

Solomon Islands

Ex-Post Evaluation of Japanese Grant Aid Project

“Project for the Reconstruction of Gizo Hospital”

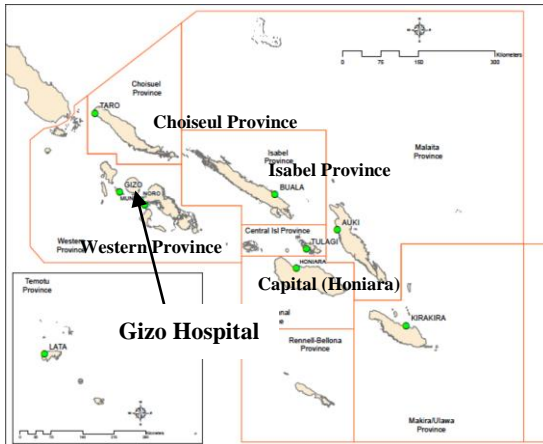
External Evaluator: Yukako Matsuura, International Development Center of Japan

0. Summary

The project aimed to improve the quality and quantity of medical referral services in the Western region of the country and secure a regional healthcare base in case of disasters, by constructing a new building for the deteriorated Gizo Hospital affected by the tsunami following the 2007 Solomon Islands earthquake as well as by providing necessary equipment. This objective has been consistent with development policies of the Government of Solomon Islands and needs of the country since the time of planning, as well as Japan’s aid policies at the time of planning. The set target of beneficiaries was slightly ambitious because a part of the intended area has had no means of transportation to Gizo. The need to restore and improve the healthcare provided by Gizo Hospital was, however, extremely serious, and the project was considered highly relevant. The project cost borne by the Japanese side was kept within budget, whereas data for that on the Solomon side was not available. The construction period was extended, and the opening of the hospital was further delayed after the handover of the new building from Japan; accordingly the process efficiency was fair. Annual records of healthcare significantly vary year to year. A number of indicators of healthcare did not always meet the target criteria set as the ideal level of pre-tsunami caseloads, such as number of outpatients and inpatients, deliveries, and surgeries, whereas caseloads in dentistry, ophthalmology, and physiotherapy greatly increased. The physical conditions of the hospital environment were upgraded, and patients’ satisfaction with the facilities and treatment was high. The project had a significant impact on people, especially those from remote islands who had received unsatisfactory healthcare but henceforth had access to qualified referral services. Presently, Gizo Hospital also functions as a disaster response hub. Moreover, visits by foreign medical teams to the hospital have increased; they provide more complicated surgeries. This outcome is counted as another impact of the project. Taking these facts into account, the project is assessed to have high effectiveness and impact. Maintenance management has also been greatly improved, and most of the provided medical equipment are used and well maintained. However, a number of issues in the water supply and ventilation systems remain unsolved. In addition, surgeons and obstetricians have not been assigned to the hospital; consequently, the sustainability of Gizo Hospital as a secondary referral hospital is rated as fair.

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

1. Project Description



Project Location



Old and New Gizo Hospital Buildings

1.1 Background

Solomon Islands is an island nation consisting of nearly 1,000 small and large islands located in the Pacific Ocean. The country is made up of nine provinces and a capital territory, Honiara City, encompassing an area of 28,900 km² with a population of 534,000 (2006). Its per-capita GNI was USD 680 (2006, World Bank). The health sector had suffered constantly from such problems as shortage of medical professionals, dilapidated facilities, and insufficient budget allocation. Rural areas were reported to have more serious demand for medical facilities due to the tribal conflicts from 1999 to 2003.

Gizo Hospital is the largest hospital in Western Province, the second largest province in the country with a population of approximately 72,000. Of the hospitals in Solomon Islands, Gizo Hospital ranked fourth for its bed capacity. It has been a referral hospital in the Western Province region, expected to cover the nearly 130,000 population in Western and Choiseul Provinces as well as a part of Isabel Province. Since its construction in 1959, the building has been extended and renovated in parts, eventually becoming a convoluted space whose layout hindered efficient movement in terms of providing medical services, even basic services. The shortage of space was also serious due to the increasing number of patients. Further extension of the old building was no longer realistic; therefore, in August 2006, the Government of Solomon Islands requested the Government of Japan for a grant aid to construct a new building adjacent to the old one for relocation.

On April 2, 2007, after the above request was submitted, a magnitude 8.1 earthquake hit the Western region of Solomon Islands and a subsequent tsunami caused serious damage to the facilities of Gizo Hospital. Houses of the hospital staff were destroyed, consequently disabling

the staff from providing hospital services. Inpatients and undamaged medical equipment were transferred to hospitals in Honiara and other places. As a result, the functions of Gizo Hospital were greatly restricted. The hospital restored its medical services gradually after the disaster; however, it definitely needed improvement to the dysfunctional layout of a maze of corridors, as well as expansion of the space itself for providing secondary referral services. Constructing a new building, and then relocating the hospital functions to it, was deemed necessary and urgent.

1.2 Project Outline

The project aimed to restore and improve the medical services of Gizo Hospital by constructing a new building for relocation and providing necessary equipment, thereby contributing to the improvement of the quality and quantity of medical referral services in Western region for the 130,000 residents in Western and Choiseul Provinces and a part of Isabel Province. Another expected impact was to secure a regional healthcare base during disasters.

Grant Limit / Actual Grant Amount	Detailed Design: JPY 72 million / JPY 72 million Construction and Equipment: JPY 1,900 million / JPY 1,691 million
Exchange of Notes Date (/Grant Agreement Date)	Detailed Design: February 2009 (/February 2009) Construction and Equipment: June 2009 (/June 2009)
Implementing Agency	Ministry of Health and Medical Services (MHMS)
Project Completion Date	March, 2012 ¹
Main Contractor(s)	Construction: Kitano Construction Corp. Equipment: NBK Corporation (Nanyo Boeki Kaisha, Ltd.)
Main Consultant(s)	Nihon Sekkei Co., Ltd.
Basic Design	November 2008
Detailed Design	September 2009
Related Projects	[Technical Cooperation] Japanese Technical Cooperation Project for the Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries (February 2011 to February 2016) [Grant Aid for Grassroots Human Security] Rehabilitation Plan for the Gizo Hospital Wharf and Jetty (Ministry of Infrastructure Development of Solomon Islands, JPY 9.9 million, 2007) [Japan Overseas Cooperation Volunteers (JOCV)] Nursing (two years from March 2011, two years from July 2013), Medical equipment (two years from October 2013)

¹ The opening of the new Gizo Hospital was delayed until March 2012; JICA handed over the new building and equipment to the hospital in August 2011. In light of the project objective, project duration is defined as the period up to the opening and operational commencement of the new hospital.

2. Outline of the Evaluation Study

2.1 External Evaluator

Yukako Matsuura, International Development Center of Japan, Inc.²

2.2 Duration of Evaluation Study

Duration of the Study: August 2014 to September 2015

Duration of the Field Study: October 13 to 24, 2014, and February 9 to 13, 2015

2.3 Constraints during the Evaluation Study

The health sector of Solomon Islands suffers from a widespread lack of records and statistical data.³ Records of medical treatments are collected and kept manually at Gizo Hospital. Certain parts of operations and treatment ledgers were missing at this evaluation, and certain data were unreliable. Therefore, parts of this evaluation are based on data whose accuracy and credibility could not be fully confirmed.

3. Results of the Evaluation (Overall Rating: B⁴)

3.1 Relevance (Rating: ③⁵)

3.1.1 Relevance to the Development Plan of Solomon Islands

At the time of project planning, the Government of Solomon Islands set forth the restoration of basic social services as its overarching goal, such as health and education, in “National Economic Recovery, Reform and Development Plan 2003–2006,” and the subsequent “Medium-Term Development Strategy 2008–2010” also emphasized the significance of health, especially rural health facilities, rural water supply, and infectious diseases control, such as malaria. The “National Health Strategic Plan 2006–2010” aimed to reinforce primary healthcare service as an important agenda and laid out policies to set up a healthcare system that focused on preventive medicine and to expand secondary medical services.

The “National Development Strategy 2011–2020” in force at the ex-post evaluation prioritizes qualified healthcare, and its implementing plan “Medium-Term Development Plan 2014–2018” intends to provide qualified secondary medical services to the entire nation by 2018. The “National Health Strategy Plan 2011–2015” emphasizes health

² The evaluator is a consultant of International Development Solutions, Inc. and assisted International Development Center of Japan with this ex-post evaluation.

³ “National Health Strategic Plan 2011–2015 (MHMS)” admits that health information in provinces as well as at the National Referral Hospital (NRH) are collected manually without being entered into a database, and counting and calculation are impossible for many health indicators without relying on estimates and compromising amid conflicting data from different sources.

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

⁵ ③: High, ②: Fair, ①: Low

promotion and preventive services through provincial health programs to improve health services qualitatively and quantitatively. Based on the policy review, the objective of this project is assessed as being in line with the development strategies and plans of Solomon Islands from the planning to the ex-post evaluation.

3.1.2 Relevance to the Development Needs of Solomon Islands

The provision of qualified healthcare to the entire nation of scattering islands has been an important agenda in Solomon Islands, to be achieved by strengthening rural health facilities. The shortage of physicians has been serious⁶, and many primary health facilities lack sufficient water and power supplies; accordingly, referrals to secondary health facilities are high. This project thus needed to focus on a secondary medical facility that would serve a sizable number of beneficiaries.⁷

To ensure nationwide secondary and tertiary health services, the Ministry of Health and Medical Services (MHMS) has divided six main islands and a thousand of the surrounding small islands into four blocks to establish a system: the central part would be covered by the National Referral Hospital (NRH), the only tertiary hospital in the country, the northeastern part by Kiluifi Hospital, the eastern part by Kirakira Hospital, and the western part by Gizo Hospital.⁸ Under these circumstances, Gizo Hospital was the appropriate choice for this project because its facility was the most decaying and affected by the 2007 tsunami disaster when the project was requested and designed.

The target setting of 130,000 beneficiaries is assessed as slightly ambitious. According to the JICA Project Formulation Survey for Earthquake and Tsunami Rehabilitation and Reconstruction in Solomon Islands conducted from April to May in 2007, before the disaster, Gizo Hospital provided services to approximately 100,000 persons consisting of 75,800 residents in Western Province, 24,200 residents in Choiseul Province, and others from a part of Isabel Province.⁹ One year after the survey, the project was designed to set a population of 130,000 as expected beneficiaries.¹⁰ Practically, access to Gizo Hospital depends on sea lane. However, there has been no traffic between Gizo Island and Isabel Island since the project designing stage, and is no prospect of launching such a lane even

⁶ The total number of physicians in the country in 2009 was 118 according to the WPRO Country Health Information Profile 2011 (http://www.wpro.who.int/countries/slb/31SOLtab2011_finaldraft.pdf?ua=1).

⁷ The construction of a primary healthcare facility requires securing water source and installing water and electricity supply systems; thus, the cost per beneficiary tends to be higher. Therefore, targeting a secondary facility was appropriate in light of cost-benefit performance in this project.

⁸ Interview with MHMS Permanent Secretary in February 2015

⁹ Report of JICA Project Formulation Survey for Earthquake and Tsunami Rehabilitation and Reconstruction in Solomon Islands, August 2008

¹⁰ Basic Design Study Report on the Project for the Reconstruction of Gizo Hospital in Solomon Islands did not refer to any information on transportation to Gizo Hospital from outside of Gizo Island nor to actual visit records. A justification for the 130,000 population target was not provided as well.

at the ex-post evaluation. Residents of Isabel Island currently receive secondary medical services in Honiara City, the capital, and only a few patients residing in islands close to Gizo would come to Gizo Hospital by their own boat or canoe. According to a 2009 population census, the most recent census available at this evaluation, the realistic number of beneficiaries is roughly 100,000 persons.¹¹ The capacity of the hospital building and facility was designed based on records of treatment from 2004 to 2006; as a result, the overestimation of beneficiaries did not affect the scale and capacity of the hospital. In the end, Gizo Hospital was designed to serve, and has been serving, the needs of 100,000 people throughout the project, whereas it was impractical to include patients from Isabel Island.

3.1.3 Relevance to Japan's ODA Policies

From the project planning stage to the ex-post evaluation, the Government of Japan consistently supported the development of the Pacific Islands, including Solomon Islands, as a partner and active member of the Pacific Islands Leaders Meetings. The Fourth Japan–Pacific Islands Forum Summit Meeting sets forth primary healthcare as an important agenda, and the fifth and the following Forum Summit Meeting promote “Overcoming Vulnerabilities and Promoting Human Security,” with particular emphasis on supporting healthcare facilities. As regards the health sector of Solomon Islands, the Government of Japan and JICA have joined in aid coordination network since 2009, based on the partnership arrangement¹² between the Government of Solomon Islands and health development partners. From these aspects, the project was assessed as being in line with Japan's ODA policy.

In short, this project has been highly relevant to the country's development plan and Japan's ODA Policy. Although the target of the project was set slightly ambitiously in terms of the number of beneficiaries, the project was consistent with the urgent development needs to recover from the disaster and strengthen the secondary healthcare foundation of the country. Therefore, its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

¹¹ According to the most recent 2009 population census, the population of Western Province was 76,649, and that of Choiseul Province was 26,372, for a total of 103,021 for both. Isabel Province had a population of 26,158 (<http://www.spc.int/prism/solomons/>).

¹² “The Partnership Agreement between the Solomon Islands Government (MHMS) and Health Development Partners.” The partners included Government of Australia, World Health Organization, International Development Association (World Bank), United Nations Children's Fund, United Nations Population Fund and Government of Japan.

The project aimed to restore and improve the medical services of Gizo Hospital by constructing a new building for relocation and providing necessary equipment. The project also included soft component to transfer skills for maintenance of the hospital. Outputs were mostly achieved as planned.

Table 1: Outputs (Departments and Facilities)¹³

	Original Plan	Actual Outputs / Changes
First Floor		
Outpatient Department (OPD)	General, emergency, special clinics (internal medicine, surgery, obstetrics and gynecology, ophthalmology, dental clinic, physiotherapy, and traveling clinic)	As planned (After the handover, the hospital placed 20 additional beds in the OPD for outpatients staying overnight.)
Medical imaging	X-ray, Ultrasonic	As planned
Medical tests	Biochemical, bacterial and TB laboratories, blood test, and blood bank	Extra toilets added; others were as planned
Administration	Pharmacy, office, duty	Most of the administration functions, except for the reception, remained in the old building, including the director's office. ¹⁴
Service	Radio room	A radio system was installed in the reception.
Second Floor		
Operating theater	Theater (1 major and 1 minor)	Location of outdoor unit of air conditioner was adjusted; others were as planned
Central sterilizing and supply	Washing room, sterilization room	As planned
Delivery	Labor, delivery (2), nursery	As planned
Wards	Male, female, pediatrics, maternity, HDU, isolation (62 beds in total)	70 beds installed at this evaluation (male, 14; female, 20; pediatrics, 12; maternity, 14; HDU, 6, isolation, 4)
Services	Electric room	As planned
Others		
Sewage treatment plant and control room		The shape of the sewage tank was modified.
Generator		As planned
Water reservoir tank		The arrangement of the water reservoir tank and machines was adjusted.

¹³ The total site area was 9,000 m², and the total floor area was 3,903.85 m², including the hospital building (3,783.26 m²), pumping room (9.35 m²), and sewage treatment plant (111.24 m²), laid out as planned.

¹⁴ The administration department has been in charge of provincial health administration. The decision was therefore made to leave the department in the old hospital building in light of its mandate and to maximize the limited space (interview with the hospital management).

Others	The shape of the roof and lighting window was changed; the entrance's sloping direction was shifted; the range of glass blocks was adjusted.
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Source: Basic Design Study Report and Documents provided by JICA

Table 2: Outputs (Equipment)

Original Plan		Actual Outputs / Changes
OPD	Examination lights, slit lamps, dental chairs, nebulizers, etc.	The specs of the dental compressor were changed.
Emergency	Examination couches, nebulizers, emergency medical kits, etc.	As planned
Physiotherapy	Hot pack heater, examination couches	As planned
X-ray	Mobile X-ray machine, ultrasound machine, X-ray viewer, dental X-ray machine, etc.	As planned
Laboratory	Spectrometer, automatic water distillation machine, autoclave, electric balance, etc.	As planned
Pharmacy	Automatic water distillation machine, electric balance, refrigerator, etc.	As planned
Operating theater	Operating light and table, anesthesia machine with ventilator, bedside monitor, defibrillator, autoclave, electrosurgical unit, etc.	The specs for the anesthesia machine were modified.
Central sterilizing and supply	Autoclave	As planned
Obstetrics	Delivery tables and beds, incubator, phototherapy unit, infant warmer, etc.	As planned
HDU	Suction unit, bag resuscitator with adult and pedia masks, stretchers, Gatch beds, etc.	As planned
Maintenance	Maintenance set	As planned

Source: Basic Design Study Report and Documents provided by JICA

Changes and adjustments to the specifications of certain facilities, as well as placement, were made according to the hospital's requests. These adjustments were all minor and necessary for better use and maintenance of facilities, and thus regarded appropriate, causing no major changes to the project duration and budget. Changes in equipment were also limited, and most items were installed and then used as planned.

Trainings for the operation and maintenance were conducted by Japanese consultants as planned, as a soft component of the project. The deliverables submitted by the consultants

were the following: proposals for the maintenance structure, budget plan, and total management system, which were drafted based on analyses of the old hospital's maintenance conditions. They also prepared manuals, ledgers, repair request sheets, maintenance flowcharts, and other documents useful for the maintenance of facilities and equipment as well as for waste management; these were presented to concerned personnel in Gizo Hospital and NRH in July 2010 and May and August 2011.¹⁵ Most of the training participants have remained in service at Gizo Hospital. Thus, appropriate personnel were selected for the training.

The pre-construction undertakings of the Government of Solomon Islands were mostly implemented as planned, such as repair of the hospital jetty, construction site preparation and demolition of existing facilities, improvement of drainage, and staff housing construction. Undertakings during the construction, such as the implementation of the public power and water supply projects; installation of a sewer pump for the public septic tank; preparation of access street and drainage facilities in front of the site; and preparation of the electricity wiring, telephone line, and water supply piping connection to the project site, were also implemented by the Solomon Islands side as planned. However, significant delays occurred in the post-construction undertakings of Solomon Islands, such as the purchase of furniture and supplies, relocation of existing furniture and equipment (including X-ray equipment), transfer of patients to new wards, and construction of walls and fences surrounding the new hospital site (See also 3.2.2.2 Project Period).

3.2.2 Project Inputs

3.2.2.1 Project Cost

The project was implemented within the planned budget. According to the plan, the project budget from the Japanese side was JPY 1,972 million; the actual cost was JPY 1,691 million, or 86% of the original budget. The project budget from Solomon side was initially estimated to be JPY 79 million; the actual budget used was unavailable at both Gizo Hospital and MHMS. As such, the total project cost was therefore impossible to evaluate by comparing the original budget and actual cost.

3.2.2.2 Project Period

The project was estimated to take 25 months from February 2009: 4 months for detail designing, 3 months for tendering, and 18 months for construction work. The construction period was prolonged for five months; the completion and handover were pushed to August 2011. To be specific, tendering was delayed for a month awaiting confirmation

¹⁵ Documents provided by JICA.

from the Government of Solomon Islands as regards assurance of the necessary electricity supply. Another extension of four months was needed for construction work owing to a delay in the visa issuance to construction workers from a third country as well as a delay of the cement supply due to a machine breakdown at a domestic cement factory. Gizo Hospital initially planned to open the new hospital with a ceremonial event upon completion of the undertakings of Solomon Island, such as installation of new furniture, walls, and fences, and a new kitchen and laundry area which were later added with Australian support.¹⁶ However, these undertakings were significantly hampered and postponed. The hospital therefore compromised to start services after furniture was placed and patients were transferred in March 2012, foregoing a formal opening. It took seven months from the handover of the new building to the commencement of services, but there were few negative impacts on patients because healthcare was still available at the old hospital. In light of the core mission of the project, which was to improve the medical services of Gizo Hospital, the launch of medical services at the new hospital, and not the handover, should mark the project's completion. Hence, the project period is assessed to be extended by 12 months or a 148% delay from the original plan.

In sum, the project cost was within the original plan, but the project period exceeded the plan considerably. Therefore, the efficiency of the project is fair.

3.3 Effectiveness¹⁷ (Rating: ③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

In this project, the operational indicators were the number of outpatients, inpatients, deliveries, and surgical operations accommodated at the hospital. The expected outcome was to restore these medical services to their pre-disaster level, or 2006 level. In addition to these operation and effect indicators (shown in Table 3 and Figure 1), other services provided only at a secondary facility, such as dentistry, ophthalmology, physiotherapy, X-ray and ultrasound examinations, and bloods testing, were also reviewed in this ex-post evaluation for measuring effectiveness (as shown in Figures 2 and 3).

The number of outpatients steadily rose in 2012 and 2013, but the record in 2014, which was reported as a preliminary figure for this evaluation, revealed a sharp drop to below half the number of the previous year. The hospital staff expressed their doubt of the

¹⁶ The construction of a kitchen and laundry area in the new hospital was launched with financial support from the Australian Government. However, construction ceased midway because of corruption issues on the constructors' side. The new kitchen and laundry area were listed in the original request of this project; therefore, their necessity was assessed at the Basic Design Study phase. Ultimately, they were excluded from the project after the Japan and Solomon Islands sides agreed that both facilities in the old compound could be used.

¹⁷ Sub-rating for Effectiveness is to be considered with that of Impact.

record and considered it unreliable, although they acknowledged a decrease in the number of outpatients to a certain degree after doctors and nurses of the hospital launched medical tours to remote islands in 2014 and primary health facilities began providing basic treatments.¹⁸ Assuming that the 2014 record is probably miscounted at the information section,¹⁹ the indicator of number of outpatients was evaluated based on the increase in 2012 and 2013. In terms of this indicator, the project has achieved a certain level of effectiveness. Meanwhile, the admission of inpatients has not been recovered to the 2006 level. A plausible reason for this phenomenon could not be identified, although sources mentioned that the number of patients who are treated sufficiently at OPD had been increasing.²⁰ The number of treated deliveries changed year to year, but the records in 2012 and in the target year 2014 significantly exceeded the level of 2006; thus, the function of delivery service was confirmed as having being restored sufficiently. The number of surgical operations has not yet been recovered to the 2006 level because a surgical doctor left the hospital after the tsunami. However, visits of foreign medical teams from Australia and other countries have increased after improvement of operating theatre through this project,²¹ which has widened a range of operable cases and increased the caseload of major surgeries, as shown in Figure 1 and Table 4. Many patients and staff indeed replied in the beneficiary survey for this evaluation that through the project, surgical operation has been the most improved among all the medical services. Therefore, this evaluation concluded that the project had an impact on surgical operations, focusing more on types and ranges of surgeries²² rather than the caseload alone.

Table 3: Quantitative Effects (Operation and Effect indicators)

	Baseline	Target	Actual		
	2006	2013	2012	2013	2014
	Baseline year	Two years after completion	Completion year	One year after completion	Two years after completion
Outpatients (person/year)	27,740	Restore/ Increase	29,886	36,112	16,434 (*1)
Inpatients	1,812	Restore/	1,584	1,390	1,422

¹⁸ The medical touring team of Gizo Hospital visits four clinics every week and goes around almost all of the major clinics in the province for over two months. (Interview with Gizo Hospital management)

¹⁹ A ledger for 2014, a main source of the database, was not available at the nursing department at the time of the field visit for this evaluation. No other record was provided by the hospital director and nursing department.

²⁰ The average annual admission from 2004 to 2006 was 1,844; the record for inpatients in 2006 was not unusual.

²¹ Foreign doctors and nurses voluntarily set up a medical team and visit Gizo Hospital for about two weeks to conduct surgical operations. Teams with various specialties have supported the hospital. (Interview with Gizo Hospital management)

²² Surgical treatment is categorized into three levels at Gizo Hospital as follows. Major operations: salpingo-oophorectomy, Caesarean section, cataract extraction, laparotomy, etc. Intermediate operations: appendectomy, hernia repair, varicose veins operation, tubal ligation, split-thickness skin graft, etc. Minor operations: abscess incision, gastroscopy, excision/biopsy of lesion, toe amputation, debridement, etc.

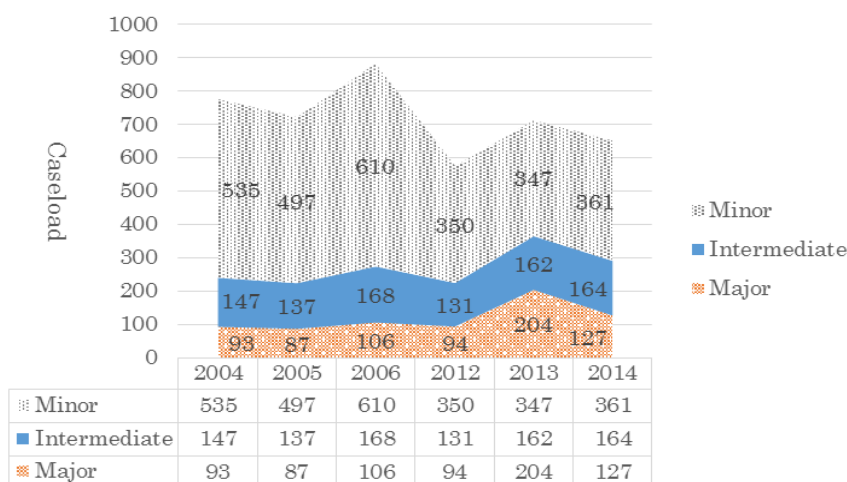
(person/year)		Increase			
Deliveries (case/year)	589	Restore/ Increase	641	305	765
Operations (case/year)	884	Restore/ Increase	575	713 (*2)	652

Source: Basic Design Study Report and Documents provided by JICA

*1: Preliminary data, February 2015

*2: Record for 11 months in 2012 with the missing records from August 2012 excluded.

Figure 1: Record of Surgical Operations



Source: Basic Design Study Report and Documents provided by Gizo Hospital

Note: Caseload of 2012 was for 11 months with the missing records from August excluded.

Table 4: Surgical operations provided at the new Gizo Hospital

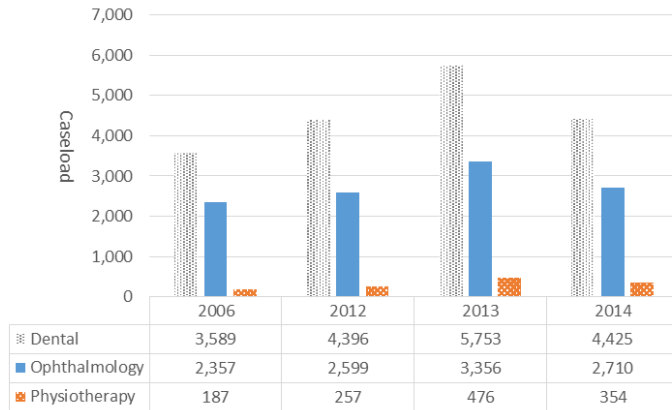
Routine surgeries	Surgeries provided with the support of foreign medical teams
Diabetes-related amputation, incision of abscess, Caesarean section, tubal ligation, fracture, suturation, appendectomy, abortion, removal of foreign body	Cataract extraction, plastic surgery, laparotomy, cholecystectomy, hernia repair, hysterectomy, scrotoectomy, arthroscopy, thyroidectomy, split-thickness skin graft

Source: Interview with Gizo Hospital

Caseloads for dental treatment, ophthalmologic treatment, and physiotherapy exceeded the target figures of 2006, as shown in Figure 2²³. Patients with obesity, diabetes, diabetes-related ophthalmologic diseases, peripheral neuropathy, and quadruple amputation caused by peripheral hypo-perfusion are increasing. Accordingly, Gizo Hospital has been strengthening preventive medical checkups as well as physiotherapy for amputees. The number of a series of examinations, except biochemical examination and X-ray, is also increasing (Figure 3).

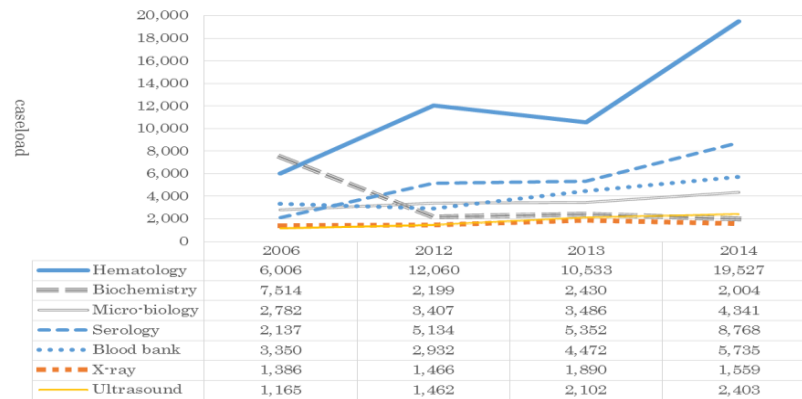
²³ A reason for the sudden decrease in 2014 after the steady increase until 2013 was not identified.

Figure 2: Records of Dental Treatment, Ophthalmologic Treatment, and Physiotherapy



Source: Basic Design Study Report and Documents provided by Gizo Hospital

Figure 3: Other Examinations



Source: Basic Design Study Report and Documents provided by Gizo Hospital

3.3.2 Qualitative Effects

Indicators for qualitative effects were not set at the project planning stage. In the ex-post evaluation, a beneficiary survey was conducted to measure the satisfaction of patients and hospital staff as regards the safety, efficiency, amenities, and improvement in medical services of the new hospital by comparing the satisfaction levels for the old and new hospitals. In addition, the qualitative effects of operations and maintenance training were also analyzed through interview and observation.

<Patient Satisfaction>

Out of a total of 165 respondents, 95 respondents who had used the old hospital rated both the old and new hospital buildings.²⁴ Their satisfaction with the new hospital was

²⁴ Five enumerators (three males and two females) interviewed patients to fill out a questionnaire for a week, except Sunday. A total of 165 patients responded: 85 males and 80 females. The 20s and 30s age groups comprised half of the total respondents, followed by the 40s age group. In terms of area, 90% of the respondents (149) were from Western Province and 7% (12) from Choiseul Province. In terms of ethnicity, 88% (145) were Melanesian and 11%

high overall and especially, their satisfaction with the cleanliness and amenities of the new building was remarkably high, changing significantly between the before and after the project (Figure 4). Satisfaction with the overall quality of services also increased as well as with other aspects with which the project did not intervene, such as staff politeness/kindness, clarity of instructions, drug availability, and opening hours. The survey revealed that the project contributed to the higher satisfaction of patients as regards overall hospital facility and healthcare services, especially with the amenities and hospital environment, which was clean and comfortable and with enough waiting space surrounding a bright courtyard. Patients and staff greatly appreciated the clean environment; the high awareness toward cleanliness and sanitation in the hospital was deemed deserving of being called a first-class hospital in the country.

Figure 4: Comparison of Patients' Satisfaction with the Old and New Hospital Buildings



<Hospital Staff Satisfaction>

In the beneficiary survey of hospital staff²⁵, 34 out of the 36 respondents (94%) gave a high rating for the cleanliness of the new hospital, whereas 31 (86%) appreciated the amenities, followed by the layout improvement for patients and staff (Figure 5). As to equipment, 22 members of the staff (61%) were satisfied with easy use of equipment, although few (11 members, 30%) agreed with the item on easy maintenance. The results suggest that staff gradually undertook “maintenance” of equipment; many broken machines and facilities had been derelict in the old hospital. In comparison with the old hospital, the new one has better environment and amenity, which is pointed out by 75% of the respondents as the most significant change (Figure 6). Among the medical

(18) Micronesian. Degree of satisfaction was graded on a scale from one to five: 5-excellent, 4-satisfactory, 3-moderate, 2-poor, and 1-very poor.

²⁵ A questionnaire was filled out by 36 hospital staff members: 2 doctors, 12 nurses, 9 lab technicians, 6 maintenance staff members, 1 administration staff member, 2 pharmacists, 3 health promotion staff members, 1 physiotherapist; 22 males and 14 females. As for years of experience, the survey indicated the following: less than a year, 1 staff member; 1 to 5 years, 11; 6 to 10 years, 6; 11 to 20 years, 8; and more than 20 years, 10.

services, surgical operations and the general outpatient practice were chosen as the most improved (Figure 7).

Figure 5: Staff Satisfaction with the New Hospital

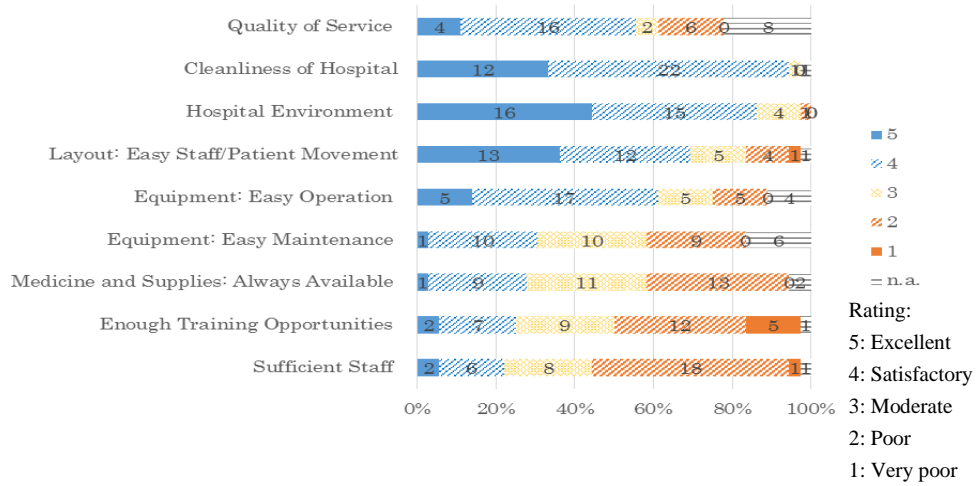


Figure 6: Most Improved Aspect from the Old Hospital

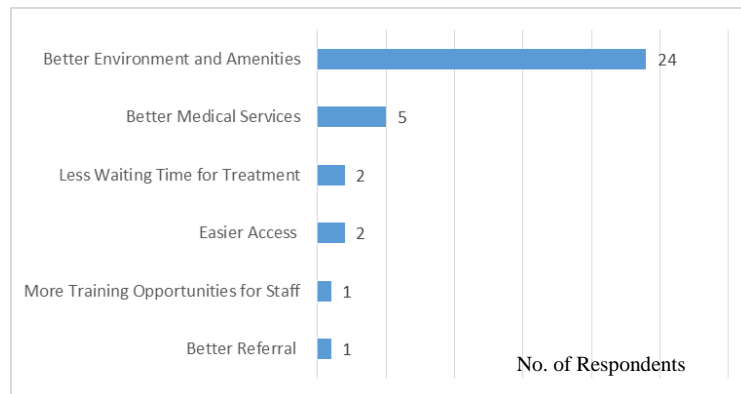
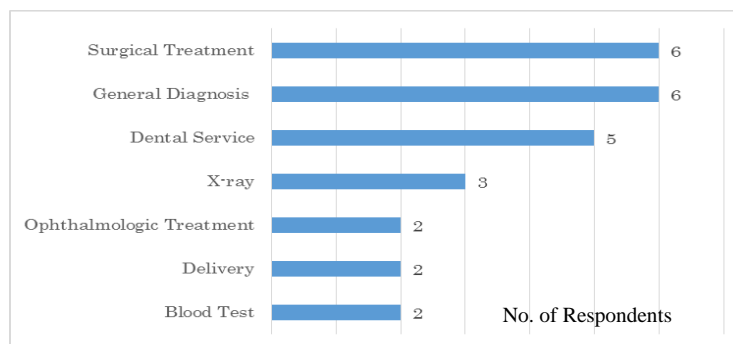


Figure 7: Most Improved Medical Service from the Old Hospital



The staff also responded to the most frequently heard complaints from patients. A total of 66% of the staff chose “time for waiting” as the most frequent, followed by “attitude of hospital staff,” marked by 25 % of the responded staff. These complaints had been heard in the old hospital, and the hospital management is eager to tackle them, especially the work management of the staff, after the hospital got on the proper track toward proper management of operations and maintenance of the hardware installed by the project²⁶. Further, a significant number of staff members and patients expressed their concern on the distance from OPD to the nearest toilets; there were reports of cases of diarrhea patients who failed to reach the toilet and ended up spreading diarrhea stool along the corridor. Thus, careful consideration was expected to decide the allocation of toilets near the OPD at the project planning phase.

Maintenance improvement was also confirmed from an interview with the maintenance department and observation of its workshop. The staff has come to understand the significance of maintenance. They have set up a managing system, made maintenance a part of their daily routine, such as regular check-up of equipment and facilities, introduced maintenance log and budgeted the maintenance cost. These progresses are considered as fruits of the operation and maintenance training conducted as a soft component of project. Meanwhile, a comment of the maintenance staff on the timing of the training is worth mentioning: the training was conducted ahead of the construction completion and relocation, without equipment and facilities to be maintained, and thus, it was challenging for the participants to capture the practical skills for maintenance and repair.

In sum, the project had effectiveness, with outpatients and delivery caseloads reaching the expected goal based on the changes over the recent years, although the number of inpatients has not been recovered to the 2006 level. Effectiveness was also confirmed in the expanded surgical operation capacity based on the fact that operable types of cases increased, although the annual operations caseload has not been recovered to its level in 2006. Moreover, the dental, ophthalmologic, and physiotherapy clinics are better equipped to treat more patients compared with the case in 2006. The hospital’s examination capacity also demonstrated an upward trend, such as blood-related tests and ultrasound test, with exceptions of microbiology tests and X-ray imaging. Quantitative effectiveness is confirmed to have reached the expected goal as a whole. Qualitative effectiveness is also upheld with the high satisfaction of patients and staff as regards the facilities and medical services at the new hospital, particularly for amenities. Advancement in maintaining

²⁶ Interview with Gizo Hospital Director. Staff capacity building was out of the scope of the project; therefore, the attitude of the hospital staff was not counted in assessing “effectiveness” in this evaluation. However, the result of the beneficiary survey was shared with Gizo Hospital as a reference for reforming hospital management.

equipment and facilities has been also observed. Consequently, the effectiveness of the project is high.

3.4 Impact

3.4.1 Intended Impact

3.4.1.1 Healthcare Reaching 130,000 Residents in Western Region through Referral Service

Approximately 100,000 residents in Western and Choiseul Provinces have been evidently covered by the referral services of Gizo Hospital, out of the targeted 130,000 beneficiaries that boldly included Isabel residents who have no access to Gizo, as described earlier in 3.1.2 “Relevance to the Development Needs.” Healthcare, including delivery services, is largely provided in a challenging environment: water and electricity supply are not sufficient even at comparatively well-organized Area Health Centers (AHCs), which are primary healthcare facilities. Rural Health Clinics (RHCs) and Nurse Aid (NA) under AHCs have further difficult conditions, including shortage of medical personnel and drugs. Under such circumstances, more patients are reportedly coming to Gizo Hospital, bypassing the referral flow of NA to RHC to AHC to Gizo Hospital.²⁷ Qualified free referral services, including safe delivery, available in the improved environment of Gizo Hospital have evidently given a positive impact on people’s life. Referral cases from Gizo Hospital to NRH, the only tertiary medical facility in the country, are reportedly decreasing owing to the broadened capacity of medical services at Gizo Hospital.

However, it was difficult to back up the above notion and to analyze pre-post traits with statistical data comparatively, because the credibility of the 2006 baseline data was not confirmed. Moreover, the counting method for referrals has been inconsistent. Therefore, it was impossible to compare the pre- and post-renovation changes of the hospital and then quantify the impact from available data (Table 5). According to the hospital director, the figure 1,200 referral cases from Gizo to NRH in 2006, or equivalent to 23 cases per week, was unrealistic financially and physically. Further, the 2014 record was divided into emergency and non-emergency cases; however, such categorization was not available in 2006, 2012, and 2013.

²⁷ In referral case, the travel cost is borne by the hospital in case of emergency recognized by the hospital; otherwise, the cost is borne by the patient or his/her family. In recent years, the number of self-paying patients is rapidly increasing according to hospital management.

Table 5: Referral Record

	2006	2012	2013	2014
Referral cases from first medical facility (case/year)	589	444	N/A	Total: 2,309 Emergency: 583 Non-emergency: 1,726
Referral cases to NRH (case/year)	1,200	129	119	Total: 25 Emergency: 18 Non-emergency: 7

Source: Basic Design Study Report, Documents provided by and interview with Gizo Hospital

3.4.1.2 Tackling the Healthcare Gap between the Main Island and Isolated Islands

Gizo Hospital has launched outreach tours by medical doctors and nurses to surrounding clinics in Western Provinces since 2014. With this effort, clinics in isolated islands now receive healthcare provided by doctors bimonthly.²⁸ Moreover, sterilization of medical appliances used in surrounding clinics is performed by Gizo Hospital.²⁹ In this manner, Gizo Hospital contributes to reducing the healthcare gap between Gizo and the isolated islands.

3.4.1.3 Improving the Health Indicators of Solomon Islands

Western Province was ahead in terms of such national health indicators of infant mortality rate and maternal mortality rate, both at the planning phase and ex-post evaluation (Table 6). However, causal relations could not be identified between the changes in the data and project intervention. The credibility of the provided data could not be examined owing to limited information. Health data from Isabel and Choiseul Provinces were unavailable; thus, for the statistics for Western region, the target area was not calculated.

Table 6: Change in Health Indicators (National average and Western Province)

	At the planning phase (2006)	At the ex-post evaluation (2014)
Population	National Total: 478,000 Western Province: 75,800	National Total: 515,870 (2009) Western Province: 76,649 (2009)
Infant Mortality Rate (per 1,000 live births)	National Average: 20.7 Western Province: 10	National Average: 26.0 (2009) Western Province: 4 (2009) 10 (2013)
Maternal Mortality Rate (per 100,000 live births)	National Average: 130 Western Province: 88	National Average: 103 (2007) Western Province: 1 (2009), 6 (2013)

²⁸ Interview with the Director of Gizo Hospital and nurses.

²⁹ Interview with a Japanese volunteer nurse dispatched to Gizo Hospital (Japan Overseas Cooperation Volunteers).

Source: Basic Design Study Report, Documents provided by and Interview with Gizo Hospital
Note: Years in parentheses indicate the year of the most recent data available. All data at the planning were from 2005.

3.4.1.4 Strengthening the Function of Base for Disaster Response in Western Province

A base for disaster response is defined as an operational center equipped to provide medical services at the time of disaster and to function as hub for gathering disaster-related information by using radio and other communication means.³⁰ In light of this definition, Gizo Hospital is assessed to have already performed such function; the Red Cross conducted damage assessments by using the hospital's radios in disasters, such as cyclones.³¹ The Red Cross in Gizo has a desire to develop an emergency response plan in collaboration with Gizo Hospital, and if this plan is put into practice, the function of Gizo Hospital as a base for disaster response would be further strengthened.

3.4.2 Other Impacts

3.4.2.1. Impacts on the Natural Environment

At the effluent treatment facility of Gizo Hospital, wastewater is clarified with depurative material according to treatment standards. Effluent treatment has been greatly improved at the new hospital; in previous days at the old hospital, non-treated wastewater was discharged and allowed to flow directly into the ocean. In medical waste management, waste collection has been better managed, with sorted waste collected routinely. Meanwhile, the incineration process needs further improvement; the incinerator operator needs better protection from secondary infection and unexpected accidents, such as by wearing the appropriate protective outfit. Moreover, a surrounding wall of the medical waste incinerator is partially damaged, and boxes of collected waste are left lying around until the incinerator is turned on. Better storage of collected waste and recordkeeping of the incinerator operation are necessary. In the current waste management, negative environmental impacts have not been observed, including hazardous smoke and smell, which may hinder project objective and effectiveness. As for the management of biological and pathological waste, such as placenta, human tissue, and body parts, MHMS does not have any standardized procedures and sees no problem in using a landfill for these types of waste. Incineration is desirable for these waste types; nonetheless, it is concluded that the current medical waste management is not causing any serious negative impact at the ex-post evaluation, based on the fact that Gizo Hospital takes the best option

³⁰ The definition of "a base for disaster response" was not clear at the time of planning of the project. For the ex-post evaluation, an original expectation for "a base for disaster response" was identified through interviews with concerned officials and consultants and set as baseline for evaluation.

³¹ Interview with a representative of Red Cross in Gizo.

available in the current condition by dumping the waste into mountain sites isolated from residential areas; so far, no environmental risks are reported.

3.4.2.2 Land Acquisition and Resettlement

Several interviews with concerned officials revealed that a few houses were resettled for the new hospital construction. The resettled households were provided with land to move to by Western Province under the Ministry of Provincial Government and Institutional Strengthening, which is in charge of land registration; these families also received proper compensation from MHMS without any troubles.³² The Ministry of Provincial Government and Institutional Strengthening does not have any regulations for resettlement and generally handles resettlements on a case to case basis through its provincial office. As no problems have been reported from the construction to this evaluation, it is presumed that resettlements were undertaken appropriately.³³

3.4.2.3 Unintended Positive/Negative Impacts

The new Gizo Hospital, with its upgraded healthcare facilities, has become a destination for foreign medical professionals to provide technical cooperation and volunteer programs. Since the opening of the new hospital, visits of foreign medical teams composed of doctors and nurses from Australia, New Zealand, and the United States, among others, are increasing (Table 7). Foreign medical teams usually stay at the hospital for two weeks to conduct surgical operations and treatments, which enable the hospital to expand its operable cases. Australia, the biggest donor to Solomon Islands's health sector, also dispatches Australian doctors and nurses who stay for a longer term, from a few months to a year, and contributes to upgrading the healthcare provided by the hospital. Doctors with various specialties rotated every three months when the field survey of this evaluation was conducted. The increase in foreign support is considered as a positive impact of the project.

To summarize, this project has largely achieved its objectives. Therefore, the effectiveness and impact of the project are high.

³² There was no documentation on the resettlement; no further information was available in the Western Province Administration and Gizo Hospital.

³³ The Report of JICA Project Formulation Survey for Earthquake and Tsunami Rehabilitation and Reconstruction in Solomon Islands, August 2008 (p. 40) pointed out the necessity for agreements on resettlement with houses built on construction sites. However, the succeeding Basic Design Study Report did not refer to this issue; hence, the detailed process of the resettlement is uncertain. It is assumed that the Provincial Administration and MHMS took proper measures to develop the land, according to an approval of the land to be developed for the hospital issued by Western Province, which was attached to the Basic Design Study Report.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

Gizo Hospital has been managed under the Western Province Health Service from the planning stage to this ex-post evaluation. The director of the Health Service serves as the director of Gizo Hospital as well. The staff at the hospital has expanded 1.8 times, including contractual staff. The maintenance department is particularly improved with the appointment of a senior engineer. Further, the maintenance system for the facilities and equipment is reinforced. At the time of planning, NRH engineers were expected to provide maintenance support to Gizo Hospital; however, most facilities and equipment are currently under the control of Gizo Hospital, with a few exceptions listed in section 3.5.2 “Technical Aspects of Operation and Maintenance.” Periodic checkup is conducted routinely;³⁴ malfunctioning machines are fixed, and a maintenance log is maintained.

In medical services, appointments of specialist physicians are delayed whereas a sufficient number of nurses are assigned. Before the 2006 tsunami disaster, there were six general physicians and four specialists: surgeon, anesthesiologist, obstetrics and gynecology specialist, and pediatrician.³⁵ At the time of ex-post evaluation, there were only five general physicians and one additional general physician expected to be placed. Solomon Islands does not have any educational institutes to train doctors; thus, MHMS has to send medical students to Cuba, Fiji, Papua New Guinea, and other countries for training doctors. Several medical students who were supposed to be assigned to Gizo Hospital canceled their return to Solomon Islands in favor of remaining at their place of training; as a result, there is no prospect to have a specialist physician in Gizo currently.³⁶ Consequently, Gizo Hospital has relied on foreign medical teams and local medical teams dispatched from NRH for complex surgeries. Although visits of foreign and local medical teams increased rapidly in 2013 after the opening of the new hospital, this trend did not continue in 2014, in which fewer visits from local teams were recorded (Table 7). Local teams reportedly intend to prioritize more remote areas than Gizo.³⁷

³⁴ The wards, OPD, operating theater, delivery department, and dental clinic are inspected weekly. The malaria laboratory, tuberculosis laboratory, central sterilization supply department, general laboratories, X-ray section, ophthalmologic clinic, diabetes clinic, physiotherapy section, and pharmacy are inspected monthly.

³⁵ The Report of JICA Project Formulation Survey for Earthquake and Tsunami Rehabilitation and Reconstruction in Solomon Islands, August 2008 (p. 36).

³⁶ Interview with MHMS management.

³⁷ Interview with Gizo Hospital management. The old hospital had approximately five visits from local teams per year. The hospital director coordinates with foreign and local medical teams for scheduling. The scheduling depends on the preference of these teams rather than that of Gizo Hospital.

Table 7: Visits of Foreign and NRH Medical Teams to Gizo Hospital

No. of Teams	2012	2013	2014	2015 (Plan)
Foreign Medical Teams	2	10	6	3(Plan)
NRH Local Medical Teams	1	6	0	N/A
Total	3	16	6	3

Source: Interview with Gizo Hospital

MHMS is responsible for appointing doctors, allocating budget, and administering procurement and other processes necessary for hospital management. However, coordination within MHMS between departments responsible for these functions appears inadequate; consequently, the managerial issues of Gizo Hospital that require MHMS's attention remain unaddressed.³⁸

In short, institutional backup from MHMS needs to be strengthened for better operation and maintenance of Gizo Hospital, especially in the appointment of specialist physicians. Otherwise, the hospital cannot recover its pre-tsunami level healthcare capacity.

3.5.2 Technical Aspects of Operation and Maintenance

The technical level of doctors, nurses, laboratory technicians, and other medical staff appears satisfactory.³⁹ Providing training opportunities for upgrading medical skills is not easy because of the limited training institutions in the country as well as limited budget. However, Gizo Hospital has undertaken efforts to provide opportunities to its staff, such as in-house clinical training and nursing training at other hospitals and the Solomon Islands National University.

Equipment maintenance has improved significantly. At the old hospital, medical equipment received maintenance rarely, and broken or malfunctioning equipment tended to be abandoned because of shortage in spare parts and lack of repairing skills.⁴⁰ Such problems have not been observed in the new hospital as regards the operation and maintenance of most of the installed medical equipment. The technical skill of the staff is upgraded through on-the-job training. However, as regards facilities, there are concerns over troubleshooting: malfunction of the chemical sterilizer in the town water treatment

³⁸ For instance, the construction of a new kitchen and laundry area, which was added as Solomon Islands's input to complement this project, has been ceased for months owing to fraud issues on the contractors' side. A strong initiative from the MHMS is required to break such a stalemate.

³⁹ According to a JOCV nurse assigned to the operational theater, the knowledge and skills of the theatre staff are as high as those in Japan. With this project, operational capacity has expanded in terms of operable cases and time. Emergency operations, such as appendicitis and Caesarean section cases, are regularly conducted for 24 hours at the new hospital.

⁴⁰ This notion is according to a report of technical cooperation for operation and maintenance (soft component) conducted in May 2011, prior to the completion of the new hospital.

plant,⁴¹ water leakage from/around air-conditioning ducts,⁴² and breakdown of ventilators possibly caused by humidity. The water leakage from/around air-conditioning ducts is a recurrence of the problem at the defect inspection. The maintenance staff is unable to identify causes to these problems and has requested for technical assistance in upgrading their maintenance skills for facilities, especially broken facilities, and for testing water quality properly.

To summarize, there is no significant problem in sustaining the medical technique/skill as well as maintaining medical equipment. However, facilities require the further improvement of the maintenance techniques/skills of the staff responsible.

3.5.3 Financial Aspects of Operation and Maintenance

The operational cost of Gizo Hospital is budgeted within the Western Province Healthcare Service Budget. It was impossible to extract the operational budget and actual cost of Gizo Hospital out of the total provincial health budget/cost at the planning phase as well as at this evaluation; therefore, financial sustainability is evaluated based on the provincial health budget/cost.⁴³ The Western Province Healthcare Service Budget is funded by the Government of Solomon Islands as well as the Government of Australia and Global Fund, along with other organizations. The health budget in 2013 was 1.2 times higher than that in 2012, with quintupled Australian financial support that has yielded around half of the total budget since 2013 (Figure 8). The Government of Australia and MHMS has exchanged a direct funding agreement valid until 2016, as the health sector support program of Australia that prioritizes healthcare in Solomon Islands and is committed to support it for the long term.⁴⁴ Australian assistance to Gizo Hospital has been steady, and doctors and nurses from Australia have been stationed at the hospital. With the ongoing and prospective Australian support, financial sustainability is confirmed.

Table 8: Fiscal Revenue and Expenditure of Western Province Healthcare Service

(Unit: SBD⁴⁵)

	Revenue	Expenditure	Balance
2012	14,437,137	15,203,239	-766,102
2013	17,298,926	16,315,467	983,459

⁴¹ Any cause could not be identified in the ex-post evaluation.

⁴² At the defect inspection conducted in August 2012, the reason for the water leakage was specified as the gap between heat insulation materials and/or heat insulation materials tightened too firmly. Consultants of the inspection team fixed the problem by filling the gap and adjusting the material for better insulation performance according to a document provided by JICA.

⁴³ The operational budget of Gizo Hospital was assumed to account for 60% of the total provincial health budget at the planning stage; the current share was not available at the ex-post evaluation.

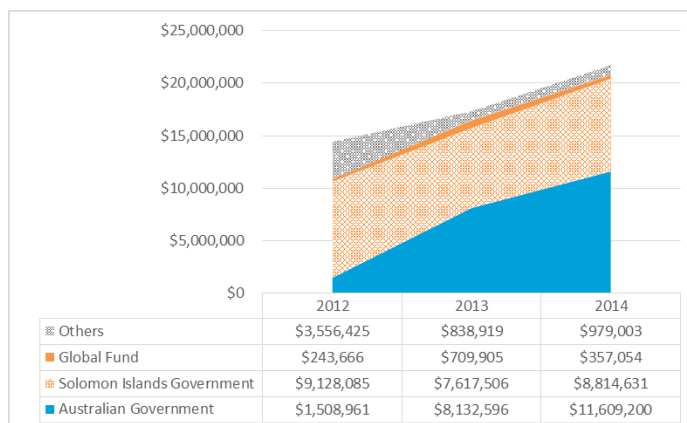
⁴⁴ Direct Funding Agreement between the Government of Australia and MHMS.

⁴⁵ SBD: Solomon Islands Dollar. JICA rate at the second field survey of this evaluation was 1 SBD=15.507 JPY.

2014	21,759,888	16,689,066	5,070,822
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Source: Documents provided by MHMS

Figure 8: Revenue Breakdown of Western Province Healthcare (SBD)



Source: Documents provided by MHMS

In the expenditure of the Western Province Healthcare Service, staff cost, including wages and housing, increased 1.7 times in 2013 and 1.4 times in 2014 compared with the baseline data of 2012. Regarding maintenance cost, the actual cost of the hospital was not available; the cost estimation revised in 2011 by the project consultant was double that in the original plan. The overall repair and maintenance expenses of the provincial healthcare services increased 1.5 times in 2013 and 2.5 times in 2014 compared with 2012 data.⁴⁶ Moreover, these increases are considered far ahead of the inflation rate. Gizo Hospital has taken possible countermeasures against expanding maintenance cost, such as installing light-emitting diode (LED) bulbs, which enabled a monthly savings of SBD 50,000 (approximately JPY 700,000) in electric bills.⁴⁷ To summarize, the budget of Gizo Hospital has expanded far beyond the original estimation at the planning stage in 2008. Nonetheless, financial sustainability is deemed high, with the expected long-term support from Australia, which has been the top donor and provided financial and policy support to Solomon Islands.

⁴⁶ According to the Basic Design Study Report in 2008, the project consultant estimated the maintenance cost of the second year after opening to be SBD 516,750. With the unpredicted increase in electricity cost and inflation, the consultant in 2011 revised the cost estimation for 2013 to SBD 1,241,361. Inflation rates were 17.3% in 2008, 7.1% in 2009, 1.1% in 2010, 7.3% in 2011, 5.9% in 2012, and 5.4% in 2013 according to the World Bank.

⁴⁷ Interview with Gizo Hospital.

Table 9: Maintenance cost of Gizo Hospital (Estimation and Actual Cost)

(Unit: SBD)

	Estimated Cost (original plan in 2008) (Gizo Hospital only)	Estimated Cost (revision in 2011) (Gizo Hospital only)	Actual Cost (Western Province Health Sector) ⁴⁸
2012		1,128,510	1,691,967
2013 (second year of the new hospital)	516,750	1,241,361	2,499,107
2014 (third year of the new hospital)	550,617	1,365,497	2,121,253

Source: Basic Design Study Report and documents provided by JICA and MHMS

3.5.4 Current Status of Operation and Maintenance

Most of the equipment installed by the project was used and maintained without problems, except the following items: one autoclave in the laboratory has not been used at all because it is not connected with a drainage pipe yet, which should have been secured by the Solomon Islands's side as its undertaking. The autoclave would be utilized once the plumbing is done with the support of NRH. A spectrometer has not been used either because of the unavailability of appropriate reagents at medical stores in the capital. The maintenance department is currently identifying suitable reagents and exploring possible suppliers. Regarding facilities, water leakage from the air conditioning duct is an ongoing problem and needs sooner troubleshooting. As for the ventilation system, 10 to 12 fans have not been functioning since 2013. The chemical sterilizer in the water supply system stopped functioning in November 2014. The problem has not been resolved because the maintenance department has faced difficulty in identifying its cause; consequently, water bypasses the sterilizer and is supplied through filtering. Urgent action is needed to resolve this problem.

Moreover, Gizo Hospital has installed two additional 5,000-liter water tanks and a 25-meter well with an electric pump to mitigate the shortage of water supply during the dry season. One of undertakings of Solomon Islands "City Water Supply Project" was implemented as planned; however, the water source was found to hold an insufficient amount of water, which would translate to serious water shortage during the dry season in future. Several patients and staff members pointed out the necessity to install more water tanks in the beneficiary survey. Measures to secure enough water and to save and use water efficiently in the hospital are necessary.

⁴⁸ This refers to the total maintenance expenditure of the provincial health sector, including repairs for buildings and equipment as well as utilities cost.

To conclude, the sustainability of the project is evaluated as fair, with consideration for the following minor problems. Specialist physicians have not been appointed; therefore, institutional arrangement needs to be strengthened at this point. As for technical aspects, a significant progress has been observed in the regular inspection and maintenance, on the one hand. On the other hand, a number of facilities have technical malfunctions that remain unresolved. Further, concerns over water shortage in the dry season and water quality remain.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The project aimed to improve the quality and quantity of medical referral services in the Western region of the country and secure a regional healthcare base in case of disasters, by constructing a new building for the deteriorated Gizo Hospital affected by the tsunami following the 2007 Solomon Islands earthquake as well as by providing necessary equipment. This objective has been consistent with development policies of the Government of Solomon Islands and needs of the country, as well as Japan's aid policies at the time of planning. The set target of beneficiaries was slightly ambitious because a part of the intended area has had no means of transportation to Gizo. The need to restore and improve the healthcare provided by Gizo Hospital was, however, extremely serious, and the project was considered highly relevant. The project cost borne by the Japanese side was kept within budget, whereas data for that on the Solomon side was not available. The construction period was extended, and the opening of the hospital was further delayed after the handover of the new building from Japan; accordingly the process efficiency was fair. Annual records of healthcare significantly vary year to year. A number of indicators of healthcare did not always meet the target criteria set as the ideal level of pre-tsunami caseloads, such as number of outpatients and inpatients, deliveries, and surgeries, whereas caseloads in dentistry, ophthalmology, and physiotherapy greatly increased. The physical conditions of the hospital environment were upgraded, and patients' satisfaction with the facilities and treatment was high. The project had a significant impact on people, especially those from remote islands who had received unsatisfactory healthcare but henceforth had access to qualified referral services. Presently, Gizo Hospital also functions as a disaster response hub. Moreover, visits by foreign medical teams to the hospital have increased; they provide more complicated surgeries. This outcome is counted as another impact of the project. Taking these facts into account, the project is assessed to have high effectiveness and impact. Maintenance management has also been greatly improved, and most of the provided medical equipment are used and well maintained. However, a number of issues in the water supply and ventilation systems remain unsolved. In addition, surgeons and obstetricians have not been assigned to the

hospital; consequently, the sustainability of Gizo Hospital as a secondary referral hospital is rated as fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

4.2.1.1 Recommendations to Gizo Hospital

- 1) The autoclave at the laboratory, which has not been used at all, needs to be connected with the drainage duct as soon as possible and with assistance by NRH so that the laboratory could start using the device.
- 2) Extra toilets may be installed near the OPD as requested by a significant number of patients and the staff. Prompt installation is advisable to meet the needs of elderly and persons with disabilities and in preparation for the occasional diarrhea outbreaks.
- 3) Incineration is preferable for biological and pathological waste management, such as placenta and human tissue, considering the possible risk of contamination of infectious materials into soil and groundwater, although disposal by landfill is regarded as fitting to local custom and practice; MHMS finds no problem with landfill disposal. Currently, the Pacific Hazardous Waste Management (PacWaste) Program is ongoing under the initiative of the Secretariat of the Pacific Regional Environment Programme (SPREP), which has been charged by the governments and administrations of the Pacific region with the protection and sustainable development of the region's environment. As part of its efforts to improve hazardous waste management in the region, PacWaste is planning and preparing to install a medical incinerator at Gizo Hospital and then conduct training on its operation and maintenance as well as on infection control measures at hospital facilities.⁴⁹ In this regard, Gizo Hospital is recommended to consult with SPREP as regards establishing an appropriate medical waste management.

4.2.1.2 Recommendations to MHMS

- 1) MHMS has made an effort to appoint specialist physicians, such as surgeons and obstetrics and gynecology specialists, to Gizo Hospital but is recommended to take further action to realize the appointment at the earliest stage possible to maximize the benefit of installed facility and equipment and to expand healthcare services. With the assignment of a surgeon, Gizo Hospital could also serve as a teaching hospital to provide practical training for medical students graduated from foreign institutes.⁵⁰

49 Details of the PacWaste Programme are available at <http://www.sprep.org/pacwaste/healthcare-waste>.

50 The MHMS management expressed an intention to use Gizo Hospital as a teaching hospital for capacity building of medical professionals once a surgeon is assigned.

- 2) The construction of the kitchen and laundry area, added as undertakings by Solomon Islands's side, should be completed as soon as possible to ensure the hygienic distribution of meals and laundry of operating gowns and other cloth items. The MHMS is requested to take a strong initiative to restart the suspended construction.

4.2.2. Recommendations to JICA

- 1) The daily operations and maintenance system are already established through soft component under the project. However, the transfer of troubleshooting skills seems insufficient. Urgent action is deemed necessary to improve the malfunctioning ventilation and air conditioning facilities, which were also observed at the defect inspection, and to solve the problem with the chemical sterilizer for the water supply. JICA is suggested to conduct follow-up maintenance trainings, especially focusing on facilities, by dispatching engineers for a few weeks.

4.3 Lessons Learned

4.3.1 Designing Hospitals

- 1) Hospital layout design with consideration for sanitary facilities and patient movement: There were cases of diarrhea patients failing to make it to a toilet in time and spreading diarrhea stool because of distant location of toilets from the OPD. Although this incident alone does not negate the relevance or validity of the project design and approach, locating toilets close to the OPD and waiting room should be considered when designing a hospital, especially in a region where diarrhea is prevalent and elderly and patients with disabilities are expected.
- 2) Hospital design to save power in areas with limited electricity: This project adopted a design for a two-story building with a ramped emergency entrance and another ramped access to the second floor, without elevators. The building also has lighting windows to maximize natural lighting and an airy layout to reduce electricity consumption. Measures to save power and ensure a comfortable environment for users are integrated into the design appropriately. Such a design could be a reference for other hospitals to be built in areas with power shortage.

4.3.2 Realistic Scope Setting for Referral Services

The target beneficiaries of this project turned out to be slightly overestimated because of the insufficient needs survey on accessibility to Gizo from Isabel Island. The hospital building and facilities were designed based on the population of Western Province with access to Gizo as well as on actual operation records of the old hospital from 2004 to 2006.

Thus, the hospital capacity is not excessive. However, over-capacity facilities and equipment could have been installed if the architectural design had been calculated based on the ambitious number of beneficiaries of 130,000 including Isabel residents. In the construction of a referral hospital, the assessment of the transportation means and cost to a referral hospital as well as of the actual number of incoming patients is crucial to set a realistic target of beneficiaries and to design practicable hospital buildings, facilities, and personnel allocation.

4.3.3 Effective Timing and Method of Training for Operation and Maintenance (Soft Component)

A soft component of the project, namely, technical cooperation for operations and maintenance, was implemented three times before the completion of the construction and handover. The training had a certain impact on staff who participated and understood the concept of “maintenance.” However, classroom lectures without the actual materials and facilities to maintain have limited effectiveness in terms of ensuring the comprehension and acquisition of practical techniques to handle the materials among the participants. In hospital construction and medical equipment provision, a soft component for operations and maintenance is better conducted upon installation of the facilities and equipment, that is, upon the time that the materials are operational for training. If this scenario is impossible, it is recommended for project consultants to make the best effort to conduct practical training and guidance, for instance by bringing in the same/similar devices for demonstrating proper practical handling.

Box: Synergy between the Project and Activities of JOCV Volunteers

Japanese volunteers specialized in nursing and medical mechanics have played an active role in Gizo Hospital. When a previous nurse volunteer was assigned to the old hospital, she was shocked to see used needles scattered about and slides with blood wiped and repeatedly used for different patients. There was no awareness of cleanliness nor infection prevention. She started to talk about the “5S principle: sort, set in order, shine, standardize, and sustain”⁵¹ to her colleagues, placed trash bins in strategic areas around the hospital, and went around to train cleaners. In this way, hygiene and cleanliness in the hospital were significantly improved. She also launched hygiene education for the hospital staff and advocated the prevention of secondary infection. Hygiene education and health promotion

⁵¹ The 5S principle was developed in Japan to improve profitability, efficiency, service, and safety. The 5S stands for the Japanese words *seiri* (sort; tidiness), *seiton* (set; orderliness), *seiso* (shine; cleanliness), *seiketsu* (standardize; standardization), and *shitsuke* (sustain; discipline).

programs for patients awaiting treatment were also introduced in collaboration with the hospital staff. Even after she left the hospital, these activities to promote awareness on sanitation and healthy lifestyle have been continued and carried on by her successors and colleagues.

The number of cleaners has increased in the new hospital. The hospital is kept thoroughly clean by cleaners going around regularly. Patients, their family, and visitors voluntarily take off their shoes and enter the hospital after washing their feet. By now, the patients and staff are concerned about the hospital environment. The beautiful and comfortable hospital is now spoken of as a symbol of Gizo and a pride of its residents.



Another volunteer, a medical mechanical technician, has been assigned to the maintenance department. She has assisted in the regular inspection and repair of medical equipment, working with other mechanical and electric technicians under the supervision of a senior engineer. She is also developing a database for equipment management. A number of laboratory devices need reagents procured from overseas, including Japan. She has helped in these transactions as a liaison.

The activities of these Japanese volunteers (JOCV) specialized in nursing, health education, and maintenance of medical equipment have greatly contributed to improving the quality of healthcare at Gizo Hospital, complementing the upgraded hard components provided by this project, namely, the building, facilities, and equipment.