

Uganda

Ex-Post Evaluation of Grant Aid Project

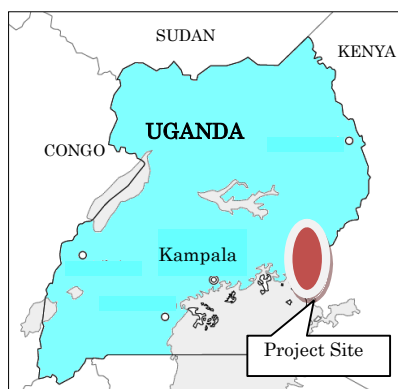
“The Project for Improvement of Health Facilities and Supply of Medical Equipment in the Eastern Region in the Republic of Uganda”

External Evaluator: Hisae Takahashi, Ernst & Young Advisory Co., Ltd.

0. Summary

This project emphasizes the development of health facilities and medical equipment, and is therefore relevant to the needs and development plans of Uganda, which considers the enhancement of medical services in rural areas as a top priority as also do the ODA policies of Japan / JICA. Accordingly, the relevance of the project is considered to be high. The efficiency of the project is also high as the project costs and project period was mostly as planned. In addition, through the construction of facilities and the provision of medical equipment, the numbers of outpatients, deliveries and operations in the target hospitals have been increased significantly, and the functions of the hospitals have been improved. A wide range of effects has been observed, including the improvement of delivery services in healthcare centres due to the provision of solar systems for lighting and the improvement of referral systems in the target areas due to the provision of ambulances and medical equipment. However, their effectiveness is considered fair since, in part, the number of medical inspections using advanced medical equipments increased only at a sluggish pace. In terms of the sustainability, the management condition of medical equipments is still a concern, which is the result of shortages of medical staff, deficiencies in their skills to handle and maintain those equipments; the same problem that the whole country is confronted with. In light of the above, this project is evaluated to be satisfactory.

1. Project Description



Project location



Outpatient ward at Bududa GH

1.1 Background

After independence from the United Kingdom in 1962, Uganda has suffered from domestic

political turmoil and economic disorder due to repeated coups. Since the administration of Museveni, which came to power in 1986, the country has put its efforts toward economic reconstruction with the support of international donors, such as the World Bank, International Monetary Fund. However, the GNI per capita as of 2002 remained at 240 US dollars, which is the lowest level among the neighbouring countries. To achieve breakthroughs in this situation, the government of Uganda developed a “Poverty Eradication Action Plan (PEAP)”, which placed the emphasis on agricultural modernization, improvements in the rural infrastructure, the revitalization of private markets, and the improvement in primary education and primary health care (PHC). Public healthcare indicators have partially improved thanks to free healthcare, the reinforcement of community healthcare, the diffusion of PHC and also preferential inputs of budgetary and human resources

However, in rural areas, healthcare conditions have remained poor as indicated by the high mortality rate among pregnant women of 510 per 100,000 (as of 2004, higher than the world average of 400) and child mortality rate (under 5 years old) of 124 per 1,000 (as of 2004, the 36th highest in the world). The reasons are considered to be as follows; 1) access to healthcare services are limited in particular for women and children in poverty; 2) facilities and equipment in hospital facilities constructed mainly from the late 1970s and early 1980s became obsolete; 3) referral systems were not maintained properly. The government of Uganda has been committed to the improvement hospital facilities and the foundation of, new ones, but restrictions on budgets and human resources made it difficult to respond to all needs.

Under these circumstances, the project targeted four eastern districts (Mbale, Tororo, Bugiri and Busia)¹ where the deterioration in facilities and equipment was extreme and improvements were urgently required, and it was considered that these districts were very important in the light of the need for progress in rural healthcare services for the whole country and came to be implemented.

1.2 Project Outline

The objective of this project is to promote the improvement of medical services and rural referral systems in the target areas by developing medical facilities and procuring medical equipment for one Regional Referral Hospital (RRH), five General Hospitals (GH)s, and 28 Health Centres (HC)s in four eastern districts (Mbale, Tororo, Bugiri and Busia) .

Grant Limit／Actual Grant Amount	1,669 million yen / 1,633 million yen
Exchange of Notes Date	August, 2005 (1/2), July, 2008 (2/2)
Implementing Agency	Health Service, Ministry of Health (MOH)
Project Completion Date	March, 2007(1/2), March, 2008 (2/2)
Main Contractors	Constructor : The Zenitaka Corporation Procurement : OS Engines MFG. Co., Ltd(1/2)

¹ In Uganda, territorial division has been implemented for several times since 2005. At the time that the project has started, the target districts were consisted of four districts (Mbale, Busia, Tororo, and Bugiri.) Due to the territorial division, Bududa and Manafwa were separated from Mbale, and also Butaleja from Tororo. As of now (2011), target districts were consisted of seven districts (Mbale, Bududa, Manafa, Tororo, Butaleja, Bugiri, Busia).

	Iwatani Corporation(2/2)
Main Consultants	Kume Sekkei Co., Ltd/International Techno Centre Co., Ltd
Basic Design	Basic design study report on the project for rehabilitation on health facilities and supply of medical equipment in Mbale, Tororo, Bugiri and Busia districts in the Republic of Uganda, January-February, 2005
Detailed Design	-
Related Projects	Improvement of Health Infrastructure Management in Uganda (2006-2009) Project on Improvement of Health Service through Health Infrastructure Management (2011-2014)

2. Outline of the Evaluation Study

2.1 External Evaluator

Hisae Takahashi, Ernst &Young Advisory Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: November, 2010 – December, 2011

Duration of the Field Study: January 15 –February 1, 2011 and June 11 –June 17, 2011

2.3 Constraints during the Evaluation Study

The target hospitals; one RRH, five GHs, and 28 HCs are dotted around the four eastern districts (Mbale, Tororo, Bugiri and Busia) . Besides, the 28 HCs are mostly located in areas where there are hazardous road conditions, which blocked the external evaluator's visit. Consequently, 13 HCs out of 28 HCs were chosen for the evaluation. As for the other 15 HCs that were not chosen due to the poor access, the evaluation was made based on the results of interviews conducted by the implementing agency and district health offices.

3. Results of the Evaluation (Overall Rating: B²)

3.1 Relevance (Rating: ③³)

3.1.1 Relevance with the Development Plan of Uganda

The government of Uganda compiled the PEAP in 2002 as a comprehensive poverty reduction strategy and targeted improvement of the health of the poor. Within the framework of the PEAP, the “Health Sector Strategic Plan I (2000/01- 2004/05)” (HSSP) revealed a plan to strive to improve conditions in the health and medical services through the establishment of support systems, including infrastructure development.

Within the “Five-year National Development Plan” (2010/11-2014/15) succeeds the PEAP, the

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

³ ①: High, ② Fair, ③ Low

improvement of access to high quality medical services is one of the most important strategies on the ground with the shortage of medical equipment and deterioration in facilities remaining crucial tasks in the healthcare sector of Uganda. In addition, within the “Health Sector Strategic and Investment Plan (2010/11-2014/15)”, the improvement of the medical facilities and equipment is positioned as a priority area, and a plan for investment in health infrastructure (especially in RRHs and GHs) is included with the aim of functional advancement in existing facilities and the implementation of maintenance management systems for medical facilities and equipment.

As above, improvement in medical facilities/equipment and healthcare services through the implementation of maintenance management systems is a coherent target in the development plan of Uganda. Therefore, this project, which aims at achieving qualitative progress in rural medical services via the provision of health and medical facilities/equipment, is relevant to the development policies of Uganda.

3.1.2 Relevance with the Development Needs of Uganda

In Uganda, many GHs were constructed in the early 1970s and most of the facilities were obsolete after 30 years from their construction, together with shortages or breakdowns in basic medical equipment. The Ministry of Health (MOH) has strived to improve these conditions, with assistance from the African Development Bank and other donors. However, the functional enhancement of GHs and HCs in rural areas, where 90% of the total population reside, has lagged. At the time of the ex-post evaluation, public health indicators, which were low at the time of planning, showed a trend toward gradual improvement⁴, but the deterioration in health facilities and the shortage of medical equipment remains a challenge for the improvement of health and medical services in Uganda. For example, only a third of the total number of health facilities had the basic medical equipment required for delivery for a pregnant woman.

This project has constructed health facilities and procured medical equipment in the four eastern districts with the aim of achieving improvements in health and medical services and is therefore relevant to the development needs of Uganda through the planning period, up to the present.

3.1.3 Relevance with Japan’s ODA Policy

Based on the Annual Bilateral Policy Dialogue for Economic Cooperation in July 1997 and the consultations with the government of Uganda at the time of the project survey in 1999, Japan has identified the following as priority areas for ODA: (1) human resources development, (2) improvement of the basic infrastructure (healthcare/medical infrastructure, water supply), (3) agricultural development, and (4) the economic infrastructure. This project comes under category (2) improvement of the basic infrastructure (healthcare/medical infrastructure, water supply), and as such it is relevant to Japan’s ODA policies.

⁴ For example, the child mortality rate declined from 124 as of 2005 (before the project) to 80 as of 2010 out of 1,000. The maternal mortality was also reduced from 430 to 510 out of 100,000.

As mentioned above, this project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policies; therefore its relevance is high.

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

In this project, the planned and actual outputs of the construction of facilities and procurement of equipment are as follows.

Table 1 Planned and Actual Outputs (Construction of Facilities)

	Planned	Actual	Difference
Construction of facilities	<u>Mbale RRH</u> Operation Theater, X-ray Unit, Maternity Ward, Delivery Unit, Obstetric Operation Theater, Connecting Corridor, Generator Room <u>Bududa GH</u> Outpatient Ward, Delivery Unit, Operation Theater, Generator Room <u>Tororo GH</u> Operation Theatre, Outpatient Ward, Delivery Unit, Female Ward, Connecting Corridor, Generator Room <u>Busolwe GH</u> Electric Wiring for Medical Equipment	<u>Mbale RRH</u> Operation Theater, X-ray Unit, Maternity Ward, Delivery Unit, Obstetric Operation Theater, Connecting Corridor, Generator Room <u>Bududa GH</u> Outpatient Ward, Delivery Unit, Operation Theater, Generator Room <u>Tororo GH</u> Operation Theatre, Outpatient Ward, Delivery Unit, Female Ward, Connecting Corridor, Generator Room <u>Busolwe GH</u> Electric Wiring for Medical Equipment	None
Construction of facilities	<u>Bugiri GH</u> Electric Wiring for Medical Equipment <u>Masafu GH</u> Outpatient Ward, Maternity Ward, Female Ward, Children's Ward, Connecting Corridor, Generator Room	<u>Bugiri GH</u> Electric Wiring for Medical Equipment <u>Masafu GH</u> Outpatient Ward, Maternity Ward, Female Ward, Children's Ward, Connecting Corridor, Generator Room	

Table 2 Planned and Actual Outputs (Procurement of Equipments to RRHs and GHs)

	Name of Hospital	Planned	Actual	Difference
	Mbale RRH	67	67	None
	Bududa GH	83	83	
	Tororo GH	80	80	
	Busolwe GH	68	68	
	Bugiri GH	69	69	
	Masafu GH	64	64	
Major equipments	Ambulance, anaesthesia unit, delivery bed, dental unit, infant warmer, instrument cupboard, surgery instrument set, operation theater, operation table, patient monitor, portable ultrasound scanner, X-ray unit, fluoroscopy X-ray unit, mobile X-ray unit, stretcher, fridge, others			None

Table 3 Planned and Actual Outputs (Procurement of Equipments to HC-III)

	HC level	Planned	Actual	Difference
	HC-III (23 places)	71	73	+2
Major equipments	solar electric system, delivery bed, delivery instrument set, instrument tray, instrument trolley, scale, others			None

Table 4 Planned and Actual Outputs (Procurement of equipment for HC-IV)

	HC level	Planned	Actual	Difference
	HC-IV (five places)	30	30	None
Major equipments	Solar electric system, mobile operation light, operation table, delivery bed, caesarean instrument set, fridge, electric suction apparatus, others			

In the construction of health facilities, there were some minor changes⁵, including changes to the location of delivery units and materials used for the floors and roofs. This is because the original plans had to be adapted to the circumstances of each hospital facility and proper location/materials adopted. These changes were approved by the implementing agency and the persons in charge from the MOH through discussions, therefore the contents of the changes are considered to be valid.

The procurement of medical equipment has been mostly implemented as planned. However, at Kwapa HC- III in the Tororo district, instrument trays, which were not on the procurement list, were purchased and since these met the actual needs they should be justified.



Photo: Outpatient ward at Masafu GH



Photo: Solar system for lighting (Banda HC- III)

3.2.2 Project Inputs

3.2.2.1 Project Cost

The project cost was lower than planned. While the limit in the Exchange of Notes (E/N) was 1,669 million yen, the actual cost was 1,633 million yen, or 98% of the planned cost. The main cause

⁵ For example, the changes were as follows; 1) change in the location of the delivery units in Tororo GH, 2) change to terrazzo from a floor of colored mortar (change in the materials), 3) change in the materials used for a connecting corridor, 4) change in the materials used for floors and roofs, 5) change in the specification of inspection counters in an inspection room, 6) change in the specifications of a sink cabinet in a cleaning room, 7) change in the height of a window in the pharmacy, 8) change in the specifications of a ceiling, 9) change in the specifications of doors in an outpatient ward.

is the discrepancy between the limit in the E/N and the bidding price offered by the companies (consultants and constructors).

3.2.2.2 Project Period

The project period was 26 months, including four months for bidding and 22 months for construction and procurement, mostly as planned.

At Masafu GH, promoted from HC to GH, infrastructure improvements (foundation construction) that were supposed to be completed by Uganda side before the commencement of the project was delayed, however, the total construction period was as planned thanks to the leeway in the schedule. However, especially the electrical construction, which was in the preliminary preparation of the project, was delayed due to the lack of support from the electric power company and the lack of communication among the authorities concerned, such as the MOH, local governments, and the local electric power company. While the description of the work that had been completed by Uganda beforehand was shared with the MOH, coordination with the electric power company and regulatory authorization for electricity was not enough and should have been enhanced.

As above, both project cost and project period were mostly as planned, therefore efficiency of the project is high.

3.3 Effectiveness⁶ (Rating: ②)

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation and Effect Indicators⁷

(1) Number of treatments (Number of outpatients receiving treatment at each hospital and the number of inpatients at Masafu GH)

As in Table 5, the number of outpatients increased at every RRH and GH in this project. Except for a few GHs, the objective of an increase in the number of patients provided with medical services is considered to have been achieved since the rates of increase exceed the population growth rates. The construction of new outpatient wards and the procurement of medical equipment led to a sense of safety and trust in the hospitals, and in addition contributed to a reduction in the treatment time and efficiency of the treatment, which eventually led to acceptance by more patients.

⁶ Rating of the Impact will be included in the rating of its effectiveness.

⁷ At the time of the basic design, the objective of this project was to increase the number of outpatient treatments without specific numerical targets. However, it is necessary to take into account the population growth, together with number of outpatient treatments. Thus, in this ex-post evaluation, the effect of the project is evaluated with consideration taken of the population growth rate in the target areas.

Reference) Population in the target areas before and after the project

	2005	2010	Change(%)
Population at target area	1,463,000	1,791,000	22%

Source : Uganda, Country STAT, <http://www.countrystat.org/uga/>

Table 5 Number of Outpatient Treatments

Target : Increase	Target (2004)	Actual (2009/10)	Increase Rate(%) ^{Note 1}
Target	244,792	379,765	55%
Mbale RRH	50,752	104,004	105%
Bududa GH	29,977	42,896	43%
Tororo GH	21,785	46,193	112%
Busolwe GH	49,052	72,107	47%
Bugiri GH	58,636	61,636	6%
Masafu GH	34,950	52,929	51%

Note 1 : Figures show the change (%) from 2004 to 2010

Source : Documents provided by each hospitals

At Masafu GH, medical facilities (maternity ward, female ward, Childrens' ward) were newly constructed to accept more inpatients, since it had been promoted from an HC to a GH. As a result, by comparing the target number with actual at the time of the ex-post evaluation, number of inpatients increased almost four times (See table 6), therefore the implementation of the project improved the function of the hospital.

Table 6 Number of Inpatient at Masafu GH

Target : Increase	Target (2004)	Actual (2009/10)	Increase Rate (%) ^{Note 1}
Total	1,812	7,093	291%

Note 1 : Figures shows the change (%) from 2004 to 2010

Source : Document provided by Masafu GH

(2) Number of inspections (Number of X-ray inspections, ultrasound scans, and electrocardiogram scans)

Table 7 shows the target and the actual number of inspections using the X-rays, ultrasound units, and electrocardiograms (ECG) at the time of the ex-post evaluation. While the number of X-ray examinations increased in the half of the target hospitals⁸, the actual number fell slightly below the target in Tororo GH, Busolwe GH, and Bugiri GH. This is because the X-ray system was used only irregularly or was no longer in use due to the shortage of radiation technologist able to perform X-ray examinations, a shortage of funds for X-ray film, or the unstable voltage of the electricity supply.

As for ultrasound inspections, a significant increase in the number was observed at Mbale RRH, Tororo GH, and Masafu GH, while the equipment was not utilized in Bududa GH, Busolwe GH, and Bugiri GH due to a lack of trained doctors and technicians. Regarding the number of ECG examinations, the actual number of examinations shows an increase. However, this is only because there was no cardiography equipment at the time of the basic design. In other words, the increase is attributable only to the results of Masafu GH, and no examinations were conducted due to the lack of doctors able to use the equipment or to analyze the diagnoses.

⁸ Mbale RRH, Bududa GH, Masafu GH

Table 7 Number of Inspections at each Hospital

Target : Increase	Number of X-ray inspections		Number of ultrasound scans		Number of ECG scan	
	Target	Actual	Target	Actual	Target	Actual
Total	10,918	8,028	493	4,741	0	86
Mbale RRH	1,750	2,957	98	3,584	0	0
Bududa GH	0	565	0	0	0	0
Tororo GH	3,168	2,256*	395	735	0	0
Busolwe GH	3,600	0	0	0	0	0
Bugiri GH	2,400	2,212	0	0	0	0
Masafu GH	0	38	0	0	0	86

Note: The “Target” represents the number of inspections in 2004, and the “Actual” in 2009/10. However, the number indicated by * shows the number of inspections in 2008/09

Source : Documents provided by each hospital

As above, in terms of the number of inspections, the medical equipment was not sufficiently utilized due to the shortage of doctors and technicians, and accordingly, the efficiency of this project is not very high.

(3) Results of medical services (Normal delivery, Cesarean delivery, Major operations)

As shown in Table 8, in terms of medical services, the actual number of normal deliveries, cesarean operations, and major operations exceeded the target, and so the objective of this project was achieved. The reason that overall medical services became stagnant at Masafu GH was that the doctor in attendance who had worked there until 2005 left the hospital for university research and no one was assigned to replace him. However, in 2007, a new doctor was finally assigned, and since then the actual number of medical services has increased.

Table 8 Number of Medical Services at each Hospital

Target : Increase	Number of normal delivery		Number of caesarean delivery		Number of major operations	
	Target	Actual	Target	Actual	Target	Actual
Total	9,602	14,615	1,356	2,203	2,824	4,980
Mbale RRH	3,855	6,838	592	1,396	1,802	2,627
Bududa GH	887	915	88	82	95	177
Tororo GH	1,788	2,750	128	138	309	481
Busolwe GH	857	1,303	166	196	109	383
Bugiri GH	1,045	1,902	289	354	388	1,255
Masafu GH	1,170	968	102	37	121	57

Note: The “Target” represents the number in 2004, and the “Actual” in 2009/10. However, the number indicated by * shows the number of inspections in 2008/09

Source : Documents provided from each hospital

As explained above, the number of treatments (outpatient treatment) increased 55% and number of medical services (normal delivery, cesarean delivery, major operations) increased 60% of target amount. The increase in the rates of the number of treatments and medical services exceeds the population growth rates and therefore the effect of this project is considered to be more than that

planned. However, regarding the number of inspections, the shortage of trained doctors and technicians led to non-use of the medical equipment, and the effect of this project on the target number of inspections is considered to be limited so far.

3.3.2 Qualitative Effects

(1) Improvement of health and medical services in the HCs

Of the 28 HCs targeted in this project, 13 HCs were chosen for a field survey. As a result, 11 HCs answered that the health and medical services had improved. The main reasons are as follows.

- Safety improvements in delivery services at night thanks to the installation of solar panels to provide lighting
- Amelioration of security around the HCs and the neighborhood thanks to the setting up of lights
- Improvement of the sense of safety of delivery felt by pregnant women thanks to the procurement of sets of delivery instruments



Photo: Light provided by the Project at Mbeheni HC in Busia District

In addition, as a result of the above, the fact that the number of deliveries in each HC demonstrated an upward trend was confirmed by the HCs. For example, the number of deliveries per month increased from 3 to 20~30 at Buhehe HC-III Busia District, which was provided with operating tables, sets of delivery instruments, and solar systems to provide lighting.

(2) Improvement of the means of transporting emergency patients

According to interview surveys⁹ at each hospital, some respondents answered that they had used trucks, which are of course not suitable for transporting emergency patients, in place of ambulances before this project or that they became able to transfer emergency patients safely thanks to ambulances provided by this project. 80% of the respondents in the beneficiary survey answered that the means of transporting emergency patients was “Very much Improved” or “Improved”. On the other hand, respondents who chose “No Change” or “Not Improved” explained that the reason was that they lacked funds to cover fuel bills or that the number of ambulances was still not enough.

(3) Reinforcement of referral systems in the target areas

According to interviews held at the HCs, the number of emergency patients transported from HCs to GHs did not increase much due to the shortage of fuel or the poor road conditions. On the other hand, according to the beneficiary survey conducted at each GH, 70% of the respondents answered that the number of patients transferred from the GHs to the RRH had increased.

At Mbale RRH, the actual number of patients who were transferred from each GH to the RRH showed an increase after the implementation of this project, as shown in Table 9. Accordingly, the procurement of ambulances and medical equipment in this project contributed to the improvement of

⁹ A beneficiary survey, conducted among hospital directors, doctors, and nurses totaling 120 (20 from each hospital) at RRHs and GHs in Mbale RRH by means of interview surveys.

the sense of safety with respect to hospitals and assurance of a means of transport, as well as promoting the maintenance of the systems of the RRH, which has led to implementation of the referral system in the RRHs in eastern areas.

Table 9 Number of Patients Transferred to Mbale RRH

	Before project	After project		
	2006	2008	2009	2010
Number of patient	64	143	228	350

Source : Documents provided by Mbale RRH

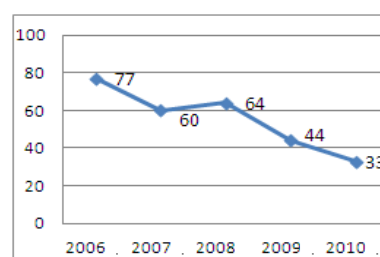
As outlined above, this project has somewhat achieved its objectives, therefore its effectiveness is fair.

3.4 Impact

3.4.1 Intended Impacts

(1) Improvement of healthcare indicators in four eastern districts

At the time of the basic design for this project, an improvement in healthcare indicators, especially the decline in maternal mortality ratio, was expected in the four eastern districts due to functional improvements including the provision of a means of transporting patients. The data on maternal mortality ratio in the target areas was obtained through field surveys, but accurate numbers were not available due to the dispatch of data. Thus, as a substitute, data regarding the number of maternal mortalities per year in Mbale RRH was obtained. The data shows that the number of maternal mortality is on a declining trend even though the population in this area is increasing.



Source : Provided by Mbale RRH

Figure1 Number of Material Mortality in Mbale RRH per Year

In addition, more than 80% of the respondents of a beneficiary survey answered that the construction of the facilities and the procurement of medical equipment contributed to the improvement of health and medical services and to a decline in the maternal mortality ratio in the target areas.

(2) Increase in the proportion of pregnant women who give birth in medical facilities

In rural areas in Uganda, there is a tendency for pregnant women to give birth at home. In delivering a baby at home, the situation can become life-threatening in an emergency due to the poor infrastructure. As in Table 10, the proportion of pregnant women who gave birth in a medical facility increased in the target areas of this project. Thanks to the solar system for lighting provided in this project, safe delivery at night became possible and the construction of a maternity ward in the GHs also permitted safe delivery. It is considered that these factors indirectly contributed to the improvement in the above indicators.

Table10 Percentage of Women Giving Birth at Home

District	Before the project (2003/04)	After the project (2009/10)
Mbale	26%	39%
Tororo	23%	29%
Bugiri	14%	16%
Busia	21%	29%

Source : MOH, “Annual Health Sector Performance Report”

(3) Improvement in quality of hospital services (results of a beneficiary survey)

In a beneficiary survey, 90% of the respondents answered that the quality of health and medical services in rural areas had improved. As the basis for their answers, some correspondents pointed out “the efficiency of services by shortening the waiting time” thanks to the enhancement of medical equipment. For example, at Tororo GH, the time required for a blood examination was reduced to 25 minutes from 40-45 minutes after this project. As a result, this made it possible to examine and treat more patients.

3.4.2 Other Impacts

(1) Impact on the natural environment, land acquisition and resettlement

As a result of interviews with personnel in the implementing agency and each hospital, the treatment of medical waste has been conducted properly and so this project has had little negative impact on the environment. The new health facilities were constructed within the property of existing hospitals, and therefore no issues arose in connection with land acquisition or the resettlement of residents.

(2) Other indirect impacts

As for other impacts, the linkage with Japan Overseas Cooperation Volunteer (JOCV) and its synergistic effects have been observed. Among the six target hospitals, JOCV specialized in healthcare assisted in the promotion of the 5Ss (Sort, Set, Shine, Standardize, and Sustain) in Mbale RHH, Tororo GH, Busolwe GH, and Masafu GH. In addition, JOVC volunteers were assigned to Mbale RRH who assisted in the maintenance of medical equipment. The instructions provided by these JOCVs instilled in the hospital workers the basic principles regarding the maintenance of medical equipment as in the 5Ss, and eventually contributed to the proper maintenance of medical equipment. In Uganda, it is often the case that a lack of basic maintenance of medical equipment and the handling of equipment with care or ensuring that they are clean has resulted in breakdowns. Instructions related to the 5Ss and the maintenance of medical equipment are absolutely fundamental to the management of health facilities and medical equipment, and



Photo: Poster of the five S posted and prepared by JOCVs

therefore these activities have been closely linked to the impact of this project. As above, activities by the JOCVs contributed to the adoption of these principles regarding the treatment of medical equipment and generated a synergistic effect.

As explained above, this project is considered to have had a positive impact, such as a decrease in the number of maternal mortality, an increase in the rate of deliveries in hospitals, and the efficiency of medical services, followed by improvements in health and medical services. In addition, the linkage with JOCVs and its synergistic effect was also confirmed.

3.5 Sustainability (Rating: ②)

3.5.1 Structural Aspects of Operation and Maintenance

In Uganda, the Health Services Department in the MOH is the regulatory authority for the management and maintenance of hospital facilities and medical equipment. In practice, the person in charge in each hospital takes care of minor problems, and in case this cannot be handled, the Mbale regional workshop (WS) in Mbale RRH is responsible for fixing defects¹⁰. The Mbale WS used to be run by contributions collected from each GH and district health offices, and they used it for fixing broken equipment. However, some hospitals were not able to afford to pay their contributions, and consequently the WS sometimes suffered from funding shortfalls and the system did not always worked effectively. In response to this situation, from fiscal year 2009/10¹¹ a budget has been allocated directly by the MOH, and the management system has been improving since then.

On the other hand, a shortage of staff including doctors has had a negative impact on hospital practice and management/maintenance activities. This is a problem common to all rural hospitals in Uganda and is not only applicable to the target hospitals in the project. Despite the efforts of each district health office to recruit doctors and technicians, they generally do not prefer to provide services in rural hospitals and every hospital has been struggling to secure a stable complement of human resources. Some hospitals are considering giving incentives, such as a housing allowance and an increase in salary, but it seems hard to find a quick solution due to budget constraints.

3.5.2 Technical Aspects of Operation and Maintenance

In this project, manuals were distributed with the aim of ensuring proper maintenance of the medical equipment at the time of the provision of the equipment. According to questionnaires distributed to each hospital, the manuals have been used effectively. However, when asking doctors and nurses the same question on the field study, 80% of the answers were “Not used enough”. The main reasons included the “Explanation is not clear.” or “Unable to understand.” Accordingly, the extent of use of the manuals varies according to the hospital or individual medical staff.

This project stipulated that “no medical equipment will be procured that doctors in Uganda have

¹⁰ regional WS are deployed in eight locations in Uganda and are responsible for the maintenance of medical equipment in hospitals within their jurisdiction. The Target GHs in this project are in the jurisdiction of the Mbale regional WS.

¹¹ Fiscal year starts from June and end June of next year in Uganda.

never used” and “no equipment will be provided to the hospitals that no doctors are able to use”. Due to these stipulations, workshops or training were not initially planned. However, after the implementation of the project, workshops on the utilization and maintenance of the equipment were held in the context of the actual situation on the ground, and technicians from the MOH, doctors, nurses, and technicians from each hospital participated in the workshops. Although the workshops in themselves were effective, they were implemented within a limited time frame for a limited number of people and no follow-up sessions were held. In addition, some of the participants left their position without ensuring a handover, and consequently ultrasound units and ECGs, which require advanced technical skills, were not always sufficiently utilized.

In the ex-post evaluation, interview surveys were conducted in the health facilities that provide training for medical equipment and the medical equipment agencies¹² that implement the procurement of medical devices regarding the necessity of training and workshops on the operation of new medical equipment. According to the interview survey results, there are few doctors who have clinical experience with advanced medical equipment, such as ultrasound units and ECGs and therefore training sessions are necessary for the doctors who have no such experience. It is hard to give a general estimation of the training period required, since it depends on each doctor’s (technician’s) experience, but for reference, two weeks of training (including weekends) for an ECG and four to six weeks of training (including weekends) for ultrasound units enables the participants to gain the skills required for the utilization of the equipment, the techniques for the analysis of diagnoses, and other basic skills, and finally to use the equipment properly.

As in this project, which involved the implementation of both the construction of facilities and the procurement of medical equipment, the equipment is provided after the construction of the facilities, therefore it is sometimes difficult to take soft components into account in the schedule in a timely manner due to the limited project period. By making efforts to arrange a more flexible schedule, this will make it possible to utilize the soft components in relation to the timing of the introduction of new equipment.

3.5.3 Financial Aspects of Operation and Maintenance

The proportion of the health sector provide for in the total government budget has fluctuated around 9% and no major change has been observed for the sector as a whole (See Table 11). On the other hand, there was a great improvement in the budget allocated to the maintenance of medical equipment. As described in the “Structural Aspects of Operation and Maintenance”, the WS, which used to be dependent on contributions from each hospital within their jurisdictions, have been allocated a budget amounting to total a billion of million Uganda Shillings (UGX), equivalent to 36 million yen¹³. The allocation of this budget is expected to contribute to the improvement of medical

¹² In this ex-post evaluation, interviews were conducted by visiting Ernst Cook Ultrasound Research and Education Institute (ECUREI), which offers training for medical equipment to doctors and nurses in East Africa, and Simed International, a medical equipment agency that conducts the procurement of medical devices and their subsequent maintenance.

¹³ The rate was applied from the foreign currency conversion rate table as of October, 2011 provided by JICA.(1UGS=¥0.036)

equipment. As for the method of the allocation of this budget, in fiscal year 2009/10, each WS was equally allocated 125 million UGX, equivalent to 4.5 million yen. In the fiscal year 2010/11, the budget will be allocated in proportion to the number of health facilities (hospitals and HCs VI) within its jurisdiction, and as a result the allocation to Mbale WS will be increased to up to 230 million UGX, equivalent to 8.28 million yen (See Table 12).

Table 11 Proportion of the Health Sector provided for in the Total Government Budget

Percentage of health sector in total government budget	FY 2007/08	FY 2008/09	FY 2009/10
	9.6%	9.0%	9.6%

Source: MOH, "Health Sector Strategic and Investment Plan 2010/11-2014/15"

Table 12 Budget Allocation to Mbale WS

(unit: millions of UGX)

Budget allocation to Mbale WS	before FY 2008/09	FY 2009/10	FY 2010/11
	-	125.0	230.0

Source : MOH "Ministerial Policy Statement Financial Year 2010/11"

However, according to an interview with the person in charge in Mbale WS, the budget allocated to WS is not still enough to implement the proper maintenance management of medical equipment. However, a change in the budget allocation to maintenance management, which had been overlooked in Uganda, is a great first step towards improvements.

3.5.4 Current Status of Operation and Maintenance

The health facilities constructed in this project were kept clean and utilized properly at least at the time of the field survey. On the other hand, 10% of medical equipment had not been used for a certain period of time on average. Among this equipment, it was confirmed that 50% of the equipment was broken, with 30% to 40% was not utilized due to a shortage of doctors and technicians and 10% left broken due to a lack of the necessary components (spare parts) to fix equipments. As for the broken equipment, it is often the case that a lack of understanding of the proper handing/usage or the extremely unstable voltage has led to mechanical failure. By improving this situation, 60% of the problems are expected to be resolved.

Currently, maintenance activities mostly target broken equipment, and so prevention measures, such as maintenance management, is not sufficient at all. Although data regarding medical equipment was collected and operational status was categorized at the technical cooperation project, "Improvement of Health Infrastructure Management in Uganda" conducted from June 2006 to May 2009, the data has not been updated after the end of this project. Accordingly, the location of the some equipment is not known or some equipment was kept in storage and not utilized at all. For example, at the Busolwe GH, two traction beds¹⁴ purchased as part of the project were missing. Not only in

http://www.jica.go.jp/announce/consul/info060407_01.html

¹⁴ Treatment of resets for dislocation and fractures, and the pulling of body parts for the purpose of a complete reset, immobilization, and pain relief.

Busolwe GH, but also in other hospitals, there are no inventory lists or updated inventory lists, and staffs other than person in charge do not know where the medical equipment is kept. Consequently, it is difficult to conduct the uniform management of medical equipment and to make the responsibilities clear. For the future, the preparation and updating of inventory lists is required for the proper maintenance of medical equipments.

It was reported that the usage of facilities and equipment had improved thanks to the encourages on the government of Uganda and the implementing agency from the JICA office and promotion activities by the JOCV. For the future, it is necessary to establish and implement maintenance management for the prevention and proper usage of equipment in order to prevent the equipment from breakdown , with the assistance of training provided by “Project on Improvement of Health Service through Health Infrastructure Management”, technical cooperation project planned from August 2011 to December 2014.

As outlined above, some problems have been observed in terms of maintenance management system, skills, and funding, therefore sustainability of the project is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project emphasizes the development of health facilities and medical equipment, and is therefore relevant to the needs and development plans of Uganda, which considers the enhancement of medical services in rural areas as a top priority as also do the ODA policies of Japan / JICA. Accordingly, the relevance of the project is considered to be high. The efficiency of the project is also high as the project costs and project period was mostly as planned. In addition, through the construction of facilities and the provision of medical equipment, the numbers of outpatients, deliveries and operations in the target hospitals have been increased significantly, and the functions of the hospitals have been improved. A wide range of effects has been observed, including the improvement of delivery services in healthcare centres due to the provision of solar systems for lighting and the improvement of referral systems in the target areas due to the provision of ambulances and medical equipment. However, their effectiveness is considered fair since, in part, the number of medical inspections using advanced medical equipments increased only at a sluggish pace. In terms of the sustainability, the management condition of medical equipments is still a concern, which is the result of shortages of medical staff, deficiencies in their skills to handle and maintain those equipments; the same problem that the whole country is confronted with. In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Improvement of systems for preventive maintenance management

As of now, maintenance management in each hospital is mainly confined to fixing broken equipment. In this process, malfunctions can be prevented by periodic checks or regular maintenance. In addition, the costs of maintenance and checks are generally held down compared to those for fixing broken equipment, so it is preferable to improve the system of preventive maintenance management. In implementing the above, the preparation and updating of the equipment list is considered effective in unifying the management and also in clarifying who is responsible for the management. Eventually it will be useful for monitoring the status of the implementation of checks, the updating of equipment, and inventory control of spare parts.

(2) Implementation of cooperation between hospitals

In the target hospitals, there was equipment that had not been in use for a certain period. One of the reasons was the lack of doctors who have the skills to utilize advanced medical equipment. A shortage of doctors is a shared problem among rural hospitals in Uganda, and it is difficult to solve it immediately. In response to this problem, it is considered effective for the four eastern districts to cooperate with each other with regard to follow-up operations by holding continual and voluntary training or learning sessions, inviting skilled doctors as instructors. It is preferable that the MOH or district health offices take the initiative and promote such activities.

4.3 Lessons Learned

(1) Utilization of the soft components (training)

With regard to any project that conducts the procurement of medical equipment, it is imperative, at the time of the basic design, to take into consideration requests from doctors and technicians who will actually use them and to implement the soft components of the appropriate contents/period depending on each equipment and the experience and knowledge of the users. Thus, it is necessary to offer training that matches to user's needs rather than providing group training. For example, in the case of training intended for doctors with a certain amount of experience, two weeks of training (including weekends) for an ECG and four to six weeks of training (including weekends) training for ultrasound units will be appropriate. In addition, it is necessary to give instructions regarding the basic handling of equipment together with the usage and skills for maintenance management, in accordance with the circumstances of each country. Furthermore, it is often the case that doctors go back to their university for research or transfer to other hospitals. In this case, it is preferable that two or more doctors take the training for advanced medical equipments in order to avoid a situation in which equipment is longer used due to a turnover of the doctors who were trained.

(2) Clarification of the procurement strategy for spare parts

In many hospitals, some equipment was no longer in use due to the lack of spare parts although the equipment itself was not yet broken. For example, operating room lights were utilized while missing some bulbs since they could not be purchased locally. In order to avoid such situations, it is necessary for the provision of medical equipment to clarify the procurement strategy for spare parts and choose medical equipment that can be utilized locally over the long term.