Democratic Socialist Republic of Sri Lanka

FY2015 Ex-Post Evaluation of Japanese Grant Aid Project
"Project for the Improvement of Central Functions of Jaffna Teaching Hospital"

External Evaluator: Tomoko Tamura, Kaihatsu Management Consulting, Inc.

0. Summary

This Project was implemented to improve the health and medical services of the Jaffna Teaching Hospital in Sri Lanka by constructing a building for Central Functions and providing facilities for a central operating theater complex and others, thereby contributing to improvement of the health of local residents.

This project has been highly relevant to both the development plan of Sri Lanka, which aims to provide people in the country with access to medical services of high quality and using the latest technology, and to the development needs of the country, by improving the medical services of Jaffna Teaching Hospital through upgrading its facilities, which were decrepit and seriously damaged. The project was also highly relevant to Japan's ODA policy, which placed importance on the prompt implementation of humanitarian and reconstruction assistance at the time the conflict in the country ended. The plan of the project was highly appropriate as a kind of assistance that was implemented in a conflict-affected country/area. Therefore, its relevance is high.

Construction of the building and procurement of equipment was conducted as planned, and the project cost was within the plan. However, the project period exceeded the plan. Therefore, the efficiency of the project is fair.

After this project, the number of operations, major operations, and laboratory tests at the hospital increased. More types of operations and laboratory tests became available at the hospital. Medical staff at the hospital appreciated that the efficiency of work and the working environment was improved because of the project. The community of the area also appreciated that the project contributed to improvement of the medical services of the hospital and the health of people in the area. They felt that the project provided them with a sense of safety and encouragement at a time when they were making an effort to rehabilitate and reconstruct their lives. This project has largely achieved its objectives. Therefore, the effectiveness and impact of the project is high.

No major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance system. Therefore, sustainability of the project effects is high.

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

1. Project Description

Project Location

Central Functions of Jaffna Teaching Hospital

1.1 Background

Jaffna Teaching Hospital was the only tertiary care institution in the Northern Province of Sri Lanka. It also functioned as a teaching hospital for the Medical Faculty of Jaffna University. The hospital also played the role of a primary and secondary health care institution because many hospitals in these categories in the region were not functioning at the time of project planning as a result of damage caused during the conflict in the country.

The facilities of the hospital, some of which were constructed in the 19th century, had not always been constructed with a proper plan. Fourteen of the twenty-four buildings in the hospital premises were more than forty years old, and were seriously damaged and decrepit. Most of the medical equipment was very old. However, these facilities and equipment had not been repaired or replaced properly due to financial problems faced by the government during the conflict. It was difficult to improve health and medical services of the hospital under these circumstances. This project, which aimed to improve the central functions of the hospital, was proposed in view of this difficulty. JICA conducted a basic design study and detailed design study in 2005 and in May 2006 respectively. However, after the detailed design study, implementation of the project was postponed as a result of deterioration in public security in the Jaffna area due to the conflict.

JICA conducted an implementation review study for the project in October 2009,[1] soon after the end of the conflict in May 2009, so that the project could start immediately with the aim of assisting rehabilitation of the conflict-affected area. This immediate action was taken because this project was identified as one of the most important types of assistance JICA could provide

[1] The Implementation Review Study was conducted with the aim of reviewing previous studies and project cost and re-confirming agreement between the two countries, as it had been several years since the Basic Design Study was conducted.

to promote peacebuilding in the Northern area of the country. An Exchange of Notes (E/N) was signed in March 2010, a Grant Agreement was signed, and the project commenced. The project was completed in December 2012, three and half years after the end of the conflict.

1.2 Project Outline

The objective of this project is to improve health and medical services at Jaffna Teaching Hospital in Sri Lanka by constructing a building for central functions and providing facilities of a central operating theater complex and others, thereby contributing to improved health of the local residents.

E/N Grant Limit or G/A Grant Amount / Actual Grant Amount	2,298 million yen / 1,641 million yen
Exchange of Notes Date /Grant Agreement Date	March 2010 / March 2010
Implementing Agency	Ministry of Health and Jaffna Teaching Hospital
Project Completion Date	December 2012
Main Contractors	The Joint Venture of Wakachiku Construction Co., Ltd. (Japan) and Sato Kogyo Co., Ltd. (Japan)
Main Consultants	The Consortium of Yamashita Sekkei Inc. (Japan) and International Total Engineering Corporation (Japan)
Basic Design Implementation Review Study	August 2005 March 2010
Detailed Design	May 2006
Related Projects	None

2. Outline of the Evaluation Study

2.1 External Evaluator

Tomoko Tamura, Kaihatsu Management Consulting, Inc.

2.2 Duration of Evaluation Study

Duration of the Study：September, 2015 - November, 2016

Duration of the Field Study：November 16th - 21st, 2015 and April 4th - 8th, 2016

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

3.1 Relevance (Rating ③[3])

3.1.1 Relevance to the Development Plan of Sri Lanka

Both at the time of planning and completion of the project, the medium- and long-term national development plan of the country, *Mahinda Chintana* (2006-2017), emphasized a policy of ensuring access to health services of high quality and using the latest technology for all the people in the country. The new government established in 2015 has the same policy.[4] The Health Master Plan of the Ministry of Health of Sri Lanka, which states that one of the most important strategies in the plan is to deliver comprehensive medical services to the people, covers the period to 2016. This project aims to ensure access to medical services of high quality using the latest technology, and to deliver comprehensive medical services to the people in the Northern area by improving the facilities at the Jaffna Teaching Hospital. Therefore, the aim of the project was highly consistent with the development plan and health sector strategies at the time of planning, completion and ex-post evaluation of the project.

3.1.2 Relevance to the Development Needs of Sri Lanka

At the time of planning and completion of the project, several hospitals of lower categories in the Northern Province and Jaffna District were not functioning as a result of damage to their facilities during the conflict; some were closed as they were in high security zones under the control of the Sri Lankan security forces. Therefore, the number of patients at Jaffna Teaching Hospital greatly increased.[5] However, facilities and equipment of the hospital had been damaged and were decrepit, and therefore the hospital was not able to take proper care of the large number of patients and to provide the medical services that a tertiary medical institute is supposed to offer. For example, some facilities, such as X-ray diagnoses, were often out of order as they were very old; medical staff could not complete all the tests they planned to carry out each day and needed to postpone some to the next day. There was also a problem with the working environment of the staff of the hospital and location of facilities: for example, the ICU and the operating theater were 100 m apart, and therefore patients suffered when they were

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[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[3] ③: High, ② Fair, ① Low

[4] "Health- Modern Healthcare", Budget Speech – 2016, Ministry of Finance, Sri Lanka

[5] At the time of project completion in December 2012, 18 out of a total of 102 medical institutions, including 6 Divisional Hospitals and 12 Primary Medical Care Centers, were not functioning in the Northern Province. 7 out of 38 institutions, including 2 Divisional Hospitals and 5 Primary Medical Care Centers, were not functioning in Jaffna District. At the time of the ex-post evaluation of the project in October 2015 the situation had improved, and only 6 Primary Medical Care Centers were not functioning in Northern Province and 1 in Jaffna District. (Sources: Documents provided by the offices of Northern Provincial Director Health Services and Jaffna Regional Director of Health Services.)

transferred between these two facilities under the scorching sun.[6] Due to this, there was a strong need to update the medical equipment and improve the environment surrounding the medical services of the hospital. Furthermore, urgent attention was needed for improvement.

At the time of the ex-post evaluation, too, the hospital is the only tertiary care institution in the Northern Province of Sri Lanka and is functioning as a teaching hospital. The hospital is playing an important role in advanced medical care and clinical training in the region

Therefore, this project, which aimed to improve medical services at the hospital by updating the facilities, was highly consistent with the development needs of the country throughout the period from the planning to the ex-post evaluation of the project.

3.1.3 Relevance to Japan's ODA Policy

The Country Assistance Policy of Sri Lanka (2004) at the time of project planning listed peacebuilding and rehabilitation as an important area of assistance. Improvement to the living environment through projects for improving public health and rehabilitation of medical facilities were mentioned as examples of humanitarian and rehabilitation assistance. It had a policy of continuing cooperation to the health and medical sector, on the basis of the previous achievements in cooperation to the sector. In this way, the project had relevance with Japanese cooperation policy.

3.1.4 Appropriateness as a Project Conducted in a Conflict-affected Country/Area

This project was assistance in the conflict-affected area; and therefore, appropriateness of timing of implementation is also important when evaluating relevance of the project. The decision to postpone implementation of the project a short while after planning the project, due to deteriorating public security during the time of the conflict, was appropriate with consideration to the safety of the stakeholders of the project. The decision to re-start the project soon after the end of the conflict was also important and appropriate, as this was a project for assisting rehabilitation and reconstruction of the project area. In this manner, timing of implementation of the project was appropriate with consideration to public security and need for rehabilitation. The project was also highly appropriate as assistance for rehabilitation and reconstruction since it assisted the health sector, which provides a public good and brings benefit to the people in the target area equally and widely.

This project has been highly relevant to the development plan and development needs of Sri Lanka, as well as Japan's ODA policy. The plan of the project was highly appropriate in terms of one implemented in a conflict-affected country/ area. Therefore, its relevance is high.

[6] Report of the Implementation Review Study.

3.2 Efficiency (Rating ②)

3.2.1 Project Outputs

Major outputs of the project in terms of construction of facilities, procurement of equipment and soft components were according to the plan as mentioned below.

＜Construction of Facility＞

Construction of a Building for Central Functions (Floor area in total: 6,870m^2, four levels above ground)

Departments	Main Facilities
Operating theater Complex	Operating rooms including those for infectious diseases, and recovery rooms
Central Supply & Sterilizing Department	Rooms for washing and sterilization, and clean storeroom
Intensive Care Units (ICUs)	Medical and surgical ICUs, and isolation ICUs for infectious diseases
Central Laboratory Complex	Laboratories for histopathology, hematology, chemical pathology, and micro pathology
Central Facilities for Diagnostic Imaging	X-ray rooms, endoscope rooms, and physiological laboratory
Administration-related rooms	Offices and machine rooms

＜Procurement of Equipment＞

Procurement and installation of necessary equipment for the Central Functions

Departments	Main Items of Equipment
Operating theater Complex & Central Supply & Sterilizing Department	Anesthetic apparatus, ventilators, surgical instrument sets, operation lamps, operation monitors, operation tables, C-arm X-ray units, autoclaves, automatic instrument washer, etc.
ICUs	Central monitor, ICU beds, patient monitors, ventilators, etc.
Central Laboratory Complex	Automatic biochemistry analyzer, blood gas analyzer, ELISA reader, microscope, automatic blood cell analyzer, hemoglobin monitor, etc.
Central Facilities for Diagnostic Imaging	X-ray systems, ultrasound scanner, endoscope, EEG, ECG, etc.

＜Soft component＞

- Improvement of the maintenance system for medical equipment
- Capacity enhancement of the technical staff in charge of maintenance of medical equipment and improved working environment for staff.
- Provision of training on concept of preventive maintenance of medical equipment and organizing working environment based on 5S concept.[7]

There were some revisions and additions to the amount of equipment actually procured by the project compared to what was planned at the time of detailed design study and implementation review study.[8] The layout of the facility was changed to have separate rooms for mammography and dental X-ray, with consideration of privacy for women.

Laboratory
(At the time of project planning)

Laboratory
(At the time of ex-post evaluation)

ICU (At the time of project planning)

ICU (At the time of ex-post evaluation)

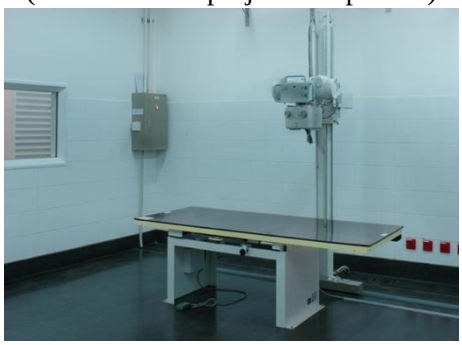
[7] 5S is a method for rationalizing and improve efficiency by using the concepts of Sort, Set in Order, Shine, Standardize and Sustain. It is often utilized for improving workplace environment in manufacturing and service industries.

[8] Major revisions to equipment were, for example: number of operation lamps of complete type was increased from four to eight and the operation lamps of simple type not provided as a result; electrolyte measurement function was added to the automatic biochemistry analyzer; number of semi-automated coagulation analyzers was increased from one to two; five-type leukocyte classification function was added to the automatic blood cell analyzer; and number of automatic X-ray film processors was increased from one to two.

Operating theater
(At the time of project planning)

Operating theater
(At the time of project completion)

Facilities for Diagnostic Imaging
(At the time of project planning)



Facilities for Diagnostic Imaging
(At the time of project completion)

Source : The photos at the time of project planning and those at the time of project completion were taken in October 2009 and October 2012 respectively. Documents provided by JICA were the source of these photos. The photos at the time of the ex-post evaluation were taken by the external evaluator in November 2015.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The project cost was planned as Japanese Yen (JPY) 2,877 million in total, which included JPY 2,298 million from the Japanese side and Sri Lankan Rupees (LKR) 672 million, equivalent to around JPY 579 million, [9] from the Sri Lankan side. Actual cost was JPY 1,890 million, including JPY 1,641 million and LKR 289 million, equivalent to around JPY 249 million. The actual cost was lower than planned (66 per cent against the plan). The actual cost from the Japanese side was less than planned as a result of tenders received.

3.2.2.2 Project Period

Project period was planned as 29 months from April 2010 to August 2012. It was actually 33 months from March 26th, 2010 to December 24th, 2012, and was longer than planned (114 per cent against the plan). The period exceeded the plan because it took more time than planned to

[9] Project cost from the Sri Lankan side included cost of demolishing the existing building, land preparation, preparatory work for building construction and others. The planned and actual costs from the Sri Lankan side were converted into Japanese yen by using the exchange rate at the time of planning (1 LKR = 0.8624 JPY in October 2009, Report of the Implementation Review Study).

sign a contract with a consultant after signing of the Exchange of Note, and also for construction of the facility, procurement and installation of equipment.

Although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair.

3.3 Effectiveness[10] (Rating：③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

＜Operation Indicators＞

At the time of planning, operation indicators of the project proposed were improvement in utilization rate of the operating theaters,[11] bed occupancy rate of ICU[12], number of tests conducted per diagnostics imaging unit per year,[13] reduction of traveling distance and time for medical staff and patients in the hospital, and improved work efficiency of medical staff, including those working in the operating theater complex.[14]

These indicators were studied in the ex-post evaluation. Utilization rate of the operating theaters was not available as the hospital did not record the total hours the operating theaters were used per year. Bed occupancy rate of ICU was almost 100 per cent at the time of planning and was slightly improved to 91 per cent for surgical ICU and 98 per cent for medical ICU at the time of the ex-post evaluation (2014).[15] Number of tests conducted per year and that per unit were increased for all diagnostics imaging facilities, including ultrasonic diagnostics, X-ray diagnostics, EEG and ECG two years after project completion (Table 1). This shows that the equipment provided by the project was utilized; problems with the old equipment at the time of planning, such as inefficiency and frequent breakdowns, had been solved; and tests were conducted efficiently. The number of tests were reduced three years after project completion, probably because the demand for diagnostics imaging concentrated in this hospital had settled down after equipment for the same purpose had been installed in lower category hospitals in Jaffna districts.[16]

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[10] Sub-rating for Effectiveness is to be put with consideration of Impact.
[11] Utilization rate of the operating theaters = Total hours the operating theaters were used per year/ total hours the operating theaters can be used x 100
[12] Bed occupancy rate of ICU = Number of patients-days per year/ (number of beds x 365 days) x 100
[13] Number of tests conducted per diagnostics imaging unit = Number of tests conducted per year / number of units of diagnostics imaging facility
[14] Report of the Implementation Review Study.
[15] According to the medical officer in charge of ICU at Jaffna Teaching Hospital, all ICU beds were always occupied (100%) at the time of project planning, and therefore there was a problem as the ICU often could not admit patients immediately as needed. The reduction (improvement) of ICU bed occupancy rate after the project shows that this problem had been solved to some extent as a result of the number of ICU beds being increased by the project.
[16] Explanation made by Director - Planning of Jaffna Teaching Hospital.

Table 1　Number of Diagnostics Imaging Tests Conducted per Year per Unit

Items		Baseline		Actual	
		2007	2011	2014	2015
		Baseline Year	1 Year Before Completion of the Project	2 Years After Completion of the Project	3 Years After Completion of the Project
Ultrasonic diagnostics	No. of units available	2	5	7 (2)	7 (2)
	No. of tests conducted per year	4,084	11,315	21,535	14,442
	No. of tests/ unit/ year	**2,042**	**2,263**	**3,076**	**2,063**
X-ray diagnostics	No. of units available	2	3	6 (3)	6 (3)
	No. of tests conducted per year	49,950	82,125	183,230	156,076
	No. of tests/ unit/ year	**24,975**	**27,375**	**30,538**	**26,013**
EEG	No. of units available	2	2	2 (1)	2 (1)
	No. of tests conducted per year	2,428	2,673	2,845	2,286
	No. of tests/ unit/ year	**1,214**	**1,337**	**1,423**	**1,143**
ECG	No. of units available	2	2	4(2)	4 (2)
	No. of tests conducted per year	26,124	28,836	59,495	41,909
	No. of tests/ unit/ year	**13,062**	**14,418**	**14,874**	**10,477**

Note：1) All of the above-mentioned items were expected to be increased after the project and there were no particular target figures set at the time of project planning.
2) Number of units shown in brackets are the ones provided by this project.
Source: Documents provided by the Implementing Agency

As described in "Background" of this report, there was around 100 m between the ICU and the operating theater, and the patients suffered while being transferred between these two facilities under the scorching sun at the time of project planning. After the project, the operating theater complex and ICU were located on the second and the third floors respectively in the same building of Central Functions. Therefore, patients can be transferred between these facilities by an elevator within two or three minutes. This is a typical example of reducing travelling time and distance for patients and medical staff.

At the time of project planning, medical staff of the hospital, such as medical officers, nursing staff, hospital assistants, and staff of the operating theater complex, were working many hours as they had to engage in overtime work to provide services to the crowd of patients. Their work burden was expected to be reduced as a result of improvement in working efficiency and environment after the project. Quantitative information about the reduction was not available, because there was no data on working hours of the medical staff at either the time of planning or ex-post evaluation of the project. In the beneficiary survey[17], which was conducted as a part

[17] Beneficiary survey to the medical staff was conducted in November 2015 as a part of this ex-post evaluation. The survey was conducted with all staff working at the Central Functions, including ICU, central laboratory, central operating theater complex and central facilities of diagnostics imaging. Questionnaire forms were distributed through the head of the units to all the 221 staff, including 62 staff in ICU, 31 in central laboratory, 88 in the operating theater complex, and 40 in the central facilities of diagnostics imaging. 175 responded in total (the responding rate was 79%), including 65% of the staff of ICU, 100% of the central laboratory, 78% of the operating theater complex, 88% of

of this ex-post evaluation, 89 per cent of the respondents who work as medical staff at Central Functions answered "efficiency of the work has improved"; and 85 per cent answered "working environment has improved" (Figure 1). However, only 35 per cent responded "need for overtime work was reduced". Need for overtime work was not reduced even though working efficiency and environment of the workplaces had been improved, probably because the work volume increased significantly as a result of the number and kind of operations being increased, as described in <Effect indicators> in the next section of this report.

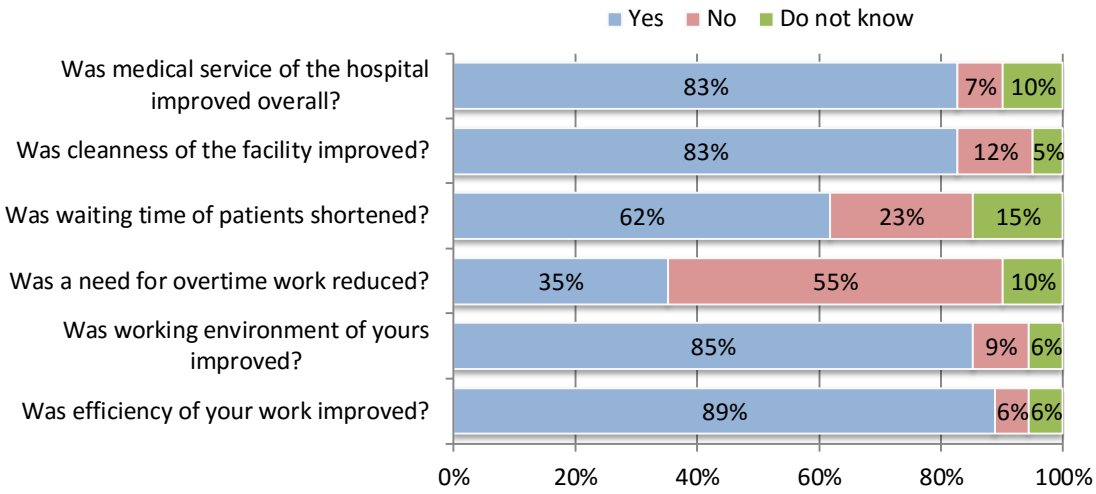

Figure 1 Answers to Questions about the Improvement Caused by Project Effect Asked to Medical Staff Working at the Central Functions of the Hospital (N=175)

Source: Beneficiary Survey

＜Effect Indicators＞

An increase in the number of operations, laboratory tests[18] and outpatients, and a decrease in the number of patients transferred to the tertiary medical care facilities in Colombo metropolitan area, were identified as effect indicators of the project. Baseline, target and actual figures of these indicators are shown in Table 2.[19]

central facilities for diagnostics imaging. These samples contained 49% of females and 51% of males. Breakdown of the samples in their job categories were, medical officers (31%), nursing staff and midwives (31%), technicians (13%) and hospital assistants (25%). The samples contained staff of ICU (23%), central laboratory (18%), central operating theater complex (39%) and central facilities for diagnostics imaging (20%). The main reasons for not responding to the questionnaire were being absent from the workplace due to being abroad or on leave.

[18] Number of blood, tissue and other tests conducted at the central laboratory of the hospital.

[19] Ex-ante Project Evaluation Report.

Table 2 Baseline, Target and Actual Figures for Effect Indicators

Items	Baseline	Target	Actual		
	2007	2015	2011	2014	2015
	Baseline Year	3 Years After Completion of the Project	1 Year Before Completion of the Project	2 Years After Completion of the Project	3 Years After Completion of the Project
1. No. of operations per year <Major operations out of the above numbers>	23,229 <5,786>	To be increased	33,282 <7,727>	35,495 <8,940>	36,691 <10,109>
2. No. of laboratory tests per year	434,706	To be increased	624,575	924,164	1,116,026
3. No. of outpatients per year	448,325	To be increased	282,946	316,865	265,987
4. No. of patients transferred to tertiary medical care facilities in Colombo metropolitan area per year	506	To be decreased	2,741	2,274	2,563

Sources: Baseline and target figures were from the Ex-ante Project Evaluation Report; actual figures were from the documents provided by the Jaffna Teaching Hospital

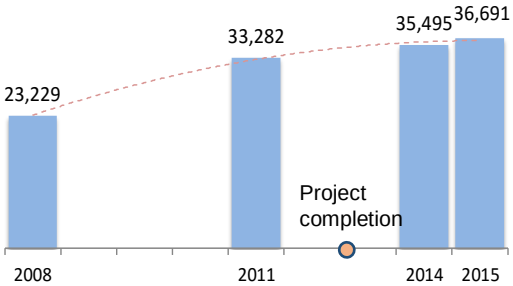

Figure 2 Number of Operations Per Year

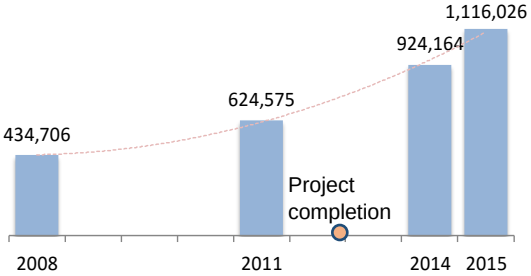

Figure 3 Number of Laboratory Tests per Year

Source: Same as Table 2

The number of operations and major operations per year increased as shown in Table 2 and Figure 2. Operations, including plastic surgery, neuro surgery, genitourinary surgery, oro-maxillary facial surgery and others, which were not available in the hospital at the time of project planning, became available after the project; as a result, patients in the Northern area did not need to visit hospitals in Colombo for these operations. The number of laboratory tests per year also increased as shown in Table 2 and Figure 3. Laboratory tests, such as histopathology tests, serum protein electrophoresis tests and others, which were not available in the hospital at

the time of project planning, became available after the project. Therefore, the hospital does not need to send samples for these tests to hospitals in Colombo, and obtained results for these tests quicker. In addition to the effect of this project, the appointment of consultant medical officers for several specializations to the hospital contributed to the above-mentioned improvement in medical services.

An increase in the number of outpatients was also identified as one of the effect indicators of the project; however, it has not been increased compared with the figure of baseline year. (Table 2). This was because lower category medical facilities in Jaffna District started functioning again after the conflict; and therefore patients were able to receive outpatient department services in these facilities (see footnote 5). This is a reasonable movement. This project did not conduct any activities to improving the facilities of the outpatient department of the hospital. Therefore, the number of outpatients and effect of the project did not have much relationship, and it can be said that this indicator was not appropriate as an indicator of this project.

One of the effect indicators of the project was a decrease in the number of patients transferred to tertiary medical care facilities in Colombo metropolitan area. However, this figure was increasing after the end of the conflict (Table 2). At the time of project planning, the national highway that connected Jaffna and Colombo was closed, and the hospital transferred a maximum of fourteen patients once a week using a small plane provided by the International Red Cross. In this way, there was a limit to the number of patients that could be transferred at the time of project planning. The above-mentioned national highway was opened after the end of the conflict, and the hospital could transfer any patients who needed more specialized and higher levels of treatment to hospitals in Colombo metropolitan area using fourteen ambulances owned by the hospital. This is the background to the increase in the number of patients transferred. An external factor - a change in the road environment - had a significant impact on the number of patients transferred, which did not have a close relationship with the effect of this project.

3.3.2 Qualitative Effects

Improved quality of clinical training at the Medical Faculty of Jaffna University and promotion of peacebuilding were expected as other impacts of the project at the time of project planning.

During an interview by the external evaluator, one of the lecturers of the Medical Faculty of the Jaffna University mentioned as an example of improvement in quality of clinical education that medical students can now learn to carry out more kinds of operations, as operations that were not available at the hospital at the time of project planning have become available after the project.

A beneficiary survey to the general public who were using this hospital was conducted as part

of the ex-post evaluation in addition to the earlier-mentioned beneficiary survey to medical staff.[20] As a result of the survey, it was found that 71 per cent of the respondents, the users of the hospital, knew that the project was implemented through assistance from the Japanese government (Figure 4). [21] Then, the survey team asked those who know this project "Do you think this project had created any impact as it was implemented soon after the end of the conflict?", and 91 per cent of them replied "Yes, there was an impact" (Figure 5). Most of them mentioned "Sense of safety and security was created among the local community" and "encouragement for rehabilitation and reconstruction effort of society" as the kind of impact. According to these results, it can be said that this project was effective as an assistance for reconstruction after the end of the conflict.

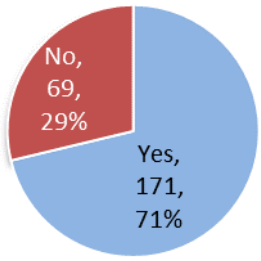

Figure 4 Do you know that this project was implemented through assistance from the Japanese government? (N=240)

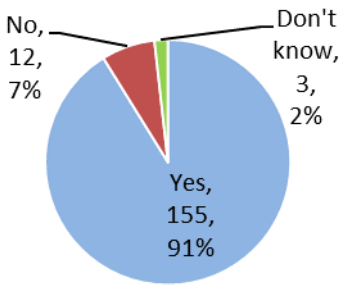

Figure 5 Do you think this project had created any impact as it was implemented soon after the end of the conflict? (N=170)

Source: Beneficiary Survey

3.4 Impact

3.4.1 Intended Impacts

The ex-post evaluation team asked the 170 users of the hospital who were aware that this project had been implemented through assistance from the Japanese Government, out of total 240 people who were interviewed in the beneficiary survey, whether they think medical services

[20] The beneficiary survey to the users of the hospital was conducted in November 2015. Face-to-face structural interviews were conducted with 240 local people who were at the six major facilities of the hospital - 40 each at the clinics of consultant medical officers, the outpatient department, the inpatient wards, the ICU, the central laboratory, and the central facilities for diagnostics imaging. Those who were using or visiting the facilities at the day of interview, such as patients, attendants of patients and visitors, were interviewed in the survey. This was an intercept type of interview with judgement sampling method, where those who are at the interview site are interviewed, because a list of the users of these facilities was not available. It was considered at the time of sampling the sample was 50% male and 50% female, and that age distribution of the samples is proportionate to the age distribution of the adult population in Jaffna district.

[21] The users knew this project was implemented through assistance from the Japanese government as there were sign plates at the entrance of the building of Central Functions explaining that the facility was donated by the Japanese government; and there were reports in newspapers and on TV at the time of project completion that explained about JICA assistance to the project.

of the Jaffna Teaching Hospital had been improved as a result of this project. 98 per cent of the respondents answered “Yes, improved” (Figure 6). Similarly, the evaluation team asked them if they think the improvement in medical services at the hospital and this project had contributed to an improvement in their health and that of their family members. To this question, 98 per cent answered “Yes, improved” (Figure 7). The objective of the project was to improve health and medical services of the hospital, thereby contributing to improvement of health of the local residents. The above-mentioned result shows that most of the local residents consider that this objective has been met.

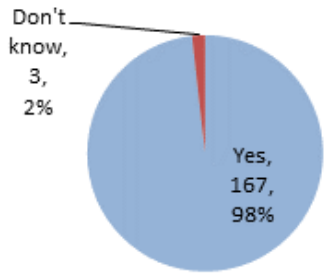

Figure 6 Do you think medical services of the Jaffna Teaching Hospital were improved as a result of this project?（N=170）

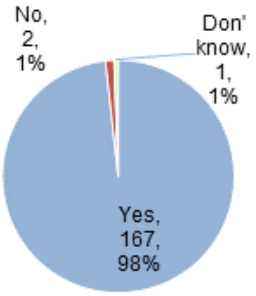

Figure 7 Do you think the improvement in medical services of the hospital and this project contributed to improve your health and that of your family members?（N=170）

Source: Beneficiary Survey

3.4.2. Other Impacts

There was no impact to the natural environment by the project, and no involuntary resettlement or land acquisition due to the project.

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

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

The organizational structure of Jaffna Teaching Hospital has been expanding. Quality Management Unit and Cost Accounting Unit were added to the organization recently. Treatment units, plastic surgery, gastroenterology, pediatric surgery, and vitreoretinal surgery units have recently been established.

The number of staff at the hospital was increasing due to appointment of consultants and medical officers after the end of the conflict (Figure 8). However, there has been a shortage of

nursing staff in this hospital. The shortage has not been solved yet, although the number of nursing staff has increased recently. The Planning Director of the hospital explained that the hospital needs around 800 nursing staff, considering there are 1,330 beds in the hospital; however there was currently only 500.[22] It was observed that part of the equipment in the ICUs and the Central Facilities of Diagnostics Imaging, which were provided by the project, was not utilized fully due to the shortage of nursing staff at the time of the ex-post evaluation.[23] The hospital had requested and negotiated with the Ministry of Health about the need to increase nursing staff . The Ministry was working on solving the shortage as a priority issue.[24]

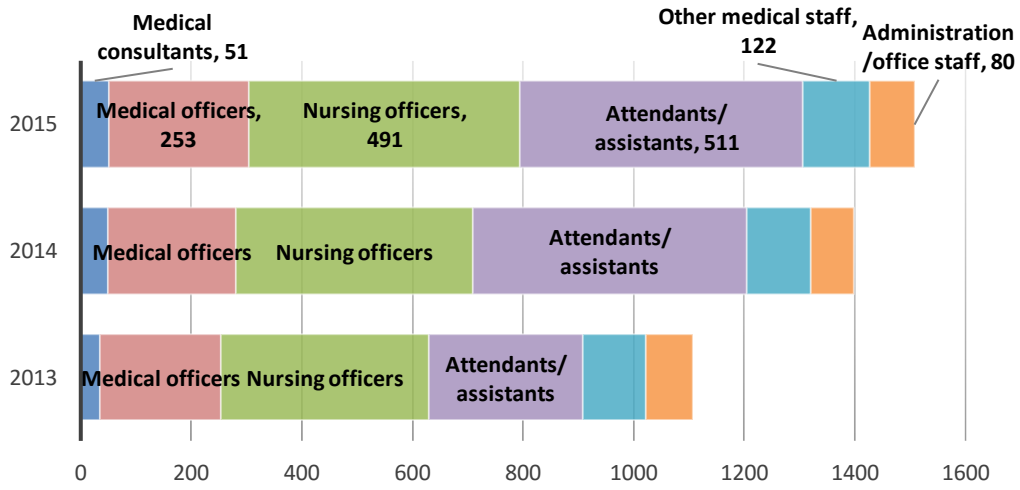

Figure 8 Number of Staff at Jaffna Teaching Hospital in Recent Years

Source: Document provided by Jaffna Teaching Hospital

The institutional arrangement for maintenance of the facility of the hospital is in accordance with the original plan. Roles and responsibility of the parties involved in maintenance is clear. As for the maintenance of the equipment and facilities provided by the project, daily maintenance of air conditioners, generators and an elevator are conducted by the Maintenance

[22] Source: Information provided by Jaffna Teaching Hospital (The hospital made a calculation according to the guideline of norms for number of nursing staff for government hospitals).

[23] For an example, 22 beds and related equipment, which were provided by the project, were installed and ready to use in ICU; however only 14 out of 22 beds can be used at a time because the nursing staff working at the ICU are able to take care of a maximum of 14 patients. Similarly, there are two endoscopy systems installed in the Endoscopy Unit; however, they cannot be used at the same time because there are not enough nursing staff working in the unit.

[24] Shortage of nursing staff has been an enduring problem of the health sector of the country. There are especially serious shortages in the least developed areas of the country, such as northern and eastern areas and estate areas. One of the reasons for the shortage of nursing staff in these areas is that there are less people who meet the entry qualification of the nursing schools, which is pass marks for the A-level examinations (entrance exams to be qualified for entering universities) in science and mathematics stream, due to unsatisfactory high school education in the stream in these areas. Senior management of Jaffna Teaching Hospital also mentioned as a cause of the shortage that there was a reluctance to become nursing staff, as the profession has a negative social image - that it is hard work but not adequately paid.

Department of the hospital. Central Engineering Consultancy Bureau, CECB, which has resident staff at the hospital, is undertaking a contract from the hospital for repairing, renovation, demolishment and new construction of buildings in the hospital. The hospital contracts out to a private company maintenance work of the water purification system, which is supplying water to the building of Central Functions. Production and maintenance of furniture and simple medical tools is conducted by the maintenance section at a workshop attached to the Orthopedics Unit.

Maintenance of medical equipment, including simple repairs, is undertaken by the branch of Biomedical Engineering Services (BES) at the Jaffna Teaching Hospital.[25] The BES Jaffna branch sends the equipment to the BES head office if the branch cannot do the repairs. BES signs an annual maintenance contract with the agents of the relevant manufacturers for medical equipment that requires maintenance by manufacturers.

As explained above, the institutional arrangements for operation and maintenance of the hospital is appropriate in general, and is facilitating sustainability of the effect of this project.

3.5.2 Technical Aspects of Operation and Maintenance

At the time of the project planning, it was mentioned that the number of staff and technical capacity of BES Jaffna branch, which was in charge of the maintenance of the medical equipment of the hospital, was not adequate. For example, the way the BES branch conducted maintenance was reactive, not preventive - reacting only after problems were found with the equipment.[26] To facilitate solving this issue, a software component of the project, including provision of advice for computerizing the inventory of equipment and formats for works, and introduction of the concept of preventive maintenance for medical equipment to avoid problems before they happen, was carried out by a Japanese expert for the benefit of the Jaffna branch of BES.

At the time of project planning, there were two technical staff[27] and three support staff in BES Jaffna branch. This staff allocation continued even after completion of the project, until one more technical staff was allocated to the branch in December 2015.[28] The Jaffna branch sent their support staff one by one to the in-service training program conducted by BES head office for a period of around six months. The branch also conducted on-the-job training.[29] The head of the branch explained that technical knowledge and skill level of staff at the branch was

[25] BES is one of the institutions under the Ministry of Health and in charge of maintenance of medical equipment at public hospitals. The head office is in Colombo and there are branches all over the country.
[26] Report of the Implementation Review Study of this project.
[27] Two technical staff were a technical officer and a biomedical assistant.
[28] One technical officer was recently allocated.
[29] There is no university or technical college to teach technical knowledge (biomedical engineering) for maintenance of medical equipment in Sri Lanka. Therefore, BES are enhancing their capacity by providing training to existing staff who have skills in mechanical and electric fields; they send existing staff who have practical experience to the in-service training.

improving as a result of the increased number of technical staff and participation to the training and OJT.

According to senior management of the hospital, medical staff who are working in the treatment units have adequate knowledge and technical skills necessary for operation of the medical equipment, including those provided by the project. Accordingly, there was no problem observed at the time of the ex-post evaluation with the status of operation and maintenance of the medical equipment provided by the project.

Computerization of the inventory and formats, concept of preventive maintenance, organizing workspace using the 5S concept, and others were advised to be introduced to the branch in the software component of the project, with the aim of improving the maintenance system for medical equipment. BES Jaffna branch was not able to implement the above-mentioned advice as they were busy carrying out their tasks with a limited number of staff. The branch started introducing preventive maintenance work after December 2015, when an additional technical staff member was added to the branch. At the time of the ex-post evaluation, they were working on preparing an inventory, master files, routine checklists, and job cards for repair of the equipment provided by the project. There will be no particular technical problem for them to carry out this initiative, because the Director of the hospital has a good understanding about the importance of preventive maintenance and concept of 5S, and the technical staff member in charge of introduction of preventive maintenance in the BES Jaffna Branch has experience in the same tasks from her previous job assignment.

3.5.3 Financial Aspects of Operation and Maintenance

Jaffna Teaching Hospital operates with a budget provided by the Ministry of Health. As Figure 9 shows, budget allocation and actual expenditure of the hospital were increasing year by year. Status of utilization of the budget allocation was also satisfactory. Actual expenditure of the hospital for the year 2015[30] was LKR 1.8 billion.[31] Figure 9 shows budget allocation and actual expenditure of the hospital for the last four years. Capital budget/ expenditure was used for new construction of buildings and facilities and new procurement of equipment. Eighty per cent of the current budget/ expenditure was personnel cost, and the remainder was cost of purchasing medicine and medical consumables, maintenance of equipment, and others.

[30] Annual budget of Sri Lankan government institutions starts from January and ends in December.
[31] Around JPY 1.5462 billion when converted at the exchange rate of 1LKR = 0.859 JPY in December, 2015, JICA exchange rate in the JICA website.

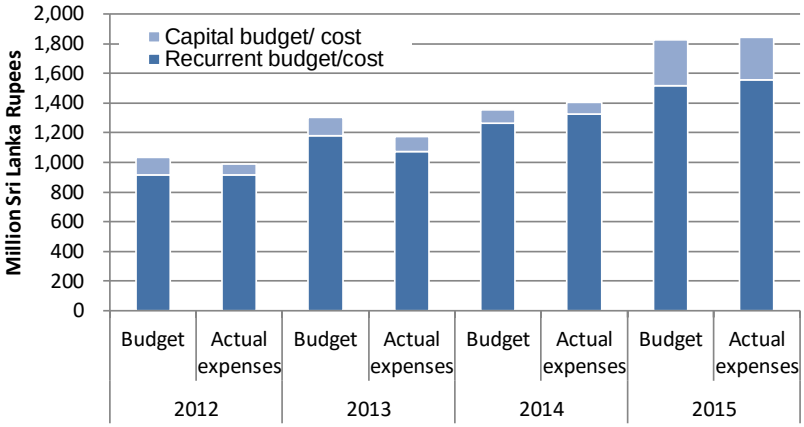

Figure 9 Budget and Expenses of Jaffna Teaching Hospital in Recent Years

Source: Document provided by Jaffna Teaching Hospital

The hospital is taking steps for renewal of medical equipment and new construction of buildings for medical facilities, with an aim of providing better health services to the people. As for the Central Functions, medical equipment, such as a blood analyzer and others, were procured and wash basins for test tubes were installed additionally to the central laboratory after the project was completed. The hospital has a plan to commence expansion of the central laboratory (see details in the next section), construction of new buildings for department of obstetrics and gynecology, and cardio surgery, improvement of laundry facilities and procurement of some items of medical equipment in 2016. Special budget allocation of LKR one billion[32] was provided by the Ministry of Health to the hospital in 2016 for the purpose of implementing the above-mentioned plan.

As mentioned above, necessary budget was allocated to the hospital for sustaining and expanding the effect of the project, as well as further expanding functions of the hospital. There has been no financial problem with regard to the operation and maintenance of the facility and equipment provided by the project.

Necessary budget allocation was provided to the Ministry of Health from the Ministry of Finance. The budget and expenditure of the ministry has been increasing. There was 17 per cent of increase to the budget in 2016 when compared to the previous year. There is also no problem with the budget disbursement and utilization.

As explained above, the financial status of the hospital and that of the ministry is satisfactory.

3.5.4 Current Status of Operation and Maintenance

The ex-post evaluation team studied the current status of operation and maintenance of the facilities and equipment provided by the project, and found that they were utilized in effective ways;

[32] Around JPY 859 million when converted at the exchange rate of 1LKR = 0.859 JPY in December, 2015, JICA exchange rate in the JICA website.

there was no problem in general for maintenance.[33]

The hospital is preparing to transfer the CT scan, a fluoroscopy and a ceiling-mounted X-ray facility from the old building to the Central Functions, which was built by the project, at the time of the ex-post evaluation. After implementation of the transfer, all the functions of diagnostic images will be centralized, and further improvement of work efficiency and services of the unit is expected.

The hospital was expanding the function of the central laboratory after the completion of the project by procuring test equipment with funds of the ministry and WHO (World Health Organization) according to the needs. As a result, the amount of equipment in the laboratory, as well as number of staff and tests they are handling, was increased. Consequently, the space of the laboratory has become inadequate. The laboratory testing unit has five sections, including hematology, chemical pathology, micro pathology, histopathology and night lab. Histopathology and night lab were still in the old building that was used before the project.[34] Currently, handing and taking over blood samples, and monitoring of the work progress, cannot be conducted efficiently because the sections of the laboratory are in two different buildings. The working environment in the old building needs to be improved as the rooms are dark with no air conditioning. To solve this problem, the hospital proposed an expansion of the space of the central laboratory to the Ministry of Health, by way of constructing another storey to the building of the Central Function.[35] The Ministry of Health allocated LKR 120 million[36] of budget to the hospital in 2016 for implementing this proposal. The hospital has already developed architectural drawings and cost estimates for the construction, and was planning to start the work very soon.

It was found as a result of the beneficiary survey of medical staff that many of them thought that the number of changing and rest rooms in the Central Functions was not enough, and that the space in these rooms was not adequate. The size of these rooms became inadequate as a result of the increase in the number of staff. A common practice in this area is that medical officers, nursing staff and hospital assistants have their own separate changing rooms. At the time of the ex-post evaluation, the nursing staff of the hospital had to work continuously for two shifts, once a week, due to staff shortages; usually they work for 8 hours by taking turns in 3 shifts for a day. It was due to having to work for longer hours that they would like to have more rest rooms.[37] Senior

[33] As mentioned in footnote 23, equipment provided by the project for ICU and endoscopy room was not fully utilized due to shortage of nursing staff. However, the equipment was maintained well and can be used as soon as the nursing staff is increased.

[34] Histopathology laboratory was not included in the original plan of the project, as there was no such specialization in the hospital at the time the Basic Design Study was conducted in 2005. There was a request from the hospital at the time of the Implementation Review Study conducted in 2010 to include a histopathology laboratory to the building of Central Functions, as other laboratories were in the building. The request was considered by JICA, however, it was not realized probably because the floor area allocated to the project was limited.

[35] The building of Central Functions, constructed by the project, has three storeys. It was designed to be able to be expanded by one more storey if needed in future. This was supposed to be for classrooms of medical students, for example, at the time of project planning. The expansion will now be carried out for setting up rooms for the laboratory, which is more urgent and important.

[36] Around JPY103.08 million when converted at the exchange rate of 1LKR = 0.859 JPY in December, 2015, JICA exchange rate in the JICA website.

[37] One rest room was constructed by the project for ICU nursing staff. After completion of the project, there was an opinion that separate rest rooms were needed for female and male nursing staff. Therefore, another rest room was

management of the ministry and the hospital understood these needs and intend to consider increasing the facility in future according to the needs.

In this manner, the current status of operation and maintenance was satisfactory in general. It is also expected that the hospital will utilize the facilities and equipment provided by the project more in future.

No major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance system. Therefore, sustainability of the project effects is high.

The ex-post evaluation paved the way for further utilization of the facilities and equipment provided by the project

It was found that several facilities and equipment provided by the project were not utilized for the original purpose at the time the external evaluator first visited the hospital during the course of the ex-post evaluation. For examples, the isolation ICU rooms for patients with infectious diseases were used as rest rooms for nursing staff. One of the endoscopy rooms was used as a store room. As soon as the external evaluator explained about these issues to the senior management of the hospital, they recognized the need for improvement and took an initiative to join the inspection of each unit of the Central Functions together with the external evaluator. They also studied the original drawings and plans of the project, and exchanged ideas actively about the need and modality of improvement.

Thereafter, they engaged in activities for improvement with the target of completing them by the time the external evaluator visited the hospital again. As a result the external evaluator, on her second visit, observed that most of the issues had been solved during the four months since her first visit. For examples, the isolation rooms of ICU and endoscopy room were used for their original purpose. For providing a better environment with respect to infection control, a steel shelf with glass covers was installed instead of an old wooden shelf in the operating theater complex; and a glass partition was installed between the washing space for medical tubes and the space for preparation of liquid food in ICU (see the photo). A technical officer was newly allocated to the BES, a female radiology technician was made available for operating mammography, an arrangement was

A glass partition was installed between the washing space for medical tubes and the space for preparation of liquid food, with an aim of improving hygiene in ICU

arranged by converting a room from another purpose. This arrangement, too, was needed because of the long working hours and common practice of the area.

made for installing excess anesthetic gas scavenging systems in the operating theaters, and repair of a UPS (uninterrupted power supply system) in the operating theater was completed. The workshop of the BES was neatly arranged according to the 5S concept.

In this manner, the ex-post evaluation paved the way for the hospital for further utilizing facilities and equipment provided by the project.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This Project was implemented to improve the health and medical services of the Jaffna Teaching Hospital in Sri Lanka by constructing a building for Central Functions and providing facilities for a central operating theater complex and others, thereby contributing to improvement of the health of local residents.

This project has been highly relevant to both the development plan of Sri Lanka, which aims to provide people in the country with access to medical services of high quality and using the latest technology; and to the development needs of the country, by improving the medical services of Jaffna Teaching Hospital through upgrading its facilities, which were decrepit and seriously damaged. The project was also highly relevant to Japan's ODA policy, which placed importance on the prompt implementation of humanitarian and reconstruction assistance at the time the conflict in the country ended. The plan of the project was highly appropriate as a kind of assistance that was implemented in a conflict-affected country/area. Therefore, its relevance is high.

Construction of the building and procurement of equipment was conducted as planned; and the project cost was within the plan. However, the project period exceeded the plan. Therefore, the efficiency of the project is fair.

After this project, the number of operations, major operations, and laboratory tests at the hospital increased. More types of operations and laboratory tests became available at the hospital. Medical staff at the hospital appreciated that the efficiency of work and the working environment was improved because of the project. The community of the area also appreciated that the project contributed to improvement of the medical services of the hospital and the health of people in the area. They felt that the project provided them with a sense of safety and encouragement at a time when they were making an effort to rehabilitate and reconstruct their lives. This project has largely achieved its objectives. Therefore, the effectiveness and impact of the project is high.

No major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance system. Therefore, sustainability of the project effects is high.

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

4.2 Recommendations

4.2.1 Recommendation to the Implementing Agency

Introduction of a system for preventive maintenance, to prevent failure and problems with medical equipment from happening, is one of the important tasks for the hospital in order to utilize the equipment provided by the project for a longer period. BES of Jaffna Teaching Hospital has commenced activities for introducing a system for preventive maintenance, such as organizing several forms and files. However, it seems that a considerable volume of work needs to be conducted for the actual implementation of the system. Close cooperation with other units and departments is also needed. Therefore, it is recommended that the senior management of the hospital set target dates to introduce the series of tasks, and conduct progress monitoring, so that a preventive maintenance system will be definitely introduced and implemented at an early date.

4.2.2 Recommendation to JICA

It is advisable for JICA to keep engaging in monitoring progress of improvement status of the above-mentioned recommendation by obtaining reports from the Ministry of Health from time to time or visiting the hospital, for examples.

4.3 Lesson Learned

- <u>Designing facilities with due consideration of future needs for expansion and change in medical services</u>

This project was implemented during a changing environment for the hospital just after the end of the conflict, to fulfill the needs of medical services. At the time of the ex-post evaluation it was found that the medical services at the hospital had been expanded as planned, as a result of the project and the appointment of consultant medical officers and additional procurement of medical equipment, which were conducted by the Ministry of Health. It was, however, found that the space available in the building of Central Functions, which was built in the project, became insufficient three years after its completion, as a result of the increase in medical staff and content of services. The hospital is going to expand the room for Central Laboratory by adding one more storey on the roof of the building this year, to solve this problem.

When a rapid expansion of medical services is expected in a changing environment, as happened with this project, it is recommended to design the facilities with due consideration of future needs for expansion, however, without making it over-designed. For example, it is useful to design the building so that one more storey can be added on the roof of the building if needed, similar to the arrangement made in this project. To sustain and expand project effects it is also useful to have spare rooms and multi-purpose rooms in the building, so that the hospital will be able to accommodate additional medical equipment and any increase in staff after the project completion.