The Republic of Uganda

FY2018 Ex-Post Evaluation of Japanese ODA Grant Aid Project

"The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Western Region in Uganda"

External Evaluator: Ms. Hisae Takahashi, Ernst & Young ShinNihon LLC

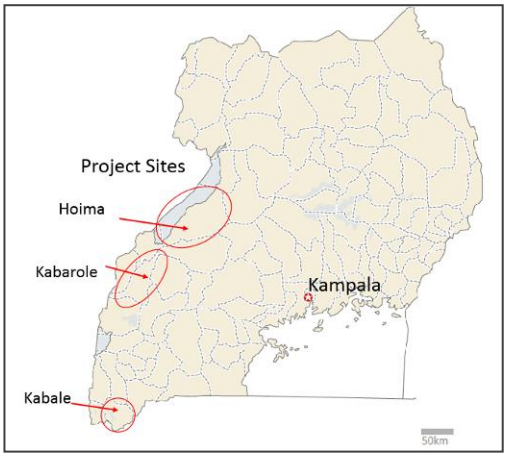
0. Summary

The objective of the Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Western Region in Uganda (the Project) is to improve services provided by Regional Referral Hospitals (RRH) [1] in the Western Region of Uganda by constructing facilities and procuring equipment for the RRH in this region, and thereby contribute to increasing the accessibility to, and quality of, regional medical services and ensuring that the regional referral system functions effectively. Its purpose is well in line with the development plan and sector strategy of Uganda, which emphasize health service improvement and health infrastructure development, as well as the need to develop the facilities and equipment of regional medical institutions for the improvement of basic indicators in the health sector, in addition to Japanese aid policy. Therefore, the relevance of the Project is high. Though the cost of the Project was within the plan, the Project period exceeded the plan because of poor bidding, the period from the conclusion of the contract with the contractor to the start of the construction was not included in the plan, and the completion date was delayed due to the circumstances of the recipient country. Thus, the efficiency is fair. With the improvement of medical facilities and equipment, it has become possible to provide efficient services at the target RRH, as evidenced by the expanded range of medical examinations and shortened waiting times. In addition, the Project has contributed securing sufficient medical examination and waiting spaces and improvement of the hygiene environment. On the other hand, targets such as for the number of outpatients and operations, which were expected to increase at the target RRH, were not achieved (excluding at some RRHs) as there were facilities and equipment that have not been fully utilized due to medical staff shortages, and activities to strengthen lower-level hospitals to reduce RRH congestion. The strengthening of the function of lower-level hospitals and the reduction of RRH congestion have also contributed to the improvement of accessibility to, and quality of, health services, and the effective functioning of the regional referral system. Thus, the Project has achieved its objectives to some extent, but some effects of the Project were limited. Therefore, effectiveness and impacts due to the implementation of the Project are fair. Some minor problems have been observed in terms of the institutional/organizational aspect, technical aspect, financial aspect and current status. Therefore sustainability of the Project effects is fair.

[1] Health services in Uganda, where a hierarchical referral system is formed, are provided by the national hospitals as the highest-order medical facility, RRHs, general hospitals, and health centers. However, patients can go to any facility at their own discretion and often visit RRHs or national hospitals directly.

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

1. Project Description



Project Locations

Outpatients Department Building of the Hoima RRH

1.1 Background

At the time of the Project planning, Uganda was still a country which displayed high mortality rates, with the infant mortality rate at 54 per 1,000 live birth (2011), the under-five mortality rate at 90 per 1,000 live birth (2011) and the maternal mortality ratio at 310 per 100,000 live birth (2010)[2]. It was considered that these issues were attributed to the limited access to health services of impoverished people, particularly the socially vulnerable such as women and children in rural areas. The Government of Uganda (GoU) made efforts through actions such as establishing free medical care system, improving the rate of accessibility to medical facilities by increasing their numbers, and strengthening medical delivery services from the community level to the district level, etc. These efforts produced certain tangible outcomes, such as the ratio of the population having access to a medical facility within 5 km from their houses increasing from 49% (1999) to 72% (2004)[3]. Nevertheless, there were still a lot of medical facilities that were in need of rehabilitation and improvement to their facilities and equipment. Thus, the improvement of medical infrastructures was continuously emphasized in government's policies. Along with the policy of GoU which took a gradual approach promoting facility improvements divided by regions, "The Projects for the Rehabilitation of Health Facilities and Supply of Medical Equipment in the Eastern Region" (2006) and "The Projects for the Rehabilitation of Health Facilities and Supply of Medical Equipment in the Central Region" (2011) were conducted with grant aid from Japan. Following the one in the central region, GoU requested assistance in developing medical facilities and equipment in the western region. In response to this request, the Project was implemented to enhance the function of medical services in the target RRHs,

[2] Source: Preparatory survey report 2 and *Annual Health Sector Performance Report 2016/17*
[3] Source: Preparatory survey report 2

which play important roles in the western region in Uganda by constructing facilities and procuring equipment, thereby contributing to upgrading the quality of regional medical services, improving the accessibility to the medical facilities, and establishing a more efficient and effective regional referral system.

1.2 Project Outline

The objective of the Project is to improve services provided by RRH in the major areas of Western Region of Uganda by constructing facilities and procuring equipment for the RRH in this region, and thereby contribute to increasing the accessibility to, and quality of, regional medical services and ensuring that the regional referral system functions effectively.

Grant Limit / Actual Grant Amount	1,817 million yen / 1,746 million yen
Exchange of Notes Date /Grant Agreement Date	November 2013 / November 2013
Executing Agencies	Health Infrastructure Division, Ministry of Health (MOH), Kabale RRH, Hoima RRH and Fort Portal RRH
Project Completion	December 2015
Target Area	Western region of Uganda (Hoima city of Hoima district, Kabale city of Kabale district and Fort Portal city of Kabarole district)
Main Contractors	Iwata Chizaki, Inc. (Civil works) Sirius, Inc. (Equipment)
Main Consultants	Yokogawa Architects & Engineers, Inc./ Intem Consulting, Inc. (JV)
Preparatory Survey	May 2011- March 2012, June - October 2013
Related Projects	【Technical Cooperation】 ・Improvement of Health Infrastructure Management in Uganda (2006- 2009） ・The Project on Improvement of Health Service through Health Infrastructure Management Phase 1 (2011-2014), Phase 2 (2016 -2020 (plan)) 【Japan Overseas Cooperation Volunteers】 ・Two nurses each at Hoima RRH and Kabale RRH : (2013- two years, 2016- two years), one medical equipment (2016- two years) 【Grant Aid】 ・The Project for Improvement of Health Care Service System in Soroti Region (2003) ・The Project for the Improvement of Health Facilities and Supply of Medical Equipment in the Eastern Region (I) (2005), (II) (2006) ・The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region in Uganda (2010)

	・The Project for the Improvement of Regional Referral Hospitals in Northern Uganda (2018) 【African Development Bank】 ・Support to the Health Sector Strategic Plan Project (SHSSPP) I (2001-2005), SHSSPP II (2008-2013) 【World Bank】 ・Uganda Health Systems Strengthening Project (2010-2015) 【African Development Fund, Nigerian Trust Fund】 ・Improvement of health services delivery at Mulago Hospital and the city of Kampala project in Uganda (2011-2015)

2. Outline of the Evaluation Study

2.1 External Evaluator

Hisae Takahashi, Ernst & Young ShinNihon LLC

2.2 Duration of Evaluation Study

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

Duration of the Study: August, 2018 – August, 2019

Duration of the Field Study: October 24 – November 14, 2018

2.3 Constraints during the Evaluation Study

Since patients who were infected by the Crimean Congo haemorrhagic fever, an infectious disease, were transported to the Fort Portal RRH during the site survey, neither the evaluator nor the local consultant could continue the survey at the Fort Portal RRH. Therefore, the interview survey etc., at this RRH could not be completed. Hence, the judgment of the evaluation was mainly made based on the answers to the questionnaire.

3. Results of the Evaluation (Overall Rating: C[4])

3.1 Relevance (Rating: ③[5])

3.1.1 Consistency with the Development Plan of Uganda

At the time of the Project planning, *the National Development Plan (2010/11-2014/15)*, the development policy of Uganda, raised "improving accessibility to high quality social service" as a long-term objective. In the health sector, it was mentioned that a lack of equipment and the deterioration of facilities were a limitation on improving their performance. Hence priority was given to repair, maintenance and proper use of facilities, and purchase of equipment as one

[6] Source: MOH, *National Development Plan (2010/11-2014/15)*

[6] Source: MOH, *National Development Plan (2010/11-2014/15)*

strategy in order to provide high quality health services[6]. In addition, *the Health Sector Strategic Investment Plan (2010/11-2014/15)*, which was formulated under *the Second National Health Policy (2010/11-2019/20)*, indicated measures to address the challenges in the health sector and clearly placed emphasis on developing health infrastructure[7].

The Second National Development Plan (2015/16-2019/20) as of the ex-post evaluation indicates human capital development as a priority goal, and in order to improve health services included in the objective of the Plan, states refurbishing existing health facilities and providing appropriate medical equipment as a measure to achieve this goal[8]. *The Health Sector Development Plan (HSDP) (2015/16-2019/20)*, published based on the above *Second National Development Plan*, also set "promoting the achievement of universal health coverage" as a goal, with the purposes of "providing equal, safe and sustainable health services" and "strengthening competitiveness at the regional and international level of health sector," among others. In the plan, (1) governance and partnership, (2) service provision system, (3) health information, (4) health finance, (5) health-related products and technologies, (6) health human resources, and (7) health infrastructure are listed in the priority sectors for investment[9]. In addition, the plan was formulated by incorporating the review results of the sector plan *Health Sector Strategy and Investment Plan* at the time of planning.

As mentioned above, in development strategies of Uganda, improvement of health services has been included in the long-term goal from the time of planning to the time of ex-post evaluation, thus the consistency with the Project, which implemented infrastructure and equipment development of regional hospitals to improve health and medical services, can be confirmed. The sector plan of the health sector also has emphasized health infrastructure development, and specified them as a sector for the investment, meaning that it is consistent with the purpose of the Project to support infrastructure and equipment development at RRHs.

3.1.2 Consistency with the Development Needs of Uganda

At the time of the Project planning, it was necessary to improve infant mortality ratio, under-five mortality ratio, maternal mortality ratio, delivery at health facilities, etc. to achieve the Millennium Development Goals (MDGs) by 2015 in Uganda[10]. These were caused by the limited access to medical services by the poor in the region, especially women, children and other socially vulnerable people. Improving those situations and dealing with diseases that could be treated and prevented reliably were considered urgent issues in the health sector. In

[6] Source: MOH, *National Development Plan (2010/11-2014/15)*
[7] Source: Preparatory survey report 2
[8] Source: MOH, *Second National Development Plan (2015/2016-2019/20)*
[9] Source: Questionnaire answers and MOH, *Health Sector Development Plan (2015/2016-2019/20)*
[10] As described above, for example, the infant mortality ratio was 54/1,000 for the MDGs target value of 31/1,000 (2011 data), and the mortality ratio for children under five was 90/1,000 for the same target value of 58/1,000 (2011 data). Source: Preparatory survey report 2 and MOH, *Annual Health Sector Performance Report 2016/17*.

particular, a system was formulated to allocate the national budget to RRHs because the facilities and equipment of RRHs, which play a central role in regional medical care, were severely deteriorated and insufficient. However, large-scale facility construction and equipment procurement could not be achieved due to the limited amount of the budget. At the time of ex-post evaluation, basic indicators in the health sector (infant mortality ratio, under-five mortality ratio, maternal mortality ratio) have improved compared to the time of planning. However, the target values (2020) indicated by the health sector plan in Uganda have not yet been achieved except for infant mortality ratio (see Table 1), thus improvement of medical services is still needed as at the time of ex-post evaluation.

Table 1 Basic indicators of Health Sector in Uganda

	At the time of planning (2011)	At the time of ex-post evaluation (2016)	HSDP Target (2020)
Infant mortality ratio (per 1,000 birth)	54	43	44
Under-five mortality ratio (per 1,000 birth)	90	64	51
Maternal mortality ratio (per 100,000 birth)	438	336	320

Source: Preparatory Survey Report 2 and MOH *Annual Health Sector Performance Report 2016/17*

In addition, prior to the implementation of the Project, support for constructing medical facilities and procuring equipment had been conducted to RRHs in the eastern and central regions through grant aid. At the time of the Project planning, MOH indicated that the western region was high-priority because the facilities and equipment were severely deteriorated, and even at the time of the ex-post evaluation, the area, with a large covered population[11], has accepted refugees from neighbouring countries such as South Sudan and Congo. Accordingly the importance of expanding the medical facilities in the western region has remained high.

3.1.3 Consistency with Japan's ODA Policy

The Country Assistance Policy for Uganda (2012) identified "living environment improvement (health and water supply)" as a priority area, and the Project was positioned as a "health service enhancement program" under the development issue of "health service improvement". Specifically, dealing with improving and expanding medical facilities and equipment of RRHs was clearly stated, meaning that the Project was consistent with Japan's ODA policy.

[11] The number of refugees from neighboring countries in Uganda has increased from approximately 400,000 as of September 2014 to 1,190,922 as of December 2018. During the same period, the number of refugees in the settlement area in Hoima, the target area, also increased from 40,097 to 87,906. Source: Website of United Nations High Commissioner for Refugees https://data2.unhcr.org/en/situations as of January 27, 2019.

In the light of above, the Project has been highly relevant to the Uganda's development plan and development needs, as well as Japan's ODA policy. Therefore its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

(1) Japanese side

The main output of the Project consists of health facilities construction at the Hoima RRH and the Kabale RRH, procurement of medical equipment for these RRHs in addition to the Fort Portal RRH, and consulting service/soft component (Training program) in the Western Region of Uganda. Tables 2 through 5 show the plan and actual output of the Project.

【Facility construction and equipment procurement】

Table 2 Planned and actual output (Hoima RRH)

Item	Plan	Actual
Outpatient Department Building (OPD)	Ground floor（760.00m^2） Reception, Laboratory, Pharmacy, Staff room, Consultation rooms (gynaecology/obstetrics, paediatric), Ear･Nose and Throat (ENT) clinic, Patient toilet, etc.	As planned
	First Floor（778.00m^2） General OPD, Specialized OPD, Dental unit and HIV consultation rooms, Patient toilet, etc.	As planned
Operation Theatre (OT) /Maternity Ward	Ground floor（810.00m^2） Operation department: OT (2), High Dependency Unit (HDU), Recovery room, Staff locker room, OT hall, Centralized Supply Sterilized Department (CSSD) Casualty department: Emergency room, Triage/Clinic, Resuscitation room, Office, Sluice/sterilisation, Staff room, etc.	As planned
	First Floor (699.75m^2) Maternity ward(42beds), New born baby room, Maternity treatment room, Nurse station, Sluice/sterilisation, Patient toilet, etc.	Largely as planned
Power Receiving House	Ground floor (36.00m^2), Power receiving room, Generator room	As planned
Total	3,083.75m^2	As planned
Equipment for Main OT/ Casualty/HDU Equipment for CSSD Equipment for OPD Equipment for Ward Equipment for Common use	･19 items (Anaesthesia machine, Operating table, Operating light, Ventilators, Operating instrument set, etc.) ･ 3 items (Autoclave, Sterilizing container Set, etc.) ･10 items (Diagnostic set, Examination couch, etc.) ･ 2 items (Bed for ward, Infant incubator) ･ 9 items (X-ray film viewer, Nebulizer, etc.)	Largely as planned
Total	43 items	

Source: Preparatory survey report 2 and questionnaire answer from MOH

Table 3 Planned and actual output (Kabale RRH)

Item	Plan	Actual
OPD Building	Ground floor (833.20m^2) OPD: Reception, Laboratory, Pharmacy, Staff room, Patient toilet, etc. Casualty: Emergency transfer room, Triage/clinic, Resuscitation room, Minor OT, Sluice/ sterilisation, Office, Staff room, etc.	As planned
	First Floor (790.00m^2) Consultation rooms (paediatric, gynaecology, general OPD, specialised OPD), Dental unit, Patient toilet, etc.	As planned
OT/Maternity ward	Ground floor (744.00m^2) OT (3), HDU, CSSD, Recovery room, Staff locker room, OT hall, etc.	As planned
	First floor (765.75m^2) Maternity ward (42 beds), Delivery room (5), New born baby room, Nurse station, Sluice/sterilisation, Patient toilet, etc.	Largely as planned
Total	3,132.95m^2	As planned
・Equipment for Main OT/Casualty/HDU ・Equipment for CSSD ・Equipment for Delivery room ・Equipment for OPD ・Equipment for Ward ・Equipment for Common use	・24 items (Anaesthesia machine, Operating table, Operating light, Ventilators, Operating instrument set, etc.) ・ 3 items (Autoclave, Sterilizing container set, etc.) ・ 3 items (Delivery bed, Doppler, etc.) ・10 items (Diagnostic set, Examination couch, etc.) ・ 2 items (Bed for ward, Infant incubator, etc.) ・11 items (X-ray film viewer, Nebulizer, etc.)	Largely as planned
Total	53 items	

Source: Preparatory survey report 2 and questionnaire answer from MOH

Table 4 Planned and actual output (Fort Portal RRH for the equipment)

Item	Plan	Actual
Equipment for Main OT/ Casualty/HDU Equipment for CSSD Equipment for Delivery room Equipment for OPD Equipment for Ward Equipment for common use	・17 items (Anaesthesia machine, Operating table, Operating light, Ventilators, Operating instrument set, etc.) ・ 2 items (Autoclave, Sterilizing Container set) ・ 2 items (Doppler) ・ 5 items (Diagnostic set , Examination couch, etc.) ・ 1 item (Infant incubator) ・ 8 items (X-ray film viewer, Nebulizer, etc.)	As planned
Total	35 items	

Source: Preparatory survey report 2 and questionnaire answer from MOH

As mentioned above, although the supported items and their content were largely as planned, the ceiling fans for the OT/Maternity ward were cancelled, and the installation place of the elevated water tank for the facility constructions and the model of the audiometer were changed for the procured equipment. The reasons for the changes and the

existence of any impact are as follows. There were no differences in the expected outputs and the functions of the equipment regarding any of the changes. It was therefore judged that the changes were reasonable.

【Changes of output (facility/equipment)】

① Cancellation of the ceiling fans of OT/Maternity ward at the Hoima RRH and the Kabale RRH

(Reason) It was cancelled because the ceiling fans might blow around linen and other materials which causes the danger to the patients, and it might spread dust and create an unsanitary environment. Furthermore, air conditioning was installed in the OT ward, and the Maternity ward had a well-ventilated design, and it was therefore judged that the installation of fans was not essential[12]. No issues were confirmed at the time of site survey of the ex-post evaluation.

② Changing the installation place of the elevated water tank in OT/Maternity ward in the Hoima RRH

(Reason) The initial planned location (the elevated water tank in the attic) was inconvenient for maintenance as it would be necessary to demolish the roof when it must be replaced. It can therefore be considered a reasonable change taking into account future maintenance. During the site survey, it was confirmed with the person in charge of operation and maintenance whether problems with operation and maintenance had occurred due to the change in the installation location, who answered that no such problems had occurred.

③ Change the berm of all the building to gravel layer at the Hoima RRH and the Kabale RRH

(Reason) The change was made to compensate for the construction budget shortage due to exchange rate fluctuations and keep the Project cost within the plan. It was planned to use concrete for the berm in order to simplify maintenance such as cleaning of the lower part of the outer wall as it would become dirty due to rain splatter. However, it was determined that this could be also be achieved with a gravel layer. It was confirmed that the change was within the boundaries necessary to achieve the objectives. It was also confirmed during the site survey that no problems had been caused.

④ Change of the model number of audio meter

(Reason) The change was made since the model planned to be used at the time of planning was discontinued. Therefore, it can be judged as an unavoidable change. The replaced

[12] Documents provided by JICA, Hoima RRH and interview to the Consultant

model after the change meets all the specifications for bidding, and the measurement range is wider than the planned model. Thus, no issues have been caused due to this change.

【Consulting service/Soft component (Training program)】

In the Project, trainings for medical personnel at each RRH were implemented to drive continued use of the procured equipment. Trainings for operation and maintenance of procured equipment were planned, such as confirmation of basic knowledge about the role and function of each equipment, daily and periodic maintenance methods, and technical guidance in clinical practice. It was then confirmed through questionnaires to the executing agency and consultants that those trainings were implemented as planned. Although the actual number of participants in the trainings slightly exceeded the plan, this was due to the fact that the number of participants required was determined anew in consultation with the RRH before the start of the trainings. Thus, this change was made based on the result for the number of people required for operation and maintenance, and the increase is considered appropriate.

Table 5 Planned and actual output (Training contents and number of participants)

Training contents	Plan	Actual
1. Maintenance technique	Basic knowledge, method of daily and periodic maintenance of procured equipment, failure diagnosis and handling technics	As planned
2. Clinical technique	Functions and roles of procured equipment, appropriate handling technics that are tailored to the situation of the patient	As planned
3. CSSD	Improvement of the system of CSSD and operation/management techniques for procured equipment	As planned
Number of participants for trainings at each RRH		
Hoima	Approximately 30	42
Kabale	Approximately 30	37
Fort Portal	Approximately 30	32

Source: Preparatory survey report 2, questionnaire answer from MOH, document provided by consultant

(2) Obligations of Ugandan side

The following eight items were planned to be covered by the Ugandan side.

1) Application for land acquisition of building permits regarding the Project

2) Procedures for the Bank Arrangement (B/A) and issuance of Authorization to Pay (A/P), and bearing of commission fees associated with them

3) Landing of imported materials and equipment cargos at the port, procedures for exemption of duties, Customs clearance, and assurance thereof, and securing of domestic transportation

4) Provision of convenience necessary for entry to and stay in Uganda to the Japanese nationals who are employed to execute provision of facilities and equipment, and execution of other works according to the verified contract

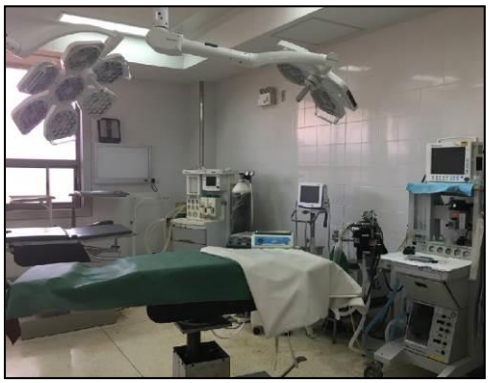
5) Exemption of all duties and taxes in Uganda to the Japanese nationals who are employed to execute provision of facilities and equipment, and execution of other works according to the verified contract

6) Securing of the budget required for effective use and maintenance of the facilities and equipment constructed and procured in the Project

7) Procedures, contracts and installation fees for power supply, telephone services, water supply and sewage for the Project facilities

8) Provision of land necessary for construction work (temporary material yard)

It was confirmed through the questionnaire answers from MOH and consultant that of the above, except 6) securing of the budget required for effective use and maintenance of the facilities and equipment, the planned items were implemented as planned[13].



Constructed OT (Hoima RRH)

Constructed Maternity ward (Kabale RRH)

3.2.2 Project Inputs

3.2.2.1 Project Cost

The Japanese side covered a cost of 1,746 million yen against the Exchange of Notes (E/N) limit of 1,817 million yen, which was within (97% of) the plan. This is because the bid price was below the planned price. The planned cost of the Project, including the burden of approximately 14 million yen on the Uganda side, was 1,831 million yen, but the total Project cost could not be compared because the records of the expenditure on the Uganda side could not be ascertained. However, since Uganda's burden was largely implemented as planned (see "3.2.1 Project Outputs"), it is considered that expenditures were made as planned.

[13] Item 6) is essentially the cost incurred after the Project implementation. Related information is described in "Financial Aspect of Operation and Maintenance" of Sustainability.

3.2.2.2 Project Period

The Project period[14] was planned to be 23 months, but actually it took 26 months from November 2013 to December 2015, which exceeded the plan (113% of the plan). The reasons for the delay were that the first bid failed; the schedule at the time of planning indicated work would start immediately after contracting with the contractor, while in practice it generally takes a certain amount of time for preparation, and the Project also took two months to prepare; in addition, although the completion of construction at the site was in November 2015, the completion ceremony (handing over) was performed in December of the same year due to the MOH's circumstances, which caused a delay of one month[15].

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

3.3 Effectiveness and Impacts[16] (Rating: ②)

3.3.1 Effectiveness

The Project constructed medical facilities at the Hoima RRH and the Kabale RRH and procured equipment to these RRHs in addition to the Fort Portal RRH. The number of outpatients, operations, emergency patients, and deliveries were set respectively as operation and effect indicators for each RRH depending on the supported Project scope. In addition, since the operation and effect indicators provided by each RRH varied in each year in measuring the achievement, the average value for three years after completion is also described[17] in addition to the results after three years of project completion, and it is used as a reference for comparison with the baseline.

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

(1) Hoima RRH (Target building components: OPD, OT and casualty[18])

The number of outpatients at the time of ex-post evaluation (2017/18) increased to 150,990 cases and 143,447 for the average for three years after completion, which exceeded the target

[14] The project period is defined from the month of G/A to the end of completion of the construction.
[15] According to the consultant, in Africa, it is realistic to initially expect about two months in the plan from the beginning as a preparation period for procedures relating to construction work after entering into an agreement with a contractor.
[17] Based on the fact that the plan of the constructed facilities was formulated based on the average for the last three years when planning the Project considering the same reasons, the three-year average value after project completion were applied in a same manner.
[17] Based on the fact that the plan of the constructed facilities was formulated based on the average for the last three years when planning the Project considering the same reasons, the three-year average value after project completion were applied in a same manner.
[18] Maternity ward is included in the target building components but the delivery room is not included, therefore the area will not be incorporated as one of the target sections.

(146,900). The number of operations at the time of ex-post evaluation which was 96% of the target (4,500), but the average for three years after completion was 3,567 which was 79% of the target. On the other hand, the number of emergency patients at the time of ex-post evaluation reached only 1,675, 36% of the target (4,600 cases) and the average for three years after completion shows largely the similar (38% of the target). At the Hoima RRH, thanks to the construction of the OPD and the increase in the number of operation rooms, the number of outpatients and operations increased. However, doctors were not placed in the emergency transfer room handling emergency patients, and emergency patients are directly transported to each medical department. Hence, it is thought that inability to accurately grasp the number of emergency patients may be a cause of the number of emergency patients falling below the target[19].

Table 6 Hoima RRH: Number of outpatient, operation and emergency patients

	Baseline	Target	Actual				
	2011	2018	2014/15	2015/16	2016/17	2017/18	Average for 3 years after completion (achievement)
		3 year after completion	Completion year	1 year after completion	2 year after completion	3 year after completion (achievement)	
No. of outpatients (case/year) Note 1	117,490	146,900	137,340	137,340	142,010	150,990 (103%)	143,447 (98%)
No. of operations (case/year) Note 2	3,602	4,500	3,297	3,495	3,567	4,301 (96%)	3,567 (79%)
No. of emergency patients (case/year)	3,656Note 3	4,600	1,835	1,836	1,697	1,675 (36%)	1,736 (38%)

Source: Preparatory survey report 2, questionnaire answers from Hoima RRH

Note 1: Outpatients include general outpatient, paediatric, obstetrics, surgery, orthopaedic, dental, ENT, hyperpiesia, diabetes, and Gynaecology departments.

Note 2: Dental operations are not included.

Note 3: Baseline data of the emergency cases was much higher compared to the recorded cases for 2014/15, 2015/16 and 2016/17. HOIMA RRH explained that the emergency cases at baseline may differ from what they included in subsequent years as a possible reason.

(2) Kabale RRH (Target building components: OPD, OT, casualty, and maternity ward)

The indicators, excluding the average value of outpatients for three year after completion and number of deliveries, are 50% or less of the target value, and all indicators are below the baseline[20]. On the other hand, in the interviews[21], the medical staff answered that the number of patients, operations, deliveries, etc. were increasing, thus there is a gap between the figures

[19] Interviews to the Hoima RRH. Nurses are assigned.

[20] The actual data differs greatly from the baseline data. Kabale RRT explained that the reasons are assumed as possible issues with data accuracy, strengthen of the functionalities of lower level health facilities and low staffing.

[21] In this evaluation, an interview survey was conducted to RRH users (medical workers and patients) with the aim of supplementing information on quantitative effect. At the Hoima RRH, focus group interviews was carried out with 10 medical workers in each department. At the Kabale RRH, individual interviews were carried out in each department (operation, outpatient, obstetrics, casualty, pediatric, dental, and otolaryngology) individually. Regarding patients, individual interviews were conducted with 16 patients (eight Hoima and eight Kabale) waiting for medical treatment in the OPD, taking into consideration their condition and burden, and receiving advice from the chief of nursing.

provided by the Kabale RRH and opinions from the field. Even through the interview with the director of the RRH, no explanation or answer regarding this gap could be ascertained.

Table 7 Kabale RRH: Number of outpatient, operation, emergency patients and deliveries

	Baseline	Target	Actual				
	2011	2018	2014/15	2015/16	2016/17	2017/18	Average for 3 years after completion (achievement)
		3 year after completion	Completion year	1 year after completion	2 year after completion	3 year after completion (achievement)	
No. of outpatients (case/year) Note 1	112,990	141,200	75,996	128,023	79,793	64,983 (46%)	90,993 (64%)
No. of operations (case/year) Note 2	5,826	7,300	3,792	2,937	1,452	1,329 (18%)	1,906 (26%)
No. of emergency patients (case/year)	1,694	2,100	0 Note3	110	540	667 (32%)	439 (21%)
No. of deliveries (case/year)	5,817	7,300	4,586	4,183	3,199	3,781 (52%)	3,721 (51%)

Source: Preparatory survey report 2, questionnaire answers from the Kabale RRH

Note 1: Outpatients include paediatrics, internal medicine, surgery, orthopaedics, dental, gynaecology departments

Note 2: Dental operations are not included

Note 3: It was showed as 0 since the emergency cases at that time were admitted directly to the surgery and each wards. This has changed and the patients for emergency are currently admitted to the accident and emergency unit.

(3) Fort Portal RRH

At the Fort Portal RRH, where equipment for outpatient department, surgery department, casualty, obstetrics department, etc. was procured, maintenance (construction) of new facilities was not included in the Project, thus it was determined that it was difficult to set specific planned and target values for the increase in the number of patients in each department[22]. Therefore, only the number of outpatients was set as the effect indicator. Although the number of patients was confirmed to exceed the target value one year after completion and the average for three years after completion also reached 102% of the target, it then decreased in 2016/17 and 2017/18, and the result at the time of ex-post evaluation achieved only 52% of the target. Although the medical staff responded in the interview at this RRH that the number of patients was increasing, the RRH also answered that there is no clear reason for this inconsistency with the records at the hospital. The director cited the effects of strikes by medical workers as one of the factors.

Table 8 Fort Portal RRH: The number of outpatients

	Baseline	Target	Actual				
	2011	2018	2014/15	2015/16	2016/17	2017/18	Average for 3 years after completion (achievement)
		3 year after completion	Completion year	1 year after completion	2 year after completion	3 year after completion (achievement)	
No. of outpatients (case/year) Note 1	142,867	178,600	N.A.	262,507	191,955	92,861 (52%)	182,441 (102%)

[22] Source: Preparatory survey report 2

Source: Preparatory survey report 2, questionnaire answers from Fort Portal RRH
Note 1: Outpatients includes general outpatients, paediatric, internal medicine, surgery, orthopaedics, ophthalmology, ENT, dental, obstetrics/gynaecology departments

As mentioned above, the data for each indicator are significantly below the target except a part of operation and effect indicators, and it is also not consistent with the results of interviews with RRH medical staff. Therefore, the data provided by each RRH and comparable data from *the annual performance review report (the annual report)* issued by the MOH were confirmed. Differences between *the annual report* and the baseline data indicated at the time of the Project planning were identified. In order to maintain the consistency of the data, when confirming the data of *the annual report*, the targets were set again based on the average value of baseline data for 2010/11- 2012/2013 of *the annual report*[23] and targets were revised based on the reset baseline data, then the changes in and achievement of the data were confirmed (see table 9). As a result, in the data of *the annual report* as well, the level of achievement of the Hoima RRH is generally high. On the other hand, it was confirmed that the other indicators at the time of ex-post evaluation and also the average for three years after completion did not achieve the target.

Table 9 Operation and effect indicator of target RRHs based on the annual report of MOH

RRH	Number of patients, cases	Before project	2014/15	2015/16	2016/17	2017/18
		Baseline	Completion	after 1 year	after 2 year	after 3 year
Hoima	Outpatient	123,635	266,820	149,428	153,136	150,990
	Operation	2,158	3,594	3,741	3,747	4,301
Kabale	Outpatient	111,220	63,133	122,114	98,893	64,983
	Operation	2,077	n.a.	2,224	1,228	1,329
	Delivery	4,539	4,209	4,185	3,199	3,781
Fort Portal	Outpatient	144,582	268,549	225,322	178,966	92,862

RRH	Number of patients, cases	Average for 3 years after completion	Revised target	Achievement (%)	
				after 3 year	Average for 3 years after completion
Hoima	Outpatient	151,185	154,544	98%	98%
	Operation	3,930	2,698	159%	146%
Kabale	Outpatient	95,330	139,025	47%	69%
	Operation	1,594	2,596	51%	61%
	Delivery	3,722	5,674	67%	66%
Fort Portal	Outpatient	165,717	180,728	51%	92%

Source: MOH, *Annual Health Sector Performance Report*, each year edition
Note: Since the data before the Project implementation included data without information, the average value for 2010/11-2012/13 were used as the baseline data. In addition, the variances of the number of outpatients and operations, etc. in each RRH are intense, and the method of obtaining data is also not enough clear, thus it is necessary to take caution when making judgments using these data.

[23] In the Project, the target was set at about 1.25 times the baseline data. Therefore, in analyzing the data of *the annual report*, 1.25 times of the baseline year data was set as the revised target value. (See table 9)

Possible reasons are as follows: 1) Strikes occurred nationwide due to dissatisfaction with salary levels for medical workers in 2017, and similar situations had often arisen since then[24], 2) In order to reduce the burden and congestion of RRHs, the GoU had recommended medical treatment at General Hospitals (GH) and Health Centres (HC) by carrying out activities such as infrastructure maintenance[25] and issuing vouchers that can be used by pregnant women at lower level health institutions, 3) the malaria control campaign (distribution of mosquito nets) was developed in the western region (for outpatients), and the number of malaria cases in the outpatient department decreased, among other factors[26].

In addition, it has been pointed out that the influx of refugees has affected the increase in the number of patients at the Hoima RRH[27]. In Uganda, the number of refugees has increased sharply due to armed conflict in the capital city of South Sudan since July 2016. There is a refugee settlement in Hoima, and refugees are permitted to use hospital facilities in the same manner as Ugandans. This greater-than-expected increase in the number of users is thought to have had an effect.

3.3.1.2 Qualitative Effects (Other Effects)

At the time of the Project planning, it was assumed that "regional health and medical services would improve, resulting in increased user satisfaction" through the development of health facilities and procurement of equipment. Through interviews and site surveys at each RRH, it was confirmed that the improvement of the quality of medical examination and treatment as well as the facility environment, such as waiting rooms and toilets, has contributed to the increase of user satisfaction thanks to the development of medical facilities and procurement of equipment. The findings are confirmed as follows.

(1) Quality of inspection and treatment

The environment of each RRH has improved as shown below through the construction of OPD, OT and maternity ward and the use of new equipment.

- Increase in the number of operations and secure the time for cleaning through expansion

[24] In 2017, the president dispatched a military doctor to a government-based hospital where medical staff strikes had been affecting medical services. Source: "Uganda brought to its knees as doctors' strike paralyses health service", The Guardian, dated September 2, 2017. URL address https://www.theguardian.com/global-development/2017/nov/16/costing-lives-doctors-strike-health-service-uganda (Accessed December 25, 2018)

[25] With the strengthening of lower level hospitals, the number of RRH outpatients has tended to decrease. On the other hand, this can be interpreted as the medical treatment that should have originally been handled by RRH now being carried out as described later in "3.3.2.1 Intended Impact" and that high quality health service can now be provided.

[26] Based on the questionnaire answer from MOH

[27] As described in footnote 11, a large influx of refugees has been reported at Kyangwali settlement in Hoima.

of OT

Thanks to the implementation of the Project, the number of operation rooms increased from one to three at both the Hoima RRH and the Kabale RRH. With this increase, an environment for performing more operations has been established, and it has become possible to cope with many patients (though only the Hoima RRH has increased the number throughout the year). Moreover, it is currently possible to secure enough time to clean the operating room and check the instruments between surgeries. (Hoima RRH and Kabale RRH)

- Provision of treatment for patients in severe condition through HDU development

Thanks to the development of HDU, it has become possible to receive and treat patients with serious cases at each RRH without referring them to another hospital. (Hoima RRH, Kabale RRH)

- Safe care following the establishment of maternity ward

Before the implementation of the Project, due to the lack of space and beds, patients in prenatal and postnatal had to be hospitalized in the same unit. New constructions of maternity wards have made it possible to divide the sections by prenatal, normal/caesarean delivery, and mothers for whom more than 24 hours have elapsed since delivery, enabling efficient and appropriate nursing (Hoima RRH and Kabale RRH). In addition, the increase in space and the procurement of incubators and other equipment have increased the number of cases of caesarean delivery and delivery of premature infants[28]. (Hoima RRH, Kabale RRH and Fort Portal RRH).

(2) Improving the environment of facilities other than medical facilities including waiting rooms and toilets, etc.

The establishment of the OPD improved the environment of the facilities as shown below.

- Securing enough waiting space

Before the OPD was newly constructed, the waiting room was narrow, hence it was an environment where patients had to wait outside the OPD. After the development of the facilities, sufficient space was secured, and the patients mentioned that they could wait for medical treatment in a comfortable environment. In addition, chairs were installed in the waiting room of the OPD, the hygienic problem of sitting straight on the floor and waiting

[28] Based on interview with RRH. Although data on premature infant delivery were not available, according to *Annual Health Sector Performance Report*, when the number of cesarean birth section was compared between the Project completion year (2015/16) and the ex-post evaluation (2017/18), it increased from 2,471 to 2,660 in Hoima RRH and from 2,176 to 2,224 in Fort Portal RRH. On the other hand, it decreased from 1,553 to 992 in Kabale RRH, but in the Kabale RRH, the number of deliveries after implementation was also lower than before the implementation, as shown by in Quantitative Effects. As a result, a trend toward a decrease in the number of patients has been confirmed as a whole due to the effect of strengthening medical facilities in the surrounding area, etc.

for examination has been improved. (Hoima RRH and Kabale RRH)

- Improvement of hygiene and hospital infection

In addition to the installation of toilets, the securing of sufficient space, and the introduction of the Central Supply and Sterilization Department (CSSD) system, the continuation of the 5S activities led by Japan Overseas Cooperation Volunteers (JOCV) have improved the hygiene environment dramatically. Ensuring sufficient space and a clean environment have also contributed to reducing the incidence of nosocomial infections. (Hoima RRH, Kabale RRH, Fort Portal RRH)

- Shortened waiting time

The waiting time for patients has been significantly reduced by the efficiency of medical treatment and treatment accompanying medical treatment using new equipment, setting the reception and increase of the number of consultation rooms. According to interviews with patients, the waiting time, which was 5 or 6 hours in the past, is about 2 hours after the Project implementation at the Hoima RRH, and the average of about 8 to 9 hours was reduced to 2 to 3 hours at the Kabale RRH (though it differs according to the content of medical inspection and treatment. (Hoima RRH and Kabale RRH))

3.3.2 Impacts

3.3.2.1 Intended Impacts

(1) Improvement of function as referral hospital

The Project aimed to improve the referral system through the effective functioning of the target RRH as regional top referral hospitals. Looking at the number of patients referred from lower level hospitals to RRH, except for the Kabale RRH, where the total number of patients decreased significantly, the results at the time of ex-post evaluation of the Hoima RRH slightly increased from those immediately after the Project completion, and it increased more than four times at the Fort Portal RRH (see table 10). The reasons behind these increases were that efficient medical treatment became possible due to the use of new equipment and that the adequacy of equipment has indirectly contributed to the acceptance of a wide variety of patients, as already stated in the section on effectiveness. In addition, the GoU has promoted activities to alleviate congestion at RRHs, and patients who can be treated in lower level hospitals will be treated at lower level hospitals. Thus, due to the improvement of lower level hospitals, RRHs can reduce congestion, making it possible to offer the advanced treatment RRHs should be providing. Therefore, this is considered to be a result of achieving certain results toward improving the quality and access of regional health and medical services along with the efforts of the MoH.

Table 10 Trend of the number of referred patients from lower level hospitals

	2014/15	2015/16	2016/17	2017/18
Hoima RRH	N/A	6,332	8,468	7,182
Kabale RRH	1,396	1,436	455	377
Fort Portal RRH	1,628	4,195	7,174	N/A

Source: Questionnaire answer from each RRH

Also, in interviews with medical staff, it was explained that the installation of the operating room and the HDU, and the procurement of the equipment accompanying it, in particular have established the environment for treating urgent or severe patients in the hospital, and the need to refer those patients to other hospitals such as national hospitals has been reduced. At the Hoima RRH, the number of patients is increasing as a whole, and the number of referred patients increased from 261 to 367. However, it decreased from 225 to 207 at the Kabale RRH and from 153 to 138 at the Fort Portal RRH compared with before and after the Project implementation. Thus it was confirmed that the number of patients transferred from both RRHs to other hospitals decreased by about 10%[29].

(2) Improvement of health indicators (maternal and new born baby mortality) in the targeted RRH jurisdiction areas

The development of maternity wards and equipment such as incubators in RRHs is considered to have contributed to the improvement of maternal and new born baby mortality ratio to a certain extent. Although the maternal mortality rate worsened at the Hoima RRH and the Fort Portal RRH, the rate of increase in the number of deliveries (147%) greatly exceeds the increase in maternal mortality (104%) at the Hoima RRH. At the Fort Portal RRH, although the increase in maternal mortality rate (147%) was higher than the increase in number of deliveries (120%), the number of patients accepted from lower level hospitals has more than quadrupled, thus it is thought that the situation that serious cases of pregnant women are more likely to be taken to RRHs affected.

[29] Based on MOH, questionnaire answers from RRH, and interviews to each RRH during the site survey

Table 11 Improvement of maternity and new born baby mortality ratio by construction of health/medical institution

RRH	Maternal mortality ratio (per 100,000 live births)		Infant Mortality rate (per 1,000 live births)	
	Before the Project 2013/14	After the Project 2017/18	Before the Project 2013/14	After the Project 2017/18
Hoima	606	632	38	35
Kabale	145	132	24	13
Fort Portal	523	771	24	22

Source: MOH, *"Annual Health Sector Performance Report"* each year edition

(3) Improvement of accessibility to and quality of regional medical services

RRHs in the target area have expanded the range of medical services that can be provided, and improved the hospital environment through facility development and equipment procurement. The MOH has also promoted the upgrading of nearby GHs and HCs, and by reducing congestion of RRHs, the waiting time for medical treatment has been shortened and the environment for providing treatment for patients who should be treated at RRHs has been improved. As seen by the tendency to move forward, the accessibility and quality are on the way to improvement. On the other hand, it has been reported that the target RRHs have not been able to fully utilize them due to the lack of medical staff and staff with advanced, specialized skills and experience. Therefore, not only the contribution of the Project, but also the effects of the efforts of the MOH are considered to have been significant.

3.3.2.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

The Project consists of hospital construction and equipment procurement in the existing hospital sites, thus at the time of planning, no particular undesirable environmental and social impacts were expected. Through questionnaires and interviews with the MOH and target RRHs, it was confirmed that there was no negative impact on the natural environment due to the construction of facilities during and after actual project completion. However, points to be considered for the sewage and solar system of the Hoima RRH and the Kabale RRH, where facilities were constructed, were indicated. The details and response are as follows.

Table 12　Considerations regarding installation of sewage and solar system indicated at the time of planning

Consideration	
Sewage	
Hoima RRH	Wastewater from the OPD Block and the OT/maternity ward are treated in a septic tank, which is popular treatment method locally. Then treated wastewater are seeped underground within the site ground via a percolation pipe.
Kabale RRH	The wastewater from the OPD/Casualty block and OT/maternity ward are connected to the hospital's sewerage pipe and discharge into the city main sewer.
Solar system	
Hoima RRH	Consumption of electric power is expected to be suppressed by introducing the solar heater system.
Kabale RRH	

Source: Preparatory survey report 2

Installation of drainage and solar heating system was implemented as planned at both the Hoima and the Kabale RRHs. However, at the time of the ex-post evaluation, it was reported that in the Hoima RRH, the existing drainage system had been clogged and the waste water was exuding to the surface[30]. As restoration would be expensive, the Hoima RRH has been considering constructing a lagoon to bypass the old system and connect it to the sewers of the main town. The solar heater system has a problem with the connection from the solar panel, and both RRHs were not using them at the time of ex-post evaluation[31]. According to the plumber at the Hoima RRH, there is no drawing of the facility in the hospital, and it is difficult to grasp the current situation, so it has taken time to address. A consultant pointed out that the drawings should have been passed to the hospital at the time of handing over, thus, it might not have been handed over at the time of transfer of person in charge.

(2) Resettlement and Land Acquisition

Facilities were constructed on the premises of the existing Hoima and Kabale RRHs. Therefore, no resettlement and land acquisition took place due to the Project implementation[32].

[30] Since there is a certain distance from the OPD and wards in the corresponding area, it was confirmed during the site survey that no damage to medical personnel and patients has occurred.
[31] Through interviews with persons in charge of maintenance at both RRHs during site visits, it was explained that they do not consider repairing them immediately as there's the budget constraints and it is not clear how to respond them.
[32] Based on the questionnaire answers from the Hoima and Kabale RRHs.

With the improvement of medical facilities and equipment, the scope of medical examinations has been expanded at the target RRHs, and it has become possible to provide efficient services such as shortening of waiting time. In addition, it has contributed to securing sufficient spaces for medical examination and waiting area and improvement of hygiene environment. On the other hand, there are facilities and equipment that have not been fully utilized due to the shortages of medical personnel, and there are also activities to strengthen lower-level hospitals to reduce the congestions of RRH, thus the number of outpatients and the operations etc. at targeted RRHs expected to increase did not reach the target except for a part of indicators. The enhancement of the function of lower level hospitals and the reduction of RRH congestion have contributed to the improvement of accessibility and quality of health services, and also functioning of regional referral system effectively. Thus the Project has achieved its expected objectives to some extent, however, generation of some effects are limited. Therefore effectiveness and impacts of the Project are fair.

3.4 Sustainability (Rating: ②)

3.4.1 Institutional / Organizational Aspect of Operation and Maintenance

Maintenance of the developed facilities and equipment are under the supervision of the Health Infrastructure Division of the MOH, and actual maintenance activities are carried out by the medical staff of RRHs and regional workshops attached to RRHs[33]. Repairs of facilities and equipment have been carried out within the workshop if possible, or through private agencies as needed.

In terms of operation, a lack of human resources in the health sector was considered a critical issue at the time of planning, thus a plan to increase the number of staff after completion of the Project was made. The number of allocated staff at the time of planning and the ex-post evaluation are shown in Table 13[34]. At the time of the ex-post evaluation, the shortage of human resources is still a serious issue, and medical staff at each RRH do not meet the planned number. Although not enough data was provided by the Fort Portal RRH, answers to the questionnaire reported a shortage in the number of staff at all three RRHs. In fact, it was also confirmed that some of the procured equipment could not have been fully utilized in the casualty department of the Kabale RRH because there were no doctors assigned. The shortage of medical human resources, especially doctors, in Uganda is an issue for the entire health

[33] Regional workshops are in charge of maintenance of facilities and equipment in GH and HC under jurisdiction area in addition to RRHs.

[34] Though the regular staff and contracted staff are allocated at each RRH, it was not discussed whether to include or exclude contract staff when obtaining information from the RRH during the ex-post evaluation. Therefore, it cannot be concluded that the number of staff at the time of ex-post evaluation shown in Table 13 has not reached to the planned number. On the other hand, even if the number of staff at the time of the ex-post evaluation exceeded the planned, it was judged at the time of the ex-post evaluation that medical staff was insufficient based on the responses on a lack of medical staff from each RRH.

sector. For example, the average number of actual allocated staff was 80% of the planned number at RRHs, 68% in GH. The shortage of doctors was particularly remarkable, which was only 58% for the whole health care facility in 2016/17[35]. Therefore, it is assumed that it cannot be solved easily, however, consideration to secure human resources should be taken to avoid a situation in which equipment is not used by planning feasible increases in staff based on the current situation, assigning personnel with similar experience or securing a sufficient handover period when transferring medical staff who have knowledge and experience[36].

Table 13 Number of staff and the increase plan at the time of planning, increase plan and actual number of staff at the time of ex-post evaluation at target RRHs

(Number of staff)

	Hoima RRH			Kabale RRH			Fort Portal		
	At the time of plan	Increase plan	At the time of ex-post evaluation	At the time of plan	Increase plan	At the time of ex-post evaluation	At the time of plan	Increase plan	At the time of ex-post evaluation
Medical officers	14	17	10	10	16	10	19	22	20
Clinical officers	21	28	25	19	25	15	24	30	
Medical technicians	3	17	3	34	37	29	21	27	N.A.
Nurses	109	128	124	114	120	118	117	126	94
Finance and admin. Staff	9	10	16	13	16	34	16	19	N.A.
Support staff	75	77	69	55	58	31	101	107	N.A.
Total	231	277	247	245	272	237	298	331	N.A.

Source: Preparatory survey report 2, questionnaire answers from each RRH

As described above, it can be said that there are concerns on Institutional / Organizational Aspect of Operation and Maintenance due to the lack of personnel, which hinders the operations of some equipment and facilities.

3.4.2 Technical Aspect of Operation and Maintenance

Medical staffs at each RRH and staffs of regional workshops have basic knowledge to conduct necessary operations and maintenance with the exception of equipment requiring high expertise and technical skills, with the follow up of the technical cooperation project. In

[35] Source: MOH, *Annual Health Sector Performance Report 2016/17*

[36] Technical cooperation, "The Project on Improvement of Health Service through Health Infrastructure Management Phase 2" (July 2016 – on going) which is ongoing at the time of ex-post evaluation, conducts trainings for maintenance on equipment for laboratories, incubators, anesthesia, electrocardiograph, infusion pump etc. It also prepares an inventory of equipment and is conducting analysis to understand the condition of each equipment. In addition, a university which specializes to train medical engineers was established in Uganda, and 16 graduates were graduated for the first time in 2016, and it was confirmed that one was assigned to Fort Portal RRH. As an approach to support both securing personnel who can use equipment and carrying out daily maintenance is essential, based on the outputs of the technical cooperation project, it is necessary to continue the efforts by the Ministry of Health in the future.

addition, how to use general equipment, sorting and management methods and organizing of equipment, and cleaning of facilities have been continued with the support of 5S activities by JOCV even after the Project completion, which have contributed to the improvement of the situation such as handling and managing equipment properly.

On the other hand, regarding equipment with advanced functions (such as ventilator, suction machine, infusion pump, defibrillator, patient monitor, etc.), due to a shortage of medical staff who have the expertise and experience to handle those equipment appropriately, it has been confirmed that the equipment has not been fully utilized. The main factors are that the training time provided in the Project was limited (about one week of user training), so it only shared the basic knowledge on operation and maintenance technology, and medical staff who received the training are not enrolled at the target RRHs due to retirement, job change, or transfer, and that there was no handover period due to lack of personnel.

3.4.3 Financial Aspect of Operation and Maintenance

The budget for each RRH is increasing as shown in Table 14. On the other hand, according to staff at each workshop, the maintenance budget is about 1/4 to 1/3 for implementing appropriate maintenance, thus it cannot be said that a sufficient amount of budget has been allocated. This has resulted in a continued situation in which it is difficult to purchase spare parts and consumables, and facilities repair will be performed once the budget is obtained. According to the interview with MOH too, there is a need to strengthen the technical and financial capacity of workshop, thus their improvement is required.

The reason that the building maintenance costs for the Hoima and Kabale RRHs and the equipment maintenance costs for Kabale are higher than the planned amounts respectively is that the planned amount is only for RRHs while the actual amount provided by each RRH is the amount including the maintenance costs for GH and HC in the whole area where each workshop is in charge of the maintenance in addition to RRHs[37]. The operation and maintenance budget for facilities and equipment is partially allocated from the part of budget of MOH to each RRH. At the time of ex-post evaluation, all RRHs had run short of operation and maintenance budgets and there are cases where it is difficult to purchase some spare parts and consumables, thus it is considered to be a financial concern.

Table 14 Budget of each RRH

(Unit: Million UShs Note)

RRH	2013/14	2015/16	2016/17	2017/18

[37] The maintenance budget of the facilities for the Fort Portal RRH has not been estimated at the time of planning because the facilities have not been developed in the Project. The required maintenance cost for the equipment was estimated to be 31.1 million UShs, however the maintenance cost for each hospital can not be confirmed at the time of the ex-post evaluation, and the overall equipment maintenance cost including GH and HC under the workshop is 194.2 thousand UShs.

Hoima	4,665	6,360	7,120	7,187
Kabale	4,297	4,920	5,480	6,157
Fort Portal	4,297	6,050	6,150	7,297

Source: MOH, *Annual Health Sector Performance Report* each year edition
Note: UShs stands for Uganda Shilling.1UShs=0.03yen (International Financial Statistics 2018 yearly average rate)

Table 15 Maintenance budget in Hoima RRH and Kabale RRH

(Unit: thousands UShs)

	Plan	Actual	
		Hoima RRH	Kabale RRH
Electricity charge	81,826	60,000	76,244
Telephone charge	4,287	6,250	7,200
Fuel cost of generator	18,734	n.a.	36,000
Water charge	16,388	65,000	60,940
Oxygen charge	178	n.a.	n.a.
Building maintenance cost	9,251	90,243	99,559
Equipment maintenance cost	29,797	28,700	220,497

Source: Questionnaire answers from the Hoima RRH and the Kabale RRH

3.4.4 Status of Operation and Maintenance

(1) Status of Operation and Maintenance of facilities

It is confirmed through the site survey that the constructed OPD, casualty, OT/maternity ward in the Hoima and Kabale RRHs were well-cleaned and generally maintained in good condition and used on a daily basis. However, the following problems were identified in the toilet, sewerage and solar heater system[38].

Toilet: The toilet in the OPD of the Hoima RRH has been clogged up by patients' pouring of stones etc., thus its use has been prohibited. In addition, in one place in the OT/maternity ward, use of the toilet has been stopped due to a leak of water from roof (only one out of multiple toilets in maternity ward). At the Kabale RRH, there is a problem with the water supply system connected to the toilet in OT/maternity wards, and water is not supplied stably, so use of the toilet has been discontinued.

Solar heater/sewer systems : As described in "3.3.2.2 Other, Positive and Negative Impacts."

The arrangement of the toilet clerk was examined at the Hoima RRH so that the same problems would not occur, but it is difficult to secure the budget, so the toilets in the relevant area have been prohibited to be used. Regarding the water leak, the parts causing the problems could not be determined, thus the toilet is not currently in use. The water supply problem at the Kabale RRH also cannot be expected to be solved until the water supply system is improved. With regard to the failure of the connection of the solar heater system, as

[38] Based on the interviews and site survey to each RRH

the causal factors could not be identified, the situation has not been dealt with. The factors as to why the above problems cannot be solved include a situation in which there is no drawing of sewers in the hospital as mentioned earlier, and it is not possible for plumber to grasp the location to be repaired, thus the budget for repair and measures could not be secured.

(2) Status of Operation and Maintenance of equipment

It was confirmed that some equipment are not being used in each RRH (see table 16). The main reasons for not using the equipment include difficulty in obtaining spare parts, lack of budget and lack of capable medical technical staff (see "3.4.1 Institutional / Organizational Aspect of Operation and Maintenance").

Table 16 Equipment which has not been utilized

RRH	Equipment
Hoima	・Autoclave: At the time of ex-post evaluation, the procured two units don't operate. As the power consumption when using autoclave is large and the electricity in the building falls, a small-scale sterilizer (not procured in the Project) has been used[39]. ・Patient monitor: Some functions cannot be used due to lack of spare parts (battery) in four out of seven units (including the patient monitors procured to Hoima RRH by other projects)[40]. ・C-arm X-ray unit: Currently not working due to a lack of the capacity of staff. ・Dental X-ray machine: Not have been used by now due to unavailability of consumables through National Medical Store
Kabale	・Autoclave: Out of service ・Patient monitor: Both units are out of service due to unavailability of spare parts. ・Suction machine: Motor was replaced during the detective inspection, but not being operating since 2019, and spare parts not available, thus out of service. ・Electric surgical unit: Out of service ・Dental X-ray machine: Not have been used due to unavailability of consumables
Fort Portal	Infusion pump, suction machine, patient monitor, audio meter, and nebulizer: They have been kept in stock room as there is no medical staff who can operate the equipment.

Source: Questionnaire answers from each RRH and the interviews to each RRH during the site survey

Spare parts are usually obtained by each hospital, but the medical equipment procured by the Project is different from that used in Uganda. Thus, there are many cases in which it is difficult to obtain them locally and also not having sufficient budget even if it is available. In addition, if it is difficult to repair the broken equipment in the workshop, it is normal to contact the agent for repair. However, it is not clear how to respond when a problem occurs,

[39] At the time of planning, power consumption was calculated and design was made, however no clear answer could be obtained from the person in charge regarding the reason for the lack of power at the time of ex-post evaluation.

[40] Regarding patient monitor, the response provided by Hoima RRH are subject to all units in Hoima RRH. In addition, when the evaluator conducted the site survey, severely ill patients used the patient monitors in the partitioned space, and it was not possible to visually confirm that the units were the one which were procured under the project. Therefore, the units, for which some functions are not used, may include the one procured by other project.

for example, when the workshops do not know the contact information of the agent, and even if the workshop contacted the agents, they don't receive a reply from the agents after the warranty period completed. Since there are personnel transfers regularly at RRHs and workshops, it is necessary to confirm and understand methods to manage and share including the Infrastructure Division of MOH. The equipment procured to each RRH has been stored in the indicated places with seal and so on. Regular cleaning is also conducted and kept in good condition, and it can be seen that 5S activities have been spread. Workshop staff regularly check the maintenance and operation status of equipment at each RRH.

(3) Effect on maintenance situation through soft component (Training program)

For the effective use of the equipment procured, the technical assistance on each item of "maintenance technique," "clinical technique" and "Central Supply and Sterilization Department (CSSD)" was carried out in the Project as described in the Output. Table 17 shows the each output and level of achievement of the training identified at the time of the Project completion. Each output was achieved at the Project completion except for the improvement of the CSSD system. The reason why only the improvement of the CSSD system achieved only 50% is considered to be the fact that sufficient staff could not be allocated at RRHs by the start of training on CSSD. The consultant also pointed out that it might have been difficult to assign perfect staff in advance, as it was the first introduction of the CSSD system for the target RRH at that time.

Table 17 Output of trainings and achievement level at the time of the Project completion

Output		Achievement level (%)		
		Hoima	Kabale	Fort Portal
I. Maintenance technique	1.Confirmation of basic knowledge of equipment	Pass (75%)	Pass (85%)	Pass (80%)
	2. Acquisition of methods of daily and periodic maintenance of procured equipment	Pass (100%)	Pass (100%)	Pass (100%)
	3.Improvement of failure diagnosis and handling techniques	Pass (100%)	Pass (100%)	Pass (100%)
II. Clinical technique	1.Confirmation of functions and roles of procured equipment	Pass (80%)	Pass (90%)	Pass (85%)
	2.Acquisition of appropriate handling techniques with the use of target equipment that is tailored to the patient	Pass (80%)	Pass (90%)	Pass (80%)
III.CSSD	1. Improvement of the system of CSSD	In progress (50%)	In progress (50%)	In progress (50%)
	2.Improvement of operation and management techniques for procured equipment	Pass (100%)	Pass (100%)	Pass (100%)

Source: document provided by JICA

With regard to the continuous utilization of equipment by the implementation of training and contribution to medical services, the following comments were received from medical staff

regarding the results and issues identified at the time of ex-post evaluation[41].

- Maintenance technique: (Expected output) Contribution to appropriate management/ operation and maintenance technique

  Since the equipment procured includes that which had not been used by RRH staff, it was an essential and useful training for acquiring basic knowledge, and contributed to the improvement of basic operation ability. However, equipment that requires advanced techniques needs continuous follow-up because problems would occur as it continues to be used. Although support mainly for workshops has been provided through technical cooperation projects, further follow-up for medical staff is also required.

- Clinical technique: (Expected output) Contribution to improvement of service at hospitals through enhancement of operation and clinical techniques with effective use of equipment

  Although the utilization of the equipment is not 100%, by using the facilities and equipment effectively, it has become possible to receive patients who would have been transferred to a large hospital in the past. In addition, contribution to the improvement of patients' satisfaction for efficient medical examination and treatment using new equipment was also confirmed. Medical staff are also satisfied with the medical services provided by RRHs.

- CSSD: (Expected output) Organization of the role and function of CSSD in each hospital by improving the operation system and strengthening the prevention of nosocomial infections

  Medical workers who had not had experience in sterilization using a large-scale autoclave prior to the Project have learned the role, function, and appropriate implementation method of sterilization using the autoclave. In particular, in large-scale sterilization work such as the operation theatre, it has contributed to the efficient and appropriate timing of sterilization for operation using equipment. However, at present, the Fort Portal RRH is the only RRH for which the procured autoclave is in operation. Furthermore, at the completion of the training implemented in the Project, the placement of CSSD-dedicated staff was considered in order to establish the operation system of the CSSD, but due to the lack of human resources, it has not been made, and the initially assumed system has not been established.

As described above, some minor problems have been observed in each terms of the institutional/organizational aspect, technical aspect, financial aspect and current status. Therefore sustainability of the Project effects is fair.

[41] Interview with the Hoima RRH and the Kabale RRH

BOX【Learning from the medical facilities improvement project for the eastern and central regions and implications for the northern region】

JICA supported the improvement of medical facilities and equipment in the eastern and western regions of Uganda before assisting the improvement of medical facilities in the western region. In the eastern region, only a very short period of initial operation training was provided for the procured equipment, and there was a technical problem with the subsequent use of the equipment. Based on this experience, the Project provided soft component (SC) training in consideration of the long-term use of equipment. In addition, in the central region, the risk of infection caused by cleaning and hygiene aspects such as leaving blood on the floor of the operation ward was pointed out, so the Project introduced a large autoclave in the OT and various measures were taken such as improvement of the CSSD system and training on the maintenance of sterilization equipment, dispatching JOCV and conducting 5S activities at each RRH. With the implementation of the training, the equipment has been used effectively for a certain period of time after the Project completion, and improvement of the hygiene situation has also been confirmed. 5S activities have continued at each RRH even after JOCV left, contributing to keeping the facilities clean and hygienic. Hence, it became a good example that made use of the learning from the past project. On the other hand, after a while, due to a shortage of medical staff and insufficient handover at the time of transfer, it was confirmed that some equipment was not fully utilized at the time of the ex-post evaluation, and the CSSD system was not functioning. In the northern region of Uganda, the support for the development of medical facilities and procurement of equipment (a grant aid project) is already in progress. In an organization where the shortage of medical staff is notable and personnel transfers are inevitable, when sudden transfers of staff occur, it is necessary to devise ways to sustain the results of SC by considering a program that guarantees how to maintain sustainability.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of the Project is to improve services provided by RRH in the Western Region of Uganda by constructing facilities and procuring equipment for the RRH in this region, and thereby contribute to increasing the accessibility to, and quality of, regional medical services and ensuring that the regional referral system functions effectively. Its purpose is well in line with the development plan and sector strategy of Uganda, which emphasize health service improvement and health infrastructure development, as well as the need to develop the facilities and equipment of regional medical institutions for the improvement of basic indicators in the health sector, in addition to Japanese aid policy. Therefore, the relevance of the Project is high. Though the cost of the Project was within the plan, the project period exceeded the plan because of poor bidding, the period from the conclusion of the contract with the contractor to the start of

the construction was not included in the plan, and the completion date was delayed due to the circumstances of the recipient country. Thus, the efficiency is fair. With the improvement of medical facilities and equipment, it has become possible to provide efficient services at the target RRH, as evidenced by the expanded range of medical examinations and shortened waiting times. In addition, the Project has contributed securing sufficient medical examination and waiting spaces and improvement of the hygiene environment. On the other hand, targets such as for the number of outpatients and operations, which were expected to increase at the target RRH, were not achieved (excluding at some RRHs) as there were facilities and equipment that have not been fully utilized due to medical staff shortages, and activities to strengthen lower-level hospitals to reduce RRH congestion. The strengthening of the function of lower-level hospitals and the reduction of RRH congestion have also contributed to the improvement of accessibility to, and quality of, health services, and the effective functioning of the regional referral system. Thus, the Project has achieved its objectives to some extent, but some effects of the Project were limited. Therefore, effectiveness and impacts due to the implementation of the Project are fair. Some minor problems have been observed in terms of the institutional/organizational aspect, technical aspect, financial aspect and current status. Therefore sustainability of the Project effects is fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency (MOH)

・Sharing the agent list for repairmen of facilities and equipment

For procured equipment, a list of agents, needed for purchasing spare parts and consumables, are distributed after the procurement. However, at the time of the ex-post evaluation, only the Kabale RRH had a list, and even at the Kabale RRH, contact with the agent has been lost, which is a factor that some equipment is not utilized. MOH is required to immediately reorganize and share the agent list with RRHs so that the RRHs can use it when necessary. In addition, RRH staff are transferred regularly, and handing over is not always carried out properly. Taking into consideration the situation, it is necessary for Infrastructure Division of MOH to also grasp the agent list and contact information, and share that information with RRH when needed.

・Consideration of handover period at time of staff transfer

At the RRHs, the workshop staff and also medical staff have transferred regularly. At that time, there were many cases in which the predecessor left the RRHs before the successor took over. It was confirmed that some equipment was not utilized since there were no personnel who could handle the equipment after transfer of the medical staff who received

the training. Also, the drawings of sewers and facilities have not been taken over by the successor, and this has disturbed conducting maintenance. MOH should set a schedule and staff assignment considering sustainability, such as setting the required handover period from the predecessor to the successor, or allocating staff with equivalent experience, when deciding on staff transfer in the future.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

・Sharing the information with the staff who is in charge of operation and maintenance of equipment and facility

The Hoima and Kabale RRHs have problems with drainage, water supply and solar systems. At both RRHs, the person in charge of maintenance does not have the drawings including the sewers for the facilities at hand, which resulted in difficulty identifying the location of issues that arose. Drawings are normally shared with maintenance personnel at the delivery stage, however, in order to prevent the situation where the person in charge of maintenance work (in the Project, a plumber) cannot grasp the structure of the facility, it can be said that it is important for the executing agency, JICA, and the consultant concerning the design of the Project provide the detailed explanation by using drawing to the person in charge of maintenance work in designing and the construction stage of the Project, so that the person in charge can grasp the necessary information for carrying out maintenance after project completion from the viewpoint of maintenance.

・Securing sustainability by reflecting lessons learned from similar projects in the past

In Uganda, similar projects targeting medical institutions in the eastern and central regions had been conducted prior to the implementation of the Project. In the past projects, lessons learned such as "it is effective to conduct training on operation and maintenance at the time of equipment procurement to ensure the continuous use of the equipment effectively" “it is necessary to prevent the risk of infection resulting from inadequate hygiene” were presented. Based on the lessons learned above, the Project incorporated training on operation and maintenance of equipment and hygiene management as soft components (training programs), and worked on the introduction of sterilization equipment and organizing CSSD. Furthermore, the 5S activities by dispatched JOCV and maintenance management by technical cooperation projects to each RRH have supported the effect. At the time of the

ex-post evaluation, it was also confirmed that some effects have not been sustained due to lack of staff. However, at the target RRHs of the Project, based on the experiences in the eastern and central regions, the effects of improving the use and maintenance of the equipment, and the hygiene environment were obtained by utilizing the lessons mentioned above. In this way, it can be said to be important to sustain the effect by confirming the lessons from similar projects in the past and then examining the project content at the time of project planning, and if possible, following results using multiple schemes.

・ Formulation of a plan that takes into consideration securing of human resources necessary for continuous use of equipment and consideration when transferring

At the RRHs, it was confirmed that some of the facilities and equipment could not have been fully utilized due to the lack of staff. The shortage of staffs has been an issue for the whole health sector in Uganda and it is assumed that it cannot be solved easily. On the other hand, at the time of planning, it was expected that approximately 30 staff would be increased at each RRH, and equipment was procured based on that premise. If shortage of staff is a concern at the planning stage as in the Project, it is necessary to scrutinize at the time of planning whether a plan to increase the number of staff is feasible, not to prevent the continuous use of equipment and facilities by insufficiency of the staff after completion of the project. In addition, at the time of transfer of staff who can handle the procured equipment, consideration must be taken to secure staff who can use the equipment continuously by arranging the replacement of staff with equal experience and handover period.