

The Republic of the Sudan

FY2021 Ex-Post Evaluation Report of Japanese Grant Aid Project

“The Project for the Improvement of Health Care Service in Suburban Area of Khartoum State”

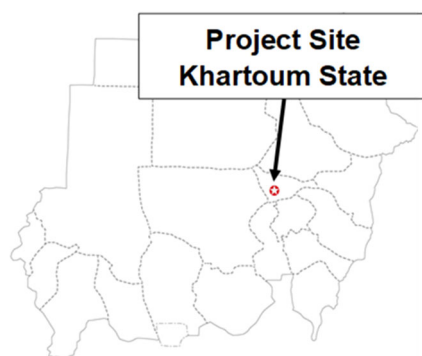
External Evaluator: Masumi Shimamura, Mitsubishi UFJ Research and Consulting Co., Ltd.

0. Summary

This project aimed to expand the supplies of maternal and child health services to residents and improve services in the suburbs of Khartoum State, Sudan, by developing the Maternal and Child Health Section at the Umbaddah General Hospital. Since maternal and child health indicators in Sudan are low and expanding the supply and improving the quality of maternal care services is a critical issue, this objective is consistent with the policy and needs at the time of project planning and ex-post evaluation. In addition, project plan and design were appropriate based on lessons learned from similar projects. The project is also consistent with Japan’s development cooperation policy, and collaboration with another project within JICA has taken place and concrete results have been generated. The project also contributes to the mainstreaming of universal health coverage, an international framework. Therefore, its relevance and coherence are high. In terms of project implementation, the project period exceeded the plan but the project cost was within the plan. Therefore, efficiency of the project is high. All quantitative effect indicators set at the time of planning were well above the targets. It was confirmed through the interviews with the executing agency and the Maternal and Child Health Section personnel, along with concrete evidence and data, that patients in critical conditions who could not be treated at sub-referral health facilities at lower level were transferred to the Maternal and Child Health Section from these health facilities, and that the Maternal and Child Health Section was utilized as an on-site obstetric training facility for medical students and students studying midwifery, respectively. It was also confirmed that the Maternal and Child Health Section has contributed to easing the pressure on other maternal and child hospitals located nearby. Thus, effectiveness and impacts of the project are high. Regarding operation and maintenance, some minor issues have been observed in the institutional/organizational and financial aspects, which have caused problems in the status of operation and maintenance, and in the environmental and social aspect. They are not expected to be improved / resolved. Therefore, sustainability of the project effects is moderately low.

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

1. Project Description



Project Location



Infant Incubator in the Nursery of the Maternal and Child Health Section

(Source: field survey assistant)

1.1 Background

In Sudan, due to an impact of the first civil war from 1955 to 1972 and the second civil war from 1983 to 2005, not enough health and medical services were provided. In particular, maternal and child health indicators such as maternal mortality rate and infant mortality rate were in a severe situation, falling below the average level of developing countries. One of the reasons for this was the lack of medical facilities and human resources, especially in Khartoum State, where the capital is located, where the population has increased due to an inflow of people from war affected areas including Darfur, which has led to a shortage of health services mainly in suburbs of the State. In particular, regional gaps in the secondary health facilities were widening. Out of seven localities composing Khartoum State, a little less than 60% of its population was concentrated in three suburban localities. However, a number of the secondary health facilities in these three localities was 20% or less of the State's total. In addition, the number of hospital beds in the three localities was far below the hospital construction standards set by the State, and health services in the suburbs of the State were inadequate. Given these situations, it was an urgent issue to expand the supplies of maternal and child health care services by developing a maternal and child health section on the premise of a general hospital in Umbaddah locality, where the number of hospital beds was especially short among the three suburban localities.

1.2 Project Outline

The objective of this project is to expand the supplies of maternal care services to residents by developing the Maternal and Child Health Section at the secondary level, which was particularly lacking in the suburbs of Khartoum State, where the population was increasing, thereby contributing to the improvement of maternal and child health service in the State.

Grant Limit / Actual Grant Amount	2,320 million yen / 2,153 million yen
Exchange of Notes Date / Grant Agreement Date	September 2015 / September 2015
Executing Agency	Khartoum State Ministry of Health
Project Completion	August 2018
Target Area	Suburban area of Khartoum State
Main Contractor	Konoike Construction Co., Ltd.
Main Consultants	Koei Research & Consulting Inc. / Binko International Ltd. (JV)
Procurement Agency	Sirius Corporation
Preparatory Survey	June 2014-May 2015
Related Projects	[Technical Cooperation] • Primary Health Care Expansion Project (2016-2019)

2. Outline of the Evaluation Study

2.1 External Evaluator

Masumi Shimamura, Mitsubishi UFJ Research and Consulting Co., Ltd.

2.2 Duration of Evaluation Study

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

Duration of the Study: September 2021-September 2023

Duration of the Field Study: Field study was not conducted. Remote surveys were conducted with the support of field survey assistant.

2.3 Constraints During the Evaluation Study

(Suspension of the ex-post evaluation study due to the disturbance in October 2021)

In October 2021, after this study began, a disturbance occurred in the capital Khartoum in which the military detained the democratically elected prime minister. The ex-post evaluation study was suspended due to the deteriorating security situation, which escalated into a large-scale demonstration by citizens who opposed to the military-led government. The external evaluator has resumed her work as the local situation calmed down, but the field study by the external evaluator was suspended. Utilizing a field survey assistant, the external evaluator remotely conducted information and data collection, project site visits, interviews with project-related personnel, etc. The external evaluator has carefully examined the obtained information, conducted analysis, and come up with the evaluation decisions.

(Effects on the ex-post evaluation study due to the occurrence of military conflict in April 2023 and special notes)

In April 2023, after the ex-post-evaluation study resumed, armed clashes between the military and paramilitary forces occurred in Khartoum. Fighting continued, and citizens and foreigners, including Japanese residents, were forced to evacuate within the country and abroad. The external evaluator conducted the study remotely utilizing the field survey assistant and compiled the evaluation results, which are evaluation analysis and judgment based on information and data collected before the outbreak of the military conflict. The situation surrounding the Maternal and Child Health Section at the Umbaddah General Hospital has changed drastically due to the military clashes, and the situation surrounding the executing agency, Khartoum State Ministry of Health, and the Maternal and Child Health Section must be carefully monitored in the future.

3. Results of the Evaluation (Overall Rating: B¹)

3.1 Relevance/Coherence (Rating: ③²)

3.1.1 Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of Sudan

At the time of planning, the Sudanese Federal Ministry of Health identified (1) expanding coverage and improving quality of primary health care, (2) strengthening hospital referral functions and improving services, and (3) social relief of vulnerable populations through health insurance as key issues in its *National Health Sector Strategic Plan II (2012-2016)*, which was developed under the *25 Years Strategic Plan for Health Sector (2003-2027)*. In addition, Khartoum State Ministry of Health's *Khartoum State Health Strategic Plan (2012-2016)* put up human resource development, infrastructure development, etc., as priorities.

At the time of the ex-post evaluation, the Sudanese Federal Ministry of Health has identified (1) expanding coverage and improving quality of primary health care, (2) improving health services in emergency care units, (3) improving health services at secondary and tertiary level health facilities, and (4) enhancing core capacities to detect and respond to outbreaks and health emergencies in a timely manner as key issues in its *National Health Sector Policy (2021-2024)*.

This project aimed to expand the supplies of maternal care services to residents in the suburbs of Khartoum State and to improve maternal and child health services, which is consistent with Sudan's development policy at the time of planning and the ex-post evaluation.

¹ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

² ④: Very High, ③: High, ②: Moderately Low, ①: Low

3.1.1.2 Consistency with the Development Needs of Sudan

At the time of planning, maternal and child health indicators in Sudan were particularly low, and the lack of medical facilities and human resources was a problem. In addition, the lack of health services, especially in the suburbs of Khartoum State, and the widening regional gaps in the secondary health facilities were also issues. Furthermore, in Umbaddah locality, Khartoum State, there was no public secondary level hospital that provides free maternal and child health services, and there was an urgent need to develop the Maternal and Child Health Section as secondary health facility.

The maternal and child health indicators for Sudan at the time of the ex-post evaluation are higher than the average for the sub-Saharan Africa region, as shown in Table 1, but lower than the average for the Middle East and North Africa region.

Table 1: Comparison of Maternal and Child Health Indicators between Sudan and Other Regions

	Sudan	Sub-Saharan African Average	Middle East and North Africa Average
Infant Mortality Rate (per 1,000 live births) (2021)	39	50	18
Under-5 Mortality Rate (per 1,000 live births) (2021)	55	73	22
Maternal Mortality Rate (per 100,000 live births) (2017)	295	534	57

Source: World Bank Open Data

In addition to the shortage of medical facilities in Sudan, the outflow of highly specialized medical personnel overseas has become a problem, and there is still a need to expand and improve the quality of maternal and child health care services. The number of deliveries in the Maternal and Child Health Section of at the Umbaddah General Hospital at the time of the ex-post evaluation is 2.3 times the target and the number of cesarean sections was 3.7 times the target. The Maternal and Child Health Section is operating beyond its capacity to handle the situation, and there is a continuing need to expand the supplies of maternal and child health services (see “3.3.1.1 Quantitative Effects (Operation and Effect Indicators)”). There is also a continuing need to address the expanding training needs of medical personnel, with the number of medical students trained in 2021 increasing to 1.65 times the number in 2019 and the number of midwifery students trained in 2021 increasing to 1.75 times the number in 2019.

Therefore, the project is in line with the development needs of Sudan both at the time of planning and the ex-post evaluation.

3.1.1.3 Appropriateness of the Project Plan and Approach

The project plan and design were based on the lessons learned from similar projects, and the use of the lessons learned was appropriate and generated the expected effects. Specifically, based on lessons learned from the similar projects, the project plan was designed so that 5S-Kaizen³ would be introduced in combination with the technical cooperation project “Primary Health Care Expansion Project” to strengthen the capacity of hospital operational management (see “3.1.2.2 Internal Coherence”).

As described below in “3.4.7 Status of Operation and Maintenance,” this project has encountered problems with many medical equipment, etc., after the completion of the project, and obtaining spare parts for repairs has become difficult. This is due to problems of communication and coordination among the parties involved within the Maternal and Child Health Section and between the hospital and the agencies, as well as budget shortfalls. Behind the communication and coordination problems, there is a high turnover of personnel, which is compounded by significant inflation within Sudan. (The depreciation of the local currency, the Sudanese Pound (SDG), has led to a decline in real wages, and medical personnel are leaving to the Middle East and other countries in search of higher salaries.) The budget shortfall is also due to Sudan’s serious economic problems, such as the depreciation of local currency, high inflation rate, and severe foreign currency shortages, and it is appropriate to consider these as external factors.

In terms of equity, consideration was given in the project so that marginalized people, such as the poor who have often chosen to deliver at home, could receive maternal and child health services and reduce maternal risks. Specifically, emergency care is provided free of charge at the Maternal and Child Health Section developed by the project. For medical services such as cesarean section surgery, the hospital basically collects a symbolic fee from patients, but this symbolic fee is kept at about 20% of the cost of similar medical services at other private hospitals. (For more information on symbolic fees, see “3.3.2.2 Other Positive and Negative Impacts,” “5) Social Systems and Norms, Human Well-being and Human Rights,” below.)

From the above, the project plan and approach were appropriate, and from the standpoint of equity, consideration was given to the poor and other marginalized people.

³ 5S is a slogan that takes the initials of each step of “sort, set, shine, standardize and sustain.” Building on the positive mindset of staff fostered by 5S, Kaizen is implemented. Kaizen is a site-driven process of gradually and continuously improving problems identified by staff, and through the implementation of Kaizen activities, improvement of quality, safety and productivity of healthcare is worked out. (Source: JICA website “Hospital Kaizen, *Quality Improvement of Healthcare Services through 5S-KAIZEN-TQM*, What is 5S-KAIZEN-TQM?”; <https://www.jica.go.jp/activities/issues/health/5S-KAIZEN-TQM-02/about.html> (in Japanese))

3.1.2 Coherence (Rating: ③)

3.1.2.1 Consistency with Japan's ODA Policy

At the time of planning, *Japan's Strategy on Global Health Diplomacy* advocated the mainstreaming of universal health coverage. The Yokohama Action Plan for the Fifth Tokyo International Conference on African Development (TICAD 5) also emphasized the promotion of effective access and dissemination of basic health services in Africa, including maternal, newborn and reproductive health. In addition, the *Country Assistance Policy for the Republic of the Sudan* (December 2012) also put up "support for basic human needs" as one of the priority areas. Furthermore, the JICA Country Analysis Paper for the Republic of the Sudan also emphasized efforts in the health sector, indicating "support for basic human needs improvement" as one of the priority areas of assistance. This project, which aimed to expand the supplies of maternal and child health care services and improve services through the development of the Maternal and Child Health Section, was consistent with Japan's assistance policy at the time of planning.

3.1.2.2 Internal Coherence

This project has collaborated with the technical cooperation project "Primary Health Care Expansion Project" as a collaboration that was envisioned at the time of planning. Internal coherence was confirmed as concrete collaboration effects were observed. During the project, experts from the technical cooperation project visited the Maternal and Child Health Section to check the facilities, and after the opening of the Section, 5S-Kaizen workshop was conducted for the hospital staff. In addition, a JICA senior advisor visited the Maternal and Child Health Section to follow up on the 5S program and conducted awareness-raising activities for staff in all departments in the Section. As specific effects of collaboration, it was confirmed that veteran staff members in the Maternal and Child Health Section provide guidance to other staff members on tidiness, cleaning, hygiene management, electricity and water conservation, etc., that medicines and medical consumables are managed according to rules, and that the separation, removal, and transportation of medical wastes are also carried out according to rules. It can be considered that these collaborative effects have led to the expansion of supplies of maternal care services and the improvement of maternal and child health services in the Maternal and Child Health Section.

3.1.2.3 External Coherence

This project did not have any collaboration with projects or support provided by other organizations. Regarding consistency with the international framework, it was confirmed

through interviews with the executing agency and the Maternal and Child Health Section personnel that the project contributes to the provision of comprehensive maternal and child health services and to the mainstreaming of universal health coverage. The Maternal and Child Health Section is planned and operated as an “open hospital for mothers and children, including the poor.” It was confirmed that both the poor and the non-poor have access to the same medical services at the same low cost, or free of charge for emergency cases, contributing to the mainstreaming of universal health coverage, which aims to make “all people have access to health care services at an affordable cost.”

The project is consistent with Sudan’s development policy and development needs, and the project plan and approach were appropriate. The project is also consistent with Japan’s development cooperation policy. Coordination with the other project within JICA has taken place, and concrete results have been confirmed. The project also contributes to the mainstreaming of universal health coverage, an international framework. Therefore, its relevance and coherence are high.

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

This project developed the Maternal and Child Health Section in the premise of the Umbaddah General Hospital in Khartoum State. Tables 2 and 3 compare the planned and actual outputs of major outputs. Regarding the facilities, as major changes from the time of planning, one elevator was installed and the pavement of the north side premise road was added. Regarding main equipment, there were changes in the quantity and materials, including changes in the material of chairs for the waiting area, changes in the quantity of refrigerators for the blood bank, changes in the size of the press machine, and changes in the quantity of oxygen regulators, humidifiers, and flowmeters. All these changes were necessary based on the needs and circumstances of the site and were appropriate changes. Consulting services (detailed design, construction supervision and procurement management) were carried out as planned.

As regards items to be borne by the Sudanese side, it was confirmed through interviews with the Japanese consultant supervising the construction that they were conducted without problems.

Table 2: Major Outputs (Facilities)

Maternal and Child Health Section (Total Floor Area: 4,653 m ²) As Planned			
Zone		Actual	Difference from the Plan and Reasons for Changes
Ground Floor	Common Zone	Entrance, Waiting Area, Reception, Cashier, Medical Record, Toilet, Slope, Stairs, Cafeteria, Kitchen, Electrical Panel Room	As Planned
	Outpatient / Laboratory / Pharmacy Zone	General Outpatient Triage, Consultation Room (ANC / PNC, Immunization / Growth Monitoring), Ultrasound / ECG Room, Gynecological Examination Room, Family Planning Lab, Laboratory, Urine Collection Room, Blood Collection Room, Blood Bank	As Planned
	Delivery Zone	Nurse Station, Labor Room, Delivery Room, Post-Delivery Room, Nursery (in-hospital delivery), Nursery (out-of-hospital delivery), Medical Waste Stock, Storage, Linen Room, Ante Room, Inpatient Toilet, Night Reception, Waiting Space of Night Visitor	As Planned
	Operation Room Zone	Ante Room, Changing / Shower Room (Male / Female), Resting Room (Male / Female), Equipment Storage, Recovery Room, Washing Room, Sterilization Room, Sterilization Equipment Stock Room, Service Corridor, Changing Room for Staff	As Planned
	Service Zone	Laundry, Machine Room, Staff Office, Staff Room (Male / Female), Night Duty Room (Male / Female), Workshop, Toilet (Male / Female)	As Planned
Move between Ground and First Floors		Elevator	Addition of one elevator An elevator for transporting patients between ground and first floors is installed at the place where the delivery zone and operation room zone of the Maternal and Child Health Section meet.

			(Reason) Installation of elevators has become standard in public hospitals in Sudan; and in this project, it was also necessary to reduce the burden of transporting and moving patients and medical personnel, and installation was requested.
First Floor	Ward Zone	Bed Room (5 Beds), Private Room (with Toilet and Shower), HDU, Storage, Linen Room, Medical Waste Stock, Pantry, Nursing Room, Inpatient Shower Room, Inpatient Toilet	As Planned
	Health Education Zone	Health Education / Seminar Room, Health Educator / Staff Office, Storage	As Planned
	Administration Zone	Director General's Room, Secretary Room, Maternal and Child Health Section Director's Room, Accountant Room, Storage, Meeting Room, Statistics Room, Resting Room, Office	As Planned
Roof Floor	-	Stairs	As Planned
Annex Facilities	Electricity Building	Transformer Room, Main Distribution Panel Room, Generator Room	As Planned
	Pump Building	Pump Room	As Planned
External Zone and Other Facilities	-	Parking, Car Entrance Area, Slope, Water Reservoir, Septic Tank, Treatment Tank, Elevated Water Tank, Pavement of the North Side Premise Road	Additional pavement of the north side premise road (Reason) The paved surface was damaged due to the overall renovation work of the existing hospital building that continued from 2013 to 2015 (see "5.1.2 Subjective Perspectives (retrospective)"), and appropriate rainwater gradient could not be secured. As a result, problems such as rainwater accumulating on the road, hindered vehicle traffic and pedestrians. Thus, additional pavement was requested.

Source: Information provided by JICA, results from interview survey of the Maternal and Child Health Section personnel

Table 3: Major Outputs (Main Equipment)

Zone	Actual	Difference from the Plan and Reasons for Changes
Common Zone	Consultation Chair, Consultation Desk, Reception Chair, Waiting Chair, etc.	Changes in the material of waiting chairs(Reason) Changed to equipment made of material suitable for use in outdoor environment.
Outpatient / Laboratory / Pharmacy Zone	Cardiotocograph (CTG), Ultrasound Scanner type A, Gynecological Examination Table, ECG Machine, Medicine Cabinet, Refrigerator for Blood Bank, Coagulometer, Electrolyte (ISE) Analyzer, Hematology Analyzer, Hot Air Oven, Platelets Incubator with Agitator, Spectrophotometer, etc.	Decrease in the quantity of refrigerators for the blood bank (from 2 to 1) (Reason) Following the completion of the Umbaddah General Hospital, which was under construction, quantity of equipment was reduced to avoid duplication of functions.
Delivery Zone	Cardiotocograph (CTG), CPAP Machine, Closed Infant Incubator, Neonatal Monitor, Ultrasound Scanner, etc.	As Planned
Operation Room Zone	Anesthesia Machine (with ventilator), Defibrillator, Electrosurgical Unit, Hand Scrub Station, High Pressure Steam Sterilizer, Closed Infant Incubator, Open Infant Incubator, Operating Table Lamp, Operating Table, Patient Monitor, etc.	As Planned
Service Zone	Washing Machine, Drying Machine, Press Machine, etc.	Changes in the size of the press machine (Reason) Size was changed to allow for work space in the entire laundry area.
Ward Zone	HDU Bed, Hospital Bed (with Mattress), Infusion Pump, Patient Monitor, Suction Unit, Syringe Pump, Oxygen Regulators / Humidifiers / Flowmeters, etc.	Increase in the quantity of oxygen regulators, humidifiers, and flowmeters (from 16 to 19) (Reason) In response to the changes in the method of oxygen supply to each hospital room from the cylinder system to the central piping system, the number was changed to suit the number of outlets to be installed in each hospital room.
Health Education Zone	TV Monitor, Projector, Projector Screen, Stacking Chair, etc.	As Planned
Administration Zone	Locker, Meeting Table (M), Meeting Table (L), Rack for Storage, etc.	As Planned

Source: Information provided by JICA, results from interview survey of the Maternal and Child Health Section personnel



Delivery Room

(Source: field survey assistant)



Cardiocotograph (CTG)

(Source: field survey assistant)



Electrosurgical Unit

(Source: field survey assistant)



Bed Room

(Source: field survey assistant)

3.2.2 Project Inputs

3.2.2.1 Project Cost

The actual project cost on the Japanese side was 2,153 million yen, compared to the planned cost of 2,320 million yen, which was within the plan (93% of the plan). The actual project cost on the Sudanese side could not be confirmed as the executing agency did not have the data.

3.2.2.2 Project Period

The overall project period was planned as 26 months, from November 2015 (start of the detailed design) to December 2017 (completion of construction) as opposed to 36 months in actuality, from September 2015 (start of the detailed design) to August 2018 (completion of construction), which exceeded the plan (138% of the planned period). The main reasons for the excess were (1) the longer time required for the comparative review between basic design and detailed design during the detailed design, (2) the extended bidding period (initially set at 45 days in accordance with the old guidelines at that time, but the revised guidelines made it

60 days), and (3) delays in construction work. The main reasons for the delay in construction were delays in procurement of reinforcing bars (inspection by the SSMO, a standards review organization for imported goods, was delayed, resulting in a significant delay in the delivery of materials to the site), as well as manufacturing and procurement of the elevator added to the scope which required more time.

Therefore, efficiency of the project is high.

3.3 Effectiveness and Impacts⁴ (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

At the time of planning, (1) “number of childbirth delivery at the target hospital,” (2) “number of patients for antenatal care (hereinafter referred to as “ANC”) / postnatal care (hereinafter referred to as “PNC”) at the target hospital,” and (3) “number of Caesarean section (hereinafter referred to as “C/S”) conducted at the target hospital” were set as quantitative effects of the project. Table 4 summarizes the baseline values, target values, and actual values between 2019 and 2021 for each indicator. As the project completion is August 2018, the target year to be compared is 2021, three years after completion.

Table 4: Quantitative Effects of the Project

Indicator	Baseline Value 2011 Actual Value	Target Value 2020 3 Years After Completion	Actual Value (Percentages in parentheses for 2021 indicate achievement rates)		
			2019 1 Year After Completion	2020 2 Years After Completion	2021 3 Years After Completion
(1) Number of Childbirth Delivery at the Target Hospital (cases)	3,626	5,000	9,725	10,942	11,687 (234%)
(2) Number of Patients for ANC / PNC at the Target Hospital (person) (cumulative total number)	14,504 * *number of deliveries x 4 (3 ANC, 1 PNC)	30,000 * *number of deliveries x 6 (4 ANC, 2 PNC)	37,820	39,200	40,913 (136%)
(3) Number of C/S Conducted at the Target Hospital (cases)	703	1,000	3,007	3,321	3,746 (375%)

Source: Ex-ante evaluation report and results from questionnaire survey of the executing agency

Note: The existing Umbaddah General Hospital was closed since February 2012 due to major renovation work. For this reason, the actual figures for the last year of operation of the hospital (2011) have been set as the baseline figures.

⁴ When providing the sub-rating, Effectiveness and Impacts are to be considered together.

Looking at the target achievement rates, the number of childbirth deliveries was 234%, the number of ANC / PNC visits was 136%, and the number of C/S was 375%, all of which greatly exceeded the target values. According to interviews with the executing agency and the Maternal and Child Health Section personnel, the Section is actually operating beyond its capacity, placing an excessive burden on the medical staff and other personnel. In addition, the number of inpatients greatly exceeded the number of people that can be accommodated, and measures such as placing beds in the hospital office room to be used as inpatient room were taken.

These circumstances led to consider the possibility that the target values may have been set too low at the time of planning. According to the executing agency, the latest demographic data were not available at the time of planning, and that they did not have sufficient data on which to base their target setting. (The national census was conducted in 2008 and the preparatory survey for this project was conducted in 2014-2015, so there was a time lag.) Given the data constraints, it can be considered that it was difficult to appropriately project target values with high degree of accuracy at the time of planning.

As described later in “5.1.2 Subjective Perspectives (retrospective),” when the project was completed and operations began, the executing agency separated the Maternal and Child Health Section from the Umbaddah General Hospital and established a separate independent hospital. It was used in a manner contrary to the originally agreed concept, such as separating patients by whether or not they have insurance and charging them as if it was a private hospital. As a result, the numbers of patients, deliveries and prenatal checkups were low. However, as a result of JICA’s persistent efforts, the management was improved as an “open hospital for mothers and children, including the poor,” which was its original purpose, and the number of pregnant women and deliveries increased significantly after 2019.

3.3.1.2 Qualitative Effects (Other Effects)

The qualitative effects of “patients in critical conditions who could not be treated at sub-referral health facilities at lower level are transferred from these health facilities” and “the Section is used as an obstetrical practical training facility for medical students and students studying midwifery” were categorized as project impacts. Therefore, these effects are regarded as impacts and shown in “3.3.2.1 Intended Impacts.”

3.3.2 Impacts

3.3.2.1 Intended Impacts

The project was expected to (1) “enable patients in critical conditions who could not be treated at sub-referral health facilities at lower level to be transferred from these health facilities”

and (2) “enable the Maternal and Child Health Section to be used as an obstetrical practical training facility for medical students and students studying midwifery.” These impacts were confirmed from the results of questionnaire survey of the executing agency and interviews with the Maternal and Child Health Section personnel.

(1) Patients in critical conditions who could not be treated at sub-referral health facilities at lower level are transferred from these health facilities

From the results of questionnaire survey of the executing agency and interviews with the Maternal and Child Health Section personnel, it was confirmed that the Section treats patients in critical conditions who were transferred from sub-referral health facilities at lower level. As shown in Table 5, the number of critically ill patients transferred from sub-referral health facilities and treated in the Maternal and Child Health Section has increased over the years. It was confirmed through interviews with the Maternal and Child Health Section personnel that the Section is equipped with all necessary medical services, including laboratory, neonatal and infant care, and ANC and PNC; that it accepts patients for all cases, including emergency care; that it is easy to refer patients from lower level health facilities; and that it provides reliable maternal and child health services not only in Khartoum State but also at the national level.

Table 5: Number of Patients in Critical Conditions Transferred from Sub-Referral Health Facilities at Lower Level and Treated at the Maternal and Child Health Section of the Umbaddah General Hospital

	2019	2020	2021
Total number of inpatients in the Maternal and Child Health Section of the Umbaddah General Hospital (cumulative total number)	159,130	142,320	272,806
Of which, number of patients in critical conditions transferred from sub-referral health facilities at lower level	209	279	350
Number of patients in critical conditions out of the above transferred numbers who have been treated	209	279	350

Source: Results from questionnaire survey of the executing agency

Note: The number (total number) of transfers from sub-referral health facilities at lower level to the Maternal and Child Health Section of the Umbaddah General Hospital is unknown.

Furthermore, the Maternal and Child Health Section has also contributed to alleviating the strain on the nearby Omdurman Maternal and Child Hospital (tertiary level) and Al Saudi Maternal and Child Hospital (tertiary level), as confirmed from the results of questionnaire survey of the executing agency and interviews with the Maternal and Child Health Section

personnel. The number of deliveries at both hospitals in the neighborhood is shown in Table 6. The number of deliveries at Omdurman Maternal and Child Hospital in 2020 increased from the previous year, but it decreased significantly in 2021. The number of deliveries at Al Saudi Maternal and Child Hospital is decreasing year by year. The decrease in the number of deliveries may be attributed in part to pregnant women refraining from giving birth at hospitals due to the spread of the COVID-19 infection; however, considering that the number of deliveries at the Maternal and Child Health Section has increased year after year, it can be assumed that deliveries at both hospitals has been distributed to the Section. In fact, according to a midwife who worked at Omdurman Maternal and Child Hospital in the past, the Maternal and Child Health Section is better equipped to provide maternal and child health care services than Omdurman Maternal and Child Hospital in terms of adequate lighting in the delivery rooms, ongoing training for hospital staff, good infection control, and PCR testing for newborns.

Table 6: Number of Deliveries at Omdurman Maternal and Child Hospital and Al Saudi Maternal and Child Hospital

		2019	2020	2021
Omdurman Maternal and Child Hospital	Number of deliveries (total)	1,499	2,004	718
	Number of natural deliveries	966	1,086	372
	Number of Caesarean section	533	918	346
Al Saudi Maternal and Child Hospital	Number of deliveries (total)	1,222	1,172	893
	Number of natural deliveries	899	702	489
	Number of Caesarean section	323	470	404

Source: Results from questionnaire survey of the executing agency

(2) The Maternal and Child Health Section is used as an obstetrical practical training facility for medical students and students studying midwifery

The Maternal and Child Health Section functions and is used as an on-site obstetric training facility for medical students and midwifery students, as confirmed from the results of questionnaire survey of the executing agency and interviews with the Maternal and Child Health Section personnel. As shown in Table 7, the number of medical and midwifery students trained at the Maternal and Child Health Section has increased over the years. According to the Maternal and Child Health Section personnel, 50 to 60 students took part in on-site obstetric training each year, with an intensive six-month training program every year since 2018. The students have taken training courses using the latest medical equipment procured by the project, which is said to have led to an improvement in their motivation. Furthermore, according to the executing agency, training for medical and midwifery

students has also contributed to the recruitment process of competent medical staff. In other words, it is possible to identify competent students through training and hire them as medical staff in the Maternal and Child Health Section. In addition, according to interviews with the Maternal and Child Health Section personnel, the Section has become an important base for midwifery student training related to nursing of newborns and infants, and the increasing demand for maternal and child health services has necessitated to expand clinical training and in-service obstetric training, in particular.

Table 7: Number of Medical and Midwifery Students Trained at the Maternal and Child Health Section of the Umbaddah General Hospital

	2019	2020	2021
Total number of medical students who received training at the Maternal and Child Health Section of the Umbaddah General Hospital	100	120	165
Of which, number of medical students from Khartoum State	100	120	165
Total number of midwifery students who received training at the Maternal and Child Health Section of the Umbaddah General Hospital	40	65	70
Of which, number of midwifery students from Khartoum State	N.A.	N.A.	N.A.

Source: Results from questionnaire survey of the executing agency

Thus, it can be said that the project has contributed to both expanding the supplies and improving the quality of maternal health services.

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Environment

The project was classified as Category C based on the *JICA Guidelines for Environmental and Social Considerations* (April 2010) since the project was considered to have minimal undesirable effects on environment. Since the Maternal and Child Health Section was constructed on the site of an existing hospital, there was no need to go through the procedures for the Environmental Impact Assessment (EIA).

It was confirmed from the results of questionnaire survey of the executing agency and interviews with the Maternal and Child Health Section personnel that mitigation measures were taken during construction. Specifically, throughout the construction period, a garbage

storage area was set up on the premises in a form linked to the existing garbage collection system and staff were deployed, storage area for oil and hazardous substances were placed in a designated area and disposal methods were coordinated with the relevant parties. In addition, storage tank for waste oil was established to prevent contamination, low-noise machines were used, and construction sites and work hours during holidays and at night were adjusted.

After project completion, medical wastes have been regularly brought to a treatment plant on the premises of Al Saudi Maternal and Child Hospital for disposal. As for wastewater, there are problems with the septic tanks not being able to treat the wastewater, and at the time of the ex-post evaluation, there is no concrete prospect for improvement. (For details, see “3.4.7 Status of Operation and Maintenance” below.)

2) Resettlement and Land Acquisition

This project was to develop the Maternal and Child Health Section on the premises of the existing Umbaddah General Hospital, and neither resettlement nor land acquisition took place.

3) Gender Equality

From the results of questionnaire survey of the executing agency and interviews with the Maternal and Child Health Section personnel, it was confirmed that the project has contributed to raising the awareness of couples about the importance of ANC and PNC for pregnant and nursing mothers, as well as raising awareness of overall health management.

4) Marginalized People

From the results of questionnaire survey of the executing agency and interviews with the Maternal and Child Health Section personnel, it was confirmed that the Maternal and Child Health Section does not differentiate medical services provided based on patient’s origin, attributes, insurance coverage, etc. As originally planned, the Section operates as an “open hospital for mothers and children, including the poor,” where both poor and low-income people and non-poor people can receive the same medical services at low rates. Treatments to emergency cases are provided free of charge.

5) Social Systems and Norms, Human Well-being and Human Rights

The Maternal and Child Health Section basically provides medical services by collecting symbolic fees from patients, and the fees collected are used to cover the operating costs of the Section. According to Maternal and Child Health Section personnel, the symbolic fee is

equivalent to about 20-25% of the cost of similar medical services in other private hospitals. According to the executing agency, the standard of symbolic fees is determined by the Legal Counsel in the State government for each medical service, and all public hospitals have the same fee structure.

6) Unintended Positive / Negative Impacts

<Synergies with the other project in JICA>

Veteran staff members in the Maternal and Child Health Section provide guidance to other staff members on tidiness, cleaning, hygiene management, electricity and water conservation, etc., as confirmed from the results of questionnaire survey of the executing agency and interviews with the Maternal and Child Health Section personnel. In addition, medicines and medical consumables are managed according to rules. Furthermore, separation, removal, and transportation of medical wastes are also carried out according to rules. It is considered that one of the factors behind these effects was the synergistic effect with the technical cooperation project, “Primary Health Care Expansion Project.”

<Impacts of the spread of COVID-19 infection>

According to the responses to questionnaire survey of the executing agency and the results of interviews with the Maternal and Child Health Section personnel, the frequency of antenatal and postnatal care visits by pregnant women has decreased, while the number of emergency patients has increased. The number of emergency cases increased due to restrictions on opportunities for prenatal checkups as a result of stay-at-home order because of the spread of COVID-19 infection, and pregnant women refraining from medical examinations.

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

3.4 Sustainability (Rating: ②)

3.4.1 Policy and System

The *National Health Sector Policy* (2021-2024) at the time of the ex-post evaluation continues to emphasize the expansion of the supplies of maternal care services and the improvement of maternal and child health services, and there are no policy or system changes regarding the positioning of this project and maintenance. In addition, the Maternal and Child Health Section provides comprehensive emergency obstetric care and delivery services as an emergency response general hospital under the Khartoum State Ministry of Health, and sub-referral health facilities at lower level are structured to refer patients to the Maternal and Child

Health Section using the referral form of the Khartoum State Ministry of Health. Referral information to the Maternal and Child Health Section is managed by the Statistics Division under the supervision of the Director General (Maternal and Child Health Section).

From the above, sustainability of policy and system of the project is assured.

3.4.2 Institutional/Organizational Aspect

After completion of the project, the Maternal and Child Health Section is responsible for operation and maintenance of the project. The personnel structure of the Maternal and Child Health Section is shown in Table 8. As of 2022, the Section operates with 313 personnel (37 doctors, 220 paramedical / medical engineers / technicians, and 56 administrative / management staff).

Table 8: Personnel Structure of the Maternal and Child Health Section (2022)

Doctor	No. of staff	Paramedical / Medical Engineer / Technician	No. of staff	Administration / Management	No. of staff
Obstetric and Gynecological Doctor	10	Nurse (Technicians)	60	Director General (Maternal and Child Health Section)	1
Pediatrician	9	Certified Nurse	20	Secretary	1
Medical Doctor	10	Midwife	30	Data Input	3
Family Medicine Consultant	0	Lab Technician	20	Human Resource	1
Pharmacist	4	Lab Assistant	15	Internal Auditor	1
Anesthetist	4	Public Health Officer	4	Accountant	2
		Health Educator	1	Cashier	2
		Medical Assistant Pharmacist	6	Biomedical Engineer	2
		Anesthesia Technician	18	Store Keeper	1
		Operation Room Assistant	24	Electrical Technician	2
		Immunization Technician	6	Air Condition and Mechanical Engineer	1
		Statistic Technician	10	Plumber	1
		Data Clerk	6	Worker	2
				Driver	2
				Cleaner	18
				Security	16
Total	37	Total	220	Total	56

Source: Results from questionnaire survey of the executing agency

According to the responses to questionnaire survey of the executing agency and the results of interviews with the Maternal and Child Health Section personnel, the personnel in the Maternal and Child Health Section consists of permanent and temporary staff, with temporary staff accounting for 60-70% of the total staff. The shortage of permanent staff is covered by temporary staff, and the necessary number of staff has been secured. Temporary staff conclude individual employment contracts with the hospital, and their salary levels are higher than those of permanent staff. This is due to the shortage of human resources in Sudan, which requires higher salaries to secure competent and experienced medical personnel in the country. However, due to financial difficulties, the Khartoum State Ministry of Health is unable to hire such personnel as permanent staff, and the hospital is staffing themselves by directly hiring temporary staff. Permanent staff leave frequently, mainly due to low salaries, and staff turnover is high.

According to the Maternal and Child Health Section personnel, due to the rapid turnover of staff, communication, coordination, and decision-making within the Section do not always run smoothly, and there are delays in reporting problems with medical equipment and other items to the Khartoum State Ministry of Health, which affects the procurement of spare parts. Problems with communication and teamwork among staff members have been pointed out as the cause, and there is a need to hold follow-up meetings among the Maternal and Child Health Section personnel, as well as mandatory training needs for nurses who operate medical equipment have been identified. The necessity to develop guidelines to clarify who is responsible for the maintenance of medical equipment and to improve decision-making process has also been pointed out.

From the above, it can be judged that there are some problems with the institutional/organizational aspect of operation and maintenance.

3.4.3 Technical Aspect

Through interviews with the Maternal and Child Health Section personnel, it was confirmed that there is no problem with the knowledge and skill levels of the doctors, nurses, midwives, and biomedical engineers who operate and maintain the medical equipment. Nurses and midwives have received training from JICA experts and Filipino instructors. Initial guidance on how to operate and maintain medical equipment was provided in the project. There were no problems caused by the fact that the medical equipment was made in Japan, and the equipment could be handled with the level of clinical technology on the site. All of the biomedical engineers who attended training during the project have left the hospital, and thus the hospital has secured replacement engineers for operation and maintenance. Two biomedical engineers

secured as replacements are stationed at the hospital to conduct routine maintenance of medical equipment and provide emergency response when problems occur. It was also confirmed through interviews with the Maternal and Child Health Section personnel that electrical technicians, air condition and mechanical engineers, and plumbers have the skills to handle daily maintenance and emergency repairs in the event of problems. All of the original technicians who received training in operation and repair methods in this project have left the hospital, and the hospital secures replacement technicians each time to carry out maintenance and management.

As for agencies dealing with medical equipment, the hospital is receiving support from unofficial vendors due to shortage of budget.

From the above, biomedical engineers, electrical technicians, air condition and mechanical engineers and plumbers in charge of operation and maintenance appear to have sufficient technical capacity to undertake usual operation and maintenance tasks, and there are no particular problems.

3.4.4 Financial Aspect

The Umbaddah General Hospital estimates the necessary amount of operation and maintenance cost for the entire hospital annually, and then submits to the Khartoum State Ministry of Health for a budget request. The budget is then allocated to the hospital after scrutiny and approval by the Khartoum State Ministry of Health. The overall financial situation of the Umbaddah General Hospital is shown in Table 9.

According to the Umbaddah General Hospital and the Maternal and Child Health Section personnel, the actual operation and maintenance budget allocated from the Khartoum State Ministry of Health is about 10% of the required amount and are not allocated in a timely manner, which has hindered the payment of expenses and the purchase of spare parts. In addition, the symbolic fee received from patients is about 20% of the maintenance cost, and the budget necessary for operation and maintenance of the hospital has not been secured with no prospects for improvement. As negative effect of the lack of funds, the Maternal and Child Health Section uses unofficial agencies, but there is no prospect of procuring spare parts or repairing equipment that has malfunctioned, and payment of salaries to medical staff and others is also delayed. Medical staff and others frequently leave the hospital, resulting in a high turnover of personnel.

Table 9: Overall Financial Situation of the Umbaddah General Hospital

(Unit: thousand SDG)

	2019	2020	2021	2022
Total Income	25,322	35,551	227,000	366,000
Total Expenditure	25,322	35,551	227,000	366,000
Office supplies			1,000	1,000
Electricity			1,000	3,000
Water			25,000	35,000
Fuel			5,000	7,000
Medical Gas			51,000	85,000
Medical Equipment Maintenance			109,000	160,000
Facility Maintenance			35,000	75,000

Source: Results from questionnaire survey of the executing agency

Note 1: Actual figures for 2019-2021. Budget-based figures for 2022..

Note 2: Breakdown of income (allocation from the Khartoum State Ministry of Health and symbolic fee) is not known.

Note 3: Breakdown of expenditures for 2019-2020 is not known.

From the above, there are problems with financial aspect of operation and maintenance, and the prospects for improvement and resolution are low.

3.4.5 Environmental and Social Aspect

As described below in “3.4.7 Status of Operation and Maintenance,” the septic tanks have not been able to purify the wastewater, which is causing sewage treatment problems.

3.4.6 Preventative Measures to Risks

Due to inflation, declining real wages, and delays in salary payments, many medical staff etc., have lost their motivation to work and left the hospital; however, the Maternal and Child Health Section has hired temporary staff each time to make up for the shortage of permanent staff. In addition, the Khartoum State Ministry of Health has allocated an additional budget to counter COVID-19 infection, and the Maternal and Child Health Section has taken measures to cope with the tight medical care situation, such as hiring additional medical staff (temporary staff).

From the above, risk measures are being taken to the extent possible.

3.4.7 Status of Operation and Maintenance

Medical equipment and facilities exist and have been utilized, but many malfunctions were

identified during the site survey by field survey assistant.⁵ As mentioned in “3.4.2 Institutional/Organizational Aspect,” there have been delays in reporting malfunctions to the Khartoum State Ministry of Health, which has also affected the procurement of spare parts. Spare parts are necessary for repairs, but due to problems including communication and coordination with agencies and budget shortages, there is no concrete prospect for their procurement or repair.⁶

There are also problems with hygiene (wastewater treatment). Originally, there were no sewage infrastructure in the area surrounding the hospital, and the plan was to treat wastewater in the septic tank in the hospital premises and discharge it into the percolation well or gutter. According to the Maternal and Child Health Section personnel, increase in the volume of wastewater due to the increase in the number of patients and inappropriate use of wash basins and toilets by patients have blocked the percolation well, causing sewage to overflow onto the hospital premises. The hospital uses vacuum trucks to transport wastewater to possible discharge areas, but the cost is high. The issue has already been reported to the Khartoum State Ministry of Health, but there are no concrete prospects for securing budget or other resources to deal with the issue.

From the above, there are problems with the status of operation and maintenance.

Some minor issues have been observed in the institutional/organizational, financial, and environmental and social aspects including the current status of operation and maintenance. They are not expected to be improved / resolved. Therefore, sustainability of the project effects is moderately low.

⁵ Medical equipment not in operation due to malfunctions are as follows.

Refrigerator for blood bank, electrolyte (ISE) analyzer, hot air oven (partial), spectrophotometer, centrifuge, distilled water production equipment, cardiocograph (CTG), CPAP (continuous positive airway pressure) Machine, infant incubator (partial), ultrasound scanner, high pressure steam sterilizer, patient monitor, syringe pump.

Facilities that are not in operation due to the malfunction are as follows.

- Elevator. Not in operation since October 2021
- Air conditioner in the patient room zone (HDU: High Dependency Unit)
- Septic tank and percolation well

⁶ According to the consultant in charge of this project, when the equipment was handed over, list and contact information of agencies in Sudan that can be requested for repairs and procurement of spare parts for a fee was submitted to the executing agency and the Maternal and Child Health Section. In addition, according to the interview with JICA Sudan Office, the Office actually contacted the agencies and approached the executing agency and the Maternal and Child Health Section to secure spare parts. However, due to budget shortages, the Maternal and Child Health Section was contacting unofficial vendors that were not on the list.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed to expand the supplies of maternal and child health services to residents and improve services in the suburbs of Khartoum State, Sudan, by developing the Maternal and Child Health Section at the Umbaddah General Hospital. Since maternal and child health indicators in Sudan are low and expanding the supply and improving the quality of maternal care services is a critical issue, this objective is consistent with the policy and needs at the time of project planning and ex-post evaluation. In addition, project plan and design were appropriate based on lessons learned from similar projects. The project is also consistent with Japan's development cooperation policy, and collaboration with another project within JICA has taken place and concrete results have been generated. The project also contributes to the mainstreaming of universal health coverage, an international framework. Therefore, its relevance and coherence are high. In terms of project implementation, the project period exceeded the plan but the project cost was within the plan. Therefore, efficiency of the project is high. All quantitative effect indicators set at the time of planning were well above the targets. It was confirmed through the interviews with the executing agency and the Maternal and Child Health Section personnel, along with concrete evidence and data, that patients in critical conditions who could not be treated at sub-referral health facilities at lower level were transferred to the Maternal and Child Health Section from these health facilities, and that the Maternal and Child Health Section was utilized as an on-site obstetric training facility for medical students and students studying midwifery, respectively. It was also confirmed that the Maternal and Child Health Section has contributed to easing the pressure on other maternal and child hospitals located nearby. Thus, effectiveness and impacts of the project are high. Regarding operation and maintenance, some minor issues have been observed in the institutional/organizational and financial aspects, which have caused problems in the status of operation and maintenance, and in the environmental and social aspect. They are not expected to be improved / resolved. Therefore, sustainability of the project effects is moderately low.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

<Secure budget for repair and maintenance of medical equipment and facilities with malfunctions>

In the Maternal and Child Health Section, necessary budget for repair and maintenance of malfunctioning medical equipment and facilities has not been allocated. In particular, the problem of blockage of percolation well is an issue that needs to be dealt with urgently from the viewpoint of sanitary management. Therefore, it is important for the Maternal and Child

Health Section to come up with a plan and estimate budget for the procurement of the necessary spare parts and submit it to the Khartoum State Ministry of Health for discussion and coordination with the Ministry. The Khartoum State Ministry of Health is also required to secure necessary budget to enable the sustainable use of medical equipment and facilities.

<Provide continuous guidance and refresher training on how to properly operate medical equipment>

Due to inflation, declining real wages, and delays in salary payments, many medical staff etc., have left the Maternal and Child Health Section and the hospital has hired temporary staff each time to fill the positions. For this reason, it is important to provide continuous guidance to medical technicians, doctors, and nurses on how to properly operate medical equipment. It is also desirable to conduct refresher training for medical technicians to reconfirm their knowledge of maintenance of medical equipment and improve their skills.

<Develop guidelines to clarify management responsibility and improve the decision-making process for the maintenance and management of medical equipment>

Communication, coordination, and decision-making within the Maternal and Child Health Section are not always smooth, and this has affected the procurement of spare parts, etc. Therefore, it is important for the Maternal and Child Health Section to develop and enforce guidelines in order to clarify who is responsible for the maintenance of medical equipment and in order to improve the decision-making process. In addition, it is desirable for the Khartoum State Ministry of Health to hold regular meetings with the Maternal and Child Health Section personnel, visit the Section to check on the situation, and follow up.

4.2.2 Recommendations to JICA

Many medical staff have left the Maternal and Child Health Section, and the number of staff who know the situation at the time of the introduction of 5S-kaizen, which was introduced in collaboration with the technical cooperation project, is decreasing. Therefore, it is desirable for JICA to follow up on 5S-kaizen and carry out awareness-raising activities so that the Maternal and Child Health Section can improve the quality of operation and management and strengthen resource management.

4.3 Lessons Learned

Importance of grasping demographic data at the time of project planning

In this project, the actual values of the quantitative effect indicators set at the time of planning greatly exceeded the targets. The Maternal and Child Health Section has been operating beyond

its capacity, creating an excessive burden on the medical staff and other personnel. In order to increase the number of beds, measures such as placing beds in the office room and using it as inpatient room are taken. It is possible that the targets were set too low at the time of planning, but the latest demographic data had not yet been available then, and there was insufficient data to serve as a basis for target setting. If existing demographic data is not fully developed at the time of project planning, conducting a new population survey would require extensive resources, including budget, which is not realistic. Therefore, a possible approach would be to use available tools for reference, for example, utilizing satellite data to estimate population. It is desirable to set targets for quantitative effect indicators after improving the accuracy of population projections through such efforts.

5. Non-Score Criteria

5.1. Performance

5.1.1 Objective Perspective

None.

5.1.2 Subjective Perspectives (retrospective)

Key informant interviews were conducted with a total of 13 people⁷ consisting of the executing agency and the Maternal and Child Health Section personnel, JICA Sudan Office staff, and the Japanese consultant in charge of construction supervision. From a subjective point of view, major events that occurred before the start of the project, during the project, at the time of project completion, and thereafter, are summarized, and reviewed the effects on the efficiency, effectiveness/impact and sustainability of the project.

(1) Before the start of the project: Major renovation of the entire Umbaddah General Hospital

The Umbaddah General Hospital was established in 2003 and opened in 2005, but the hospital's ground contained weak soil, and four to five months after opening, structural problems arose in the hospital's building and foundations. In particular, there were major

⁷ The breakdown of the interviewees is as follows.

- Khartoum State Minister of Health: one person
- Khartoum State Ministry of Health personnel: one person
- Director General of the Maternal and Child Health Section at the Umbaddah General Hospital: one person
- Administrative Director of the Maternal and Child Health Section at the Umbaddah General Hospital: one person
- Doctors of the Maternal and Child Health Section at the Umbaddah General Hospital: two people
- Biomedical engineers of the Maternal and Child Health Section at the Umbaddah General Hospital: two people
- Midwife of the Maternal and Child Health Section at the Umbaddah General Hospital: one person
- Maintenance staff of the Maternal and Child Health Section at the Umbaddah General Hospital: two people
- National staff in charge of the project at JICA Sudan Office: one person
- Japanese consultant in charge of construction supervision of the project: one person

problems with drainage and sanitation. For this reason, a technical evaluation team consisting of the University of Khartoum and Al-Dar Consultancy of Khartoum State conducted technical diagnosis of the building's structure, etc. Based on the results of the diagnosis, the hospital suspended services in February 2012 and carried out major renovation work, including the foundation (2013-2015).

In view of the ground problem, a foundation structure method (pile foundation method) was adopted for this project to cope with problem soils. In addition, as described in Table 2 of "3.2.1 Project Outputs," pavement of the north side premise road was added to the project scope because the paved surface was damaged due to the major renovation work.

(2) During the project: Sudan's deteriorating economic situation and rising inflation

Due to the deterioration of Sudan's economic situation and the effects of rising inflation,⁸ the brains of the country's competent medical personnel have flowed overseas.⁹ Under these circumstances, it was a challenge to secure medical staff and administrative management personnel with sufficient qualifications and experiences after the completion of the Maternal and Child Health Section. The financial problems of the Khartoum State Ministry of Health were also identified as a concern.

In order to cope with this problem, the Maternal and Child Health Section hired non-permanent staff (temporary contract staff) to fill the shortage of permanent staff. (At the time of the ex-post evaluation, temporary staff accounted for 60-70% of the total staff). Due to the shortage of human resources, competent and experienced medical personnel had to be hired at a higher salary level than permanent staff in Sudan. (See "3.4.2 Institutional/Organizational Aspect.")

(3) At the time of project completion: The Maternal and Child Health Section opened for use that differs from the concept agreed upon at the time of planning

The decision was made by the previous Khartoum State Minister of Health, prior to the change of government, that the Maternal and Child Health Section would be separated from the management and operation of the Umbaddah General Hospital and become an independent hospital. This was due to financial problems at the Khartoum State Ministry of Health. The Khartoum State Ministry of Health tried to provide maternal and child health services only to those who had insurance coverage because it was difficult to secure the labor and maintenance costs necessary to run the hospital.

⁸ The inflation rates in Sudan during the project period were 16.9% (2015), 17.8% (2016), 32.4% (2017), and 63.3% (2018). Even after the completion of the project, the rates have soared to 51.0% (2019), 163.3% (2020), 359.1% (2021), and 138.8% (2022). (Source: IMF data)

⁹ The Gulf countries have recruited competent medical personnel with high salaries.

This situation was immediately recognized as a problem, and JICA Sudan Office held repeated discussions with the Khartoum State Ministry of Health, the Umbaddah General Hospital, and local residents to obtain their opinions and confirm details, and then requested that the Khartoum State Ministry of Health improve the situation to be in line with the original management plan. JICA encountered resistance from the Khartoum Ministry of Health, which stated that “if all maternal and child health services were provided free of charge, the hospital would not be able to operate.” However, as a result of persistent and repeated discussions with Sudanese officials and requests for improvement, the facilities and equipment developed by this project were integrated into the Umbaddah General Hospital as the Maternal and Child Health Section, which is now operated as an “open hospital for mothers and children, including the poor,” as originally planned. JICA Sudan Office followed up on the number of patients, frequency of medical checkups, and condition of medical equipment to confirm that the Maternal and Child Health Section was operating as originally intended. As discussed above in “3.3.1.1 Quantitative Effects (Operation and Effect Indicators),” the number of pregnant women and deliveries has also increased significantly since 2019, the year after the opening.

JICA Sudan Office has acted as a bridge between the hospital and the Khartoum State Ministry of Health to hold meetings and coordinate on important issues such as securing spare parts. In addition, list of local agencies who can maintain medical equipment and procure spare parts was provided to the Maternal and Child Health Section. However, the Maternal and Child Health Section is receiving support from unofficial vendors not in the list due to lack of budget. JICA Sudan Office actually contacted the agencies and tried to secure spare parts, but the high staff turnover rate of the agencies was also an obstacle. JICA Sudan Office has been continuing follow-ups to promote communication and coordination among the parties concerned in order to resolve the issue.

(4) After project completion: Effects and responses to the spread of COVID-19

The number of emergency cases increased due to restrictions on opportunities for prenatal checkups as a result of the spread of COVID-19 infection. In light of the emergency situation, the Khartoum State Ministry of Health has allocated additional budget to cope with COVID-19 infections. In addition, the Maternal and Child Health Section hired additional staff to deal with the medical pressure. The hospital took strict infection control measures and set up an isolation unit within the hospital to cope with the situation. In addition, efforts were made to prevent hospital-acquired infections by testing for the COVID-19 at the entrance of the hospital.

JICA Sudan Office, in collaboration with the United Nations Development Programme (UNDP), provided hospital personnel and users with masks, face shields, and other protective equipment. In addition, members of the JICA Alumni Association in Sudan worked with the

hospital staff to prepare and distribute handmade antiseptic solutions. JICA Sudan Office collaborated in procuring necessary materials such as ethanol and glycerin. Furthermore, under the initiative of the JICA Alumni Association in Sudan, workshops were held for hospital personnel on 5S-Kaizen, infectious disease control, medical risk management, and medical equipment maintenance, and awareness raising activities were conducted on measures against COVID-19 infection.

5.2. Additionality

JICA's significant role in ensuring that the Maternal and Child Health Section operates according to its original purpose.

The project was completed in August 2018 and since 2019 the Maternal and Child Health Section has been operating as an “open hospital for mothers and children, including the poor.” At the beginning of the opening, the Khartoum State Ministry of Health tried to provide maternal and child health services only to those with insurance coverage; however, JICA Sudan Office immediately considered this situation as a problem, tenaciously held repeated discussions until the operation was conducted according to its original purpose, and continued follow-up thereafter. Without such meticulous support from JICA, it would not have been possible to expand the supplies of maternal care services in the Maternal and Child Health Section and improve maternal and child health services.

JICA's flexible support under the pandemic after the completion of the project

Since 2020, COVID-19 infections have spread around the world, and Sudan has also been greatly affected. As mentioned above, JICA's prompt and flexible “face-to-face assistance” in this unprecedented situation has further enhanced the local people's trust, familiarity, and favorable impression towards Japan, and has greatly contributed to the smooth operation of the hospital. JICA stayed close to the field even after completion of the project during the pandemic and flexibly provided assistance according to the needs of the field, and thereby JICA was able to deepen ties and trust with the people involved and demonstrate JICA's strength in its emphasis on a field-oriented approach.

(End)