge of O&M of the installed short-wave broadcasting system equipment. While no concerns were reported from institutional perspectives at the time of ex-post evaluation, scope to recruit a further two staff members has been examined, with future sustainability in mind.

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<sup>23</sup> Source: document provided by JICA, interview survey to executing agency



Source: document provided by executing agency

Figure 1 Organization Structure of SIBC

### 3.4.2 Technical Aspect of Operation and Maintenance

The staff in charge of SIBC equipment have been worked on radio transmitters as technical staff members and it was confirmed at the project planning stage that their capacity for O&M of facilities and equipment was sufficient to conduct O&M. O&M for the latest installed equipment required basic knowledge, which was conveyed by a Japanese technician as technical transfer, including the operational method of measuring equipment to detect errors, quality management, changing repair parts and so on. They were conducted as a form of On the Job Training, where SIBC staff members also experienced the entire process of installing equipment alongside Japanese technical staff. Accordingly, the SIBC staff members in charge are deemed to properly understand the function of the equipment, measures to be taken and contact information in the event of troubles. While two SIBC staff members understand the O&M methods at the time of ex-post evaluation, SIBC sees the need to share the experiences with other SIBC technical staff in future<sup>24</sup>. Though there are no plans to hold their own training on SIBC, courses on radio broadcasting or equipment are held at Fiji National University once every two years, in which staff may participate as required. Most SIBC technical staff had actually had opportunities to participate trainings in the past.

No issues emerged in terms of obtaining consumables and spare parts up to the time of ex-post evaluation. Stock supplied within the project scope was stored in the store room and it was also confirmed that coolant to cool the transmitter, which had to be regularly purchased, had been procured from Australia. When equipment has some issues, it is also possible to contact and receive some advice from the Japanese supplier. Manuals for short-wave transmitters are placed inside their facility and the use of manuals as required was also

<sup>24</sup> Source: interview survey with executing agency

observed during the site visit. As noted above, there were no concerns on O&M of the equipment provided from a technical aspect.

### 3.4.3 Financial Aspect of Operation and Maintenance

According to an interview with SIBC, no issues on the O&M budget or procured equipment arose, though the amounts concerned cannot be considered enough. The purchase of consumables, including coolant water for cooling transmitters and other, were also confirmed. No serious issues for financial information were confirmed in the details of SIBC's Income and Expenditure as well as cash flow (Tables 5, 6) up to 2016. The balance of payment up to 2016 shows a surplus and there are no cash flow issues.

Table 5 The breakdown of SIBC's revenue and expenditure

(Unit: Solomon Island Dollars)

	2014	2015	2016
<b>Revenue</b>			
Government grants	375,694	375,694	775,695
COS <sup>Note 1</sup>	4,006,000	3,900,000	3,930,000
Advertising	3,081,561	3,507,040	3,693,707
Broadcasts	1,240,862	1,426,311	1,486,367
Service messages	1,357,771	1,023,946	841,991
Rental income	195,592	246,560	307,400
Other revenue	231,930	127,695	181,421
<b>Sub total</b>	<b>10,489,410</b>	<b>10,607,246</b>	<b>11,216,581</b>
<b>Expenditure</b>			
Administrative expenses	3,788,427	4,067,413	3,359,607
Depreciation expenses	654,512	721,555	709,568
Direct costs	82,741	41,230	65,632
Employees cost	3,566,539	4,216,388	4,327,003
Finance expenses	20,571		2,877
Repair and maintenance	516,181	551,931	747,692
<b>Sub total</b>	<b>8,628,971</b>	<b>9,598,517</b>	<b>9,212,379</b>
<b>Net profit</b>	<b>1,860,439</b>	<b>1,008,729</b>	<b>2,004,202</b>

Source: documents provided by executing agency

Note 1: Abbreviation of Community Service Obligation. Items to be paid by the Government of the Solomon Islands on behalf of community to government owned companies which provide non-commercial goods and services.

Table 6 Breakdown of cash flow

(Unit: Solomon Island Dollars)

	2014	2015	2016
Cash flows from operating activities	1,444,353	2,557,342	2,072,117
Cash flows from investing activities	(1,481,704)	(1,322,960)	(1,439,663)
Cash flows from financing activities	(450,000)	(650,000)	(600,000)
Net cash flow	(487,351)	584,382	32,454
<b>Cash and cash equivalents</b>	<b>625,314</b>	<b>1,209,696</b>	<b>1,242,150</b>

Source: documents provided by executing agency



On the other hand, the Solomon Star (newspaper) posted an article in 2017 stating that the supply of power to SIBC was restricted due to serious financial difficulties of the government, the operation of the medium-wave transmitter was ceased in December 2017 and moves to shorten the operating time of the short-wave transmitter were also being considered if the situation were to worsen<sup>25</sup>. According to SIBC, measures to remedy this situation are needed and means of further streamlining the power consumption are being examined. For example, the International Telecommunication Union recommends shifting radio transmission of broadcasts from analog to digital format by 2020, which will reduce power consumption by 40%. Since the transmitter provided by this project is convertible to digital, SIBC is considering the feasibility of this implementation including securing the financial resources to fund such conversion.

As mentioned above, despite no serious problems in SIBC's financial situation up to 2016, power provision was stopped in 2017 when the ex-post evaluation was carried out due to unpaid electricity, whereupon the medium-wave broadcasting ceased. Concerns have been confirmed that if the financial situation deteriorates further, it will also hinder the operation of short-wave broadcasting equipment.

#### 3.4.4 Status of Operation and Maintenance

It was confirmed during the interviews with SIBC and the site visit that facilities and equipment, including the short-wave transmitter and antenna and so on, were basically fully utilized and operated. The required O&M such as inspection and cleaning were made and the insides of facilities and premises were kept clean and organized. A problem whereby the transmission frequency-switching system did not automatically occur arose in January 2018, but does not affect the operating system function. SIBC has already contacted the suppliers concerning these issues and ordered the parts needed to inspect the condition and solve the issues. It is clear that SIBC has properly managed the operating equipment in making such responses.

Meanwhile, the scope to which disaster-prevention broadcasting communications radio systems and VHF radio equipment are used and installed in related organizations, allowing quick communication in the event of an emergency, remains not high as shown in Table 7. For example, in NDMO, repeaters, which are part of VHF radio equipment, are kept in SIBC due to the NDMO office relocating<sup>26</sup>. Since the Meteorological Agency was in part of the NDMO

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<sup>25</sup> "SIBC battles to stay on air", Solomon Star, dated December 24, 2017.

URL: URL address

<http://www.solomonstarnews.com/index.php/news/national/item/19768-sibc-battles-to-stay-on-air>  
(Accessed June 19, 2018)

<sup>26</sup> NDMO strongly requested reinstallation of the equipment (repeater) in the relocated office. Conversely, SIBC considers that NDMO's current office is located in an area prone to flooding in the event of a disaster, which may hinder the equipment, thus the installation site is considered unsafe. NDMO is planning to relocate the office again

office when the equipment was installed, the Meteorological Agency used NDMO's equipment on a shared basis, but after the NDMO office was relocated, the Meteorological Agency could not set up the VHF radio equipment and it was not usable. Also, in the Ministry of Mines, Energy and Rural Electrification, VHF radio equipment is temporarily installed in a corner of the warehouse due to partial renovation of the office. Accordingly, scope to respond immediately in the event of an emergency is maintained for equipment of SIBC, police headquarters and NDMO excluding repeaters. The reason is that the need for such equipment remains poorly understood and it can be also pointed out that the involvement of the relevant agencies (those where VHF radio equipment is installed) other than the executing agency, SIBC, during the implementation of the project remained extremely limited. When installing the VHF radio equipment, although operating instructions were explained to the relevant agencies, there was no scope for the latter to agree on any details given of other measures to take in the event of relocation, their individual roles for ongoing use of the same and responsibilities. When setting up the equipment, there is a need for the relevant agencies to gather together, nurture understanding, acknowledge the significance of agreement and need to establish the same then clarify the responsibilities and roles etc. of each institution to cooperate in future.

Table 7 Installation and utilization status of VHF radio equipment

Installed place	Installation and utilization status
SIBC	Installed in headquarters and usable in the event of an emergency.
NDMO	Part of equipment relocated to SIBC during office relocation and kept there at the time of ex-post evaluation.
Meteorological Agency	Resetting did not take place at the time of office relocation and it is not in a usable situation.
Police Headquarter	All VHF radio equipment can be used and is actually used to communicate information to prevent disasters both inside and outside the police headquarters.
Ministry of Mines, Energy and Rural Electrification	Along with the renovation of the office, it was shifted to the warehouse.

Source: Interview surveys with each agencies

In light of the above, although the institutional, technical and O&M status of short-wave transmitter are good, some minor problems were observed in the management status of VHF radio equipment for emergency contact and part of the financial situation of the maintenance institution. Therefore, sustainability of the project effects is fair.

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and SIBC is considering storing it until relocation and then re-installing it. Even if part of the equipment is not reinstalled, there will be scope to use the VHF radio by using a mobile receiver or similar.

## **4. Conclusion, Lessons Learned and Recommendations**

### 4.1 Conclusion

This project was implemented to provide swift and adequate disaster and disaster-prevention information throughout the Solomon Islands by installing short-wave transmitter systems, thereby helping improve the islanders' awareness of disaster-prevention and mitigate damage from natural disasters. Its purpose is consistent with the development strategy of the Solomon Islands which has prioritized improving resilience and related measures when disasters occur and development needs frequently impacted by natural disasters, as well as Japan's aid policy. Thus, the relevance of the project is high. Though the project cost was within the planned budget, the project period largely exceeded the plan due to the extra time needed to respond to land issues and upgrade the transmitter performance. Consequently, efficiency of the project is fair. Implementing the project made short-wave radio broadcasting possible on a 24-hour basis in the event of a disaster and the effect of using weather forecasts obtained through radio broadcasting to prevent damage was confirmed. Conversely, disaster-prevention broadcasting communications radio systems, installed to related agencies handling disaster management information, have not been fully utilized. Accordingly, although this project has achieved its expected objectives to some extent, part of the effect remained limited, so effectiveness and impacts of the project are fair. While the institutional and technical aspect and the condition of the O&M for the radio broadcasting system are positive, management and utilization of disaster-prevention broadcasting communications radio system and financial aspect of agencies overseeing operation and maintenance have minor issues. Accordingly, sustainability of the project can be judged as fair.

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

### 4.2 Recommendations

#### 4.2.1 Recommendations to the Executing Agency

- Recommendations for effective utilization of VHF radio equipment

At the time of ex-post evaluation, half of the VHF radio equipment provided to related agencies could not be used appropriately in an emergency. If large-scale disasters were to occur, which would preclude the use of mobile phones and the Internet, there would be a need to maintain a system allowing each related agency to keep in touch with the others swiftly via the relevant equipment. First of all, each agency incapable of responding to reinstallation, or where equipment is not installed in an appropriate place, has to establish an environment whereby equipment can be promptly utilized and a test operation to confirm that an environment where information can be communicated has to be performed.

#### 4.2.2 Recommendations to JICA

None

#### 4.3 Lessons Learned

- Conditioning of project commencement considering the delay factors caused by land issues

In this project, it took time to solve the land problem and the project period exceeded 200% of plan. In the Solomon Islands, where most land landowners remains unregistered, even for past projects, many cases were delayed due to problems related to land expropriation issues, e.g. the landowner who was not identified at the time of planning, would raise their ownership after the project got underway. In areas and sectors where land acquisition and resettlement delaying the project have previously been confirmed, it is desirable to prepare the project as not to interrupt the project implementation by citing conditions for the commencement of the project as the completion of land acquisition and resettlement by the government and executing agency.

- Approach to relevant agencies with the continuous utilization of equipment in mind

In this project, to deliver disaster-prevention information promptly, in addition to improve radio short-wave broadcasting nationwide, VHF radio equipment was installed at major related agencies dealing with disaster information. However, at the time of the ex-post evaluation, it was confirmed that the VHF radio equipment had not been effectively utilized and many agencies were incapable of an immediate response in the event of disaster. As related agencies usually communicated information by telephone or email and large-scale disasters e.g. necessitating the use of VHF radio equipment after the project had not yet occurred in the country, the major factors underlining the importance of VHF radio equipment in the event of a disaster were not sufficiently recognized. In addition, another relevant reason is a lack of clarity as to who is responsible for continuing the communication means using the VHF radio equipment. Given that the executing agency of this project was SIBC and the involvement of related agencies was limited, it is also worth noting that the system/responsibilities concerning its continued utilization to deliver information by utilizing VHF radio equipment of each institution at the time of installation were not clearly defined. When installing equipment to be used by multiple related organizations besides the executing agency, executing agencies and experts need to consider the sustainability of project effectiveness, clarify who is responsible for O&M equipment when installing equipment and then have to prepare a mechanism to be used continuously and fully share the perception of the importance with the relevant agencies.