Republic of Benin

FY2023 Ex-Post Evaluation Report of Grant Aid Project

"Le Projet de Construction et d'Équipement de l'Hôpital d'Allada dans le Département de l'Atlantique"

External Evaluator: Sayuri Kon

Foundation for Advanced Studies on International Development

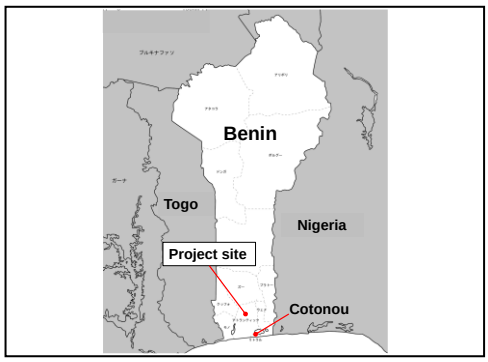
0. Summary

The objective of this project is to strengthen the implementation system of healthcare services in Allada-Toffo-Ze health zone[1] in the Atlantique region by establishing a core hospital in the region, thereby contributing to the expansion of opportunities for the provision of healthcare services, including maternal and child healthcare. The project objective aligned with Benin's development policy and the development needs of the maternal and child health sector in the region as well as the needs for a referral hospital. Although there was no collaboration with other organizations or donors, the project objective was consistent with Japan's ODA policies for Benin, and it was confirmed that the quality of healthcare services have improved as a result of collaboration with another JICA project. Therefore, its relevance and coherence are high. Although its outputs were mostly as planned, the project cost slightly exceeded the plan and the project period significantly exceeded the plan, so the efficiency of the project is moderately low. As a result of the project's implementation, Allada Hospital has exceeded the targets for the clinical indicators set at the time of planning and received high satisfaction ratings from hospital staff and users. Although issues regarding negative environmental impacts remain, several intended and unintended positive impacts were identified. Therefore, effectiveness and impacts of the project are high. In terms of sustainability, some issues have been observed in the institutional/organizational, technical, finance, 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's effect is moderately low.

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

[1] In Benin, each region is divided into areas called "health zone," which serves as health-service area, and there are 34 health zones throughout the country. Each health zone has health facilities for communities, such as commune health centers, centered on a zone hospital. Because no commune health center is equipped with operating rooms or for specialized care (dentistry, otorhinolaryngology, etc.), patients who need these healthcare services visit zone hospitals. In serious cases, patients are transferred to zone hospitals with better medical equipment. The Atlantique region, the project's target area, is divided into three health zones: Allada-Toffo-Ze, Abomey-Calavi-So-Ava, and Ouidah-Kpomasse-Tori-Bossito.

1. Project Description



Project Location (source: prepared by the evaluator based on a white map)

Photo 1: Allada Hospital built by the project (source: taken by the evaluator)

1.1 Background

In Benin at the time of the project planning, infant mortality rate was 59 deaths per 1,000 live births (2014), under-five mortality rate was 90 deaths per 1,000 live births (2014), and maternal mortality rate was 350 deaths per 100,000 live births (2014),[2] making it difficult to achieve the Millennium Development Goal (MDG) targets.[3] To improve this situation, the Ministry of Health of Benin has made it a priority and worked on it to reduce infant and maternal mortality rates, enhance the implementation of health care services in each health zone, and provide equal services in each health zone.

The Atlantique region, this project's target area, is adjacent to the Littoral region, where the economic center of Cotonou is located, and has the largest population in the country (approximately 1.4 million people, 2013) and the highest population growth rate.[4] Infant and under-five mortality rates in the region remained at the national average.[5] The Atlantique region has three health zones, each of which was supposed to have health centers centered on a zone hospital (hôpital de zone, hereinafter referred to as "HZ"). However, there was no HZ in Allada-Tofo-Ze health zone, the target health zone of the project (hereinafter referred to as "the target health zone"). As a result, pregnant women requiring cesarean sections and patients requiring surgery due to traffic trauma in the target health zone had to be transferred to HZs or other health facilities in other health zones, which was placing a heavy physical burden on them. Meanwhile, hospitals in other health zones that were receiving those patients were chronically overcrowded, which was hampering the provision of appropriate medical services. With this background, the government of Benin asked the government of Japan to provide grant aid for the construction of

[2] Preparatory Survey Report
[3] Among the eight goals set by the MDGs, those related to the health sector were Goal 4, "reduce child mortality," and Goal 5, "improving maternal health." In Benin, the target for infant mortality rate was set at 39 per 1,000 live births and for under-five mortality rate at 65 per 1,000 live births as indicators for Target 4, and maternal mortality rate was set at 125 per 100,000 live births for Target 5 (source: Preparatory Survey Report).
[4] Preparatory Survey Report
[5] Preparatory Survey Report

a new hospital (hereinafter referred to as “Allada Hospital”) and equipment to improve medical services and access in the target health zone.

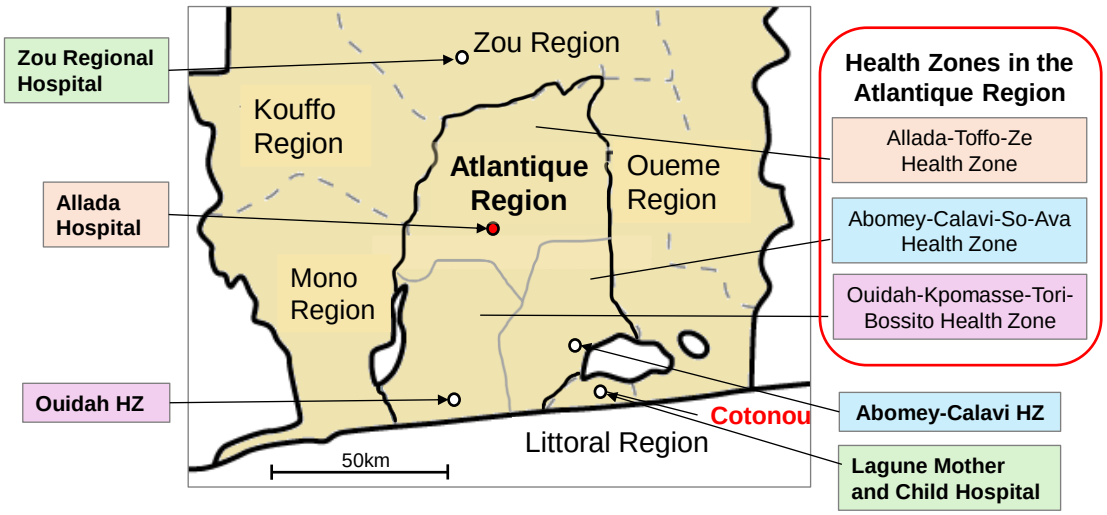


Figure 1: Location Map of Allada Hospital and Surrounding Hospitals
(source: prepared by the evaluator)

1.2 Project Outline

The objective of this project is to strengthen the implementation system of healthcare services in Allada-Toffo-Ze health zone in the Atlantique region, through the establishment of a HZ in the region, thereby contributing to the expansion of opportunities for the provision of healthcare services, including maternal and child healthcare.

Grant Limit / Actual Grant Amount	1,900 million yen / 1,894 million yen
Exchange of Notes Date / Grant Agreement Date	March 2015 / March 2015
Executing Agency	Ministry of Health, Department of Maintenance for Facility and Medical Equipment
Project Completion	February 2019
Target Area	Atlantique Region
Main Contractors	Building: Daiho Corporation Equipment: Helicom Corporation Inc.
Main Consultant	Nihon Sekkei Inc. / EARL Consultants Incorporated (JV)
Preparatory Survey	May 2014 – March 2015
Related Project	Technical Cooperation “Healthcare Management and Quality Improvement Advisor” (2016 – 2020)

2. Outline of the Evaluation Study

2.1 External Evaluator

Sayuri Kon, Foundation for Advanced Studies on International Development

2.2 Duration of Evaluation Study

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

Duration of the Study: November 2023 – January 2025

Duration of the Field Survey: February 26, 2024 – March 8, 2024, May 20, 2024 – May 24, 2024

3. Results of the Evaluation (Overall Rating: B[6])

3.1 Relevance/Coherence (Rating: ③[7])

3.1.1 Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of Benin

At the time of the project planning, in *the Third Growth and Poverty Reduction Strategy* (2011-2015), Benin's national development plan, "strengthening human capital," including cooperation in the health sector, was positioned as one of the five strategic goals. *The National Health Development Plan* (2009-2015) also identified "reduction of maternal and under-five mortality" as a priority. *The Government Action Plan* (2021-2026), the national development plan at the time of the ex-post evaluation, identified "improving people's lives" as one of the three priority areas, and "building and strengthening the health care system" was set as one of the main initiatives. In addition, *the National Health Development Plan* (2024-2030), a development plan for the health sector, included "improving the quality of health services and care" and "developing health infrastructure, equipment, and health care products" in its six strategic directions.

It can be said that the HZ development implemented under the project aligned with Benin's development policy would help solve the priority issues set in the national development plan at the time of planning and of the ex-post evaluation. Based on the above, the project was consistent with the development plan of Benin.

3.1.1.2 Consistency with the Development Needs of Benin

At the time of the project planning, the health indicators related to this project in Benin (see Table 1) were falling short of the MDG targets, and maternal and child health services needed to be expanded. Regarding health indicators in the Atlantique region, maternal and child health indicators, such as prenatal and postnatal care visitation rates, and in-hospital maternal mortality rate are at the national average or tended to be better than the national average, but child health indicators remained at the national average. At the time of the ex-post evaluation, the national average and Atlantique region's maternal mortality rates in 2022, for which data were available, were worse than when the project was planned, and neonatal and under-five mortality rates for 2017-2018 also show a worsening trend. Therefore, the maternal and child

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

[7] ④: Very High, ③: High, ②: Moderately Low, ①: Low

health sector's development needs were high even at the time of the ex-post evaluation.

Table 1: Health Indicators in Benin and Atlantique Region

	2011 - 2012			2022		
	Benin	Atlantique Region	MDG4,5 Targets	Benin	Atlantique Region	SDG3[8] Target
Neonatal Mortality Rate (per 1,000 live births)	25	25	No target value	30*2	43*2	12
Under-five Mortality Rate (per 1,000 live births)	75	78	65	96*2	108*2	25
Maternal Mortality Rate (per 100,000 live births)	340*1	No data	125	215.5	133.9	70
In-hospital Maternal Mortality Rate (per 1,000 live births)	152.3	61.3	No target value	171.8	87.7	No target value
Prenatal Care Receipt Rate (%)	85.8	94.2	No target value	83.2*2	93.2*2	No target value
Postnatal Care Receipt Rate (%)	51.0	49.5	No target value	65.5*2	66.7*2	No target value

Source; Preparatory Survey Report (2011-12), *Health Statistics Yearbook 2022*, Ministry of Health
Note *1: Data for 2013 (source: World Health Statistics, WHO, https://www.who.int/data/gho/publications/world-health-statistics (Accessed on June 13, 2024))
*2: Data for 2017-2018 (source : *Demographic and Health Surveys 2017-2018*, Ministry of Planning and Development)

In Benin, HZs had been developed in each health zone prior to the implementation of this project, but no HZ existed in the target health zone of the three health zones in the Atlantique region. Therefore, pregnant women requiring cesarean sections, patients requiring surgery due to traffic trauma, etc. had to be transferred to Abomey-Calavi HZ in the neighboring health zone,[9] other private hospitals, and in some cases, even more distant hospitals in Cotonou, and this caused a great burden for them. Since the opening of Allada Hospital, the number of

[8] Goal 3 of the SGDs is to "ensure healthy lives and promote well-being for all at all ages." Of these, Target 3.1 is "Reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030" and Target 3.2 is to "end preventable deaths of newborns and children under-five years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-five mortality to at least as low as 25 per 1,000 live births."
[9] Of the commune health centers in the target health zone, the distance from Abomey-Calavi HZ to the most distant Toffo commune health center is about 65 km.

emergency cases handled by Allada Hospital has been increasing,[10] except in 2021, when the new coronavirus infection (COVID-19) significantly affected the number of emergency case. The number of emergency cases handled by Allada Hospital increased from about 800 in 2019 to nearly 1,500 in 2023.[11] This indicates that there is a great need for Allada Hospital as a hospital which receives emergency cases transferred from health centers and other facilities.

Based on the above, the project was consistent with the development needs of Benin at the time of planning and the ex-post evaluation.

3.1.1.3 Appropriateness of the Project Plan and Approach

1) Use of Lessons Learned from Similar Projects

As a lesson learned from similar projects in the past, an ex-post evaluation of the grant aid, "Project of Reinforcement of Lagune Mother and Child Hospital of Cotonou" (May 2007), revealed that the procurement procedures with overseas companies for the medical gas work to be borne by the recipient were not completed before construction was completed. It was therefore recommended that the counterpart organization's procurement procedural capacity be considered in advance when determining the works they would undertake. Based on the lesson learned, the items the counterpart would bear in this project were limited to the content and scale they certainly could implement/handle technically and financially. Specifically, it was determined that simple facilities that did not require advanced construction techniques, such as staff housing, could be constructed by the Beninese side and that they would bear the cost.[12] In addition, because the procurement of medical equipment directly affects the effectiveness of medical functions, it was not planned to be borne by the Beninese side. Based on the above, the lesson learned from similar projects in the past was applied in the planning of this project.

2) Consideration for Marginalized People

In this project, to ensure pregnant women's privacy, a dedicated entrance for them was constructed in the delivery department, which was separated from the general outpatient department. The obstetrics and gynecology outpatient clinic was also constructed separately from the general outpatient department. Rest rooms and shower rooms for staff and patients were installed separately by gender, and those rooms for male and female were the same in number . Out of consideration for the handicapped, handicapped-accessible restrooms were installed in four locations in the hospital, and handrails were installed throughout the facility.

[10] As described in the "3.3 Effectiveness and Impact," from April 2020 to April 2022, the Allada Hospital building was used as an inpatient ward for COVID-19 patients and the original Allada Hospital functions were transferred to a nearby health center for operation. Therefore, the number of emergency cases counted during the above period is the number of cases received at the nearby health center.
[11] Questionnaire Allada Hospital completed
[12] Questionnaire the consultant completed

Based on the above, the project made it easier for women and people with disabilities, who were assumed to be the marginalized people, to use the hospital.

3.1.2 Coherence (Rating: ③)

3.1.2.1 Consistency with Japan's ODA Policy

At the time of the project planning, in *the Yokohama Action Plan* (2013-2019) announced at TICAD V, Japan had set out "to build a society where all people benefit from growth" as the main support measure and would strengthen the promotion of Universal Health Coverage.[13] In addition, *the Country Assistance Policy for Benin* (December 2012) identified health and medical care as one of the priority areas and set the goal of improving access to health and medical services. Based on the above, this project was consistent with Japan's ODA policies.

3.1.2.2 Internal Coherence

When this project was planned, it was expected to promote various activities to improve the quality of health services (awareness-raising for medical staff, 5S activities, humanistic childbirth, etc.) led by the regional health office in cooperation with JICA experts.[14] Under the technical cooperation project, "Medical Management and Quality Improvement Advisor" (2016-2020), which started during the implementation of this project, Allada Hospital was designated as a pilot hospital, and one staff member of the hospital participated in the working group of the technical cooperation and the development of training materials and national guidelines for the 5S-KAIZEN-TQM method.[15] As a result, after the technical cooperation, Allada Hospital finalized the 5S-KAIZEN-TQM activity plan, established a quality management team and a work improvement team as in-house organizations for quality improvement, and conducted 5S-KAIZEN-TQM training in the hospital. At the time of the ex-post evaluation, several cases of practices of 5S and their contribution to the quality improvement of services in the hospital were identified. For example, in the room where

Photo 2: Well-organized inspection record forms (source: taken by the evaluator)

[13] In which "all people have access to appropriate preventive, therapeutic, rehabilitative, and other health care services at a cost they can afford."
[14] Preparatory Survey Report
[15] The 5S-KAIZEN-TQM method is a method for improving the workplace environment and quality control, whereby the 5Ss (Sort, Set, Shine, Standardize, Sustain) are used to improve the work environment, and KAIZEN (improvement) activities are used to improve work content by making the people conducting the activities aware of problems. Ultimately, through TQM (Total Quality Management), it is aimed to achieve a state in which KAIZEN is continuously and voluntarily implemented. (source: JICA website, https://www.jica.go.jp/activities/issues/health/5S-KAIZEN-TQM-02/about.html (accessed on June 13, 2024))

ultrasound examinations are performed in the diagnostic imaging section, there used to be a mess of forms to fill out for test results, so staff took some time to find the forms when writing down the results, keeping their patients waiting for a long time. However, at the time of the ex-post evaluation, the forms were filed by type and labeled on the outside of the file to indicate the type of paper, so staff no longer had to search for the forms and reduced the time patients had to wait.[16]

Based on the above, the collaboration between this project and the other JICA projects, which was anticipated at the time of planning, contributed to the realization of the project's objective of "strengthening the implementation system of healthcare services."

3.1.2.3 External Coherence

There was no planned collaboration between this project and the projects conducted by other Japanese institutions, donors, or international frameworks, and there was no collaboration from the start of implementation to the time of the ex-post evaluation.

Based on the above, the project was consistent with the development plan and needs of Benin, and the lesson learned from similar projects in the past was applied in the planning of this project. The project was also consistent with Japan's ODA policies, and the collaboration with the other JICA project and the outcomes from the collaboration were confirmed. Therefore, its relevance and coherence are high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

3.2.1.1 Work Borne by the Japanese Side

The project's main outputs consisted of Allada Hospital's construction, medical equipment procurement and technical guidance (soft components) at Allada Hospital. Tables 2 through 4 show the project's planned and actual outputs, and Table 5 shows the changes in facility specifications.

Table 2: Planned and Actual Facility Construction

Ward	Planned Department	Actual
Outpatient, emergency and obstetrics ward	General outpatient, specialized outpatient, obstetrics and gynecology outpatient, emergency, diagnostic imaging, pharmacy, administration (2,433.63 m^2)	Mostly as planned (2,060.29 m^2)
Delivery, surgery and laboratory ward	Delivery, surgery and sterilization, laboratory (911.18 m^2)	Mostly as planned (1,065.63 m^2)
In-patient ward	In-patient ward (15 four-person rooms, 2 two-person rooms, 1 single room, critical care, etc.) (1,309.10 m^2)	Mostly as planned (1,296.01 m^2)

[16] Interview with Allada Hospital staff

Annex buildings	Electrical and mechanical building, a power receiving room, a water tank and a pump room, an elevated water tank and a pump room, morgue building, kitchen building, 3 staff houses, sewage treatment layer (692.17 m^2)	Laundry ward was added. (822.28 m^2)
Total area 5,346.08 m^2		**5,244.21 m^2**

Source: Preparatory Survey Report, materials provided by JICA, inspection by the evaluator

Table 3: Planned and Actual Medical Equipment

Planned	Actual
189 types (ultrasound equipment, incubators, sterilizers, anesthesia machines, etc.)	As planned

Source: Preparatory Survey Report, materials provided by JICA

Table 4: Planned and Actual Technical Guidance (Soft Components)

<table>
<tr><th>Training Topic</th><th>Training Contents</th><th>Actual</th></tr>
<tr><td>1) Daily Equipment Maintenance</td><td>- Seminars for medical staff on the importance of medical equipment maintenance from the perspective of continuous medical service implementation.
- Guidance for medical staff who operate medical equipment on how to perform daily inspection.</td><td>As planned</td></tr>
<tr><td>2) Periodic Equipment Maintenance</td><td>- Seminars for medical staff on the importance of medical equipment maintenance from the perspective of continuous medical service implementation.
- Guidance for equipment maintenance technicians on how to perform periodic inspection.</td><td>As planned</td></tr>
<tr><td>3) Developing Equipment Maintenance Plan and Budget Plan</td><td>- Provide instructions on ordering reagents, consumables, and spare parts and inventory management techniques.
- Provide instructions on the preparation of annual equipment maintenance plans and budget plans.</td><td>As planned</td></tr>
<tr><td>Number of Training Participants (Actual only)</td><td colspan="2">(Unit: person)
<table>
<tr><th>Training</th><th>Daily Equipment Maintenance</th><th>Periodic Equipment Maintenance</th><th>Total</th></tr>
<tr><td>1st*1</td><td>83</td><td>2</td><td>85</td></tr>
<tr><td>2nd*1</td><td>118</td><td>2</td><td>120</td></tr>
<tr><td>Both 1st and 2nd</td><td>43</td><td>2</td><td>45</td></tr>
</table>
Note *1: Some participants attended more than once during the same training period of the 1st and 2nd sessions, in which case they were counted as one person.</td></tr>
<tr><td>4) Additional Support by Use of Residual Funds (Actual only)</td><td colspan="2">- Technical guidance to connect the piping and wiring borne by the Beninese side to the piping and power distribution system constructed by the Japanese side.
- Technical guidance for connection and installation of generator installed by the Beninese side at the facilities.</td></tr>
</table>

Source: Preparatory Survey Report, materials provided by JICA

Table 5: Changes in Facility Specifications

Changes in Overall Design (before construction)	- Addition of laundry ward - Addition of family rooms - Change in the layout of the delivery department - Relocation of each nurse manager's office - Relocation of the accounting department - Relocation of the chief nurse's office
Changes in Detailed Design (before construction)	- Construction of laundry ward was shifted to be borne by Beninese side - Construction of family rooms was shifted to be borne by Beninese side
Changes in Detailed Design (after starting construction)	- Outpatient department: Layout changes to nurse's station, record storage, and reception area; walls added to general reception area and stretcher storage area; door size changes in compressor room in dental exam room. - Emergency department: Workbench in resuscitation room shortened, mini-kitchen in staff room repositioned - Laundry ward changed to be borne by Japanese side - Addition of water heaters and plumbing for future additional installation

Source: Materials provided by JICA

As mentioned above, the works that the Japanese side implemented went mostly as planned, but some changes were made to the facility specifications as described in Table 5. Before the start of construction, it was decided that the Japanese side would construct the laundry ward and family rooms because they were essential for the operation of the hospital and needed to be completed in time for its opening. However, the bidding was unsuccessful, and the construction of those buildings was changed to be borne by the Beninese side due to the shortage of funds caused by exchange rate fluctuations and other factors. Later, after re-bidding, there were a certain amount of funds left, so only the laundry ward was changed to be borne by the Japanese side. As for the other changes to the specifications, based on the materials that JICA provided and questionnaire responses from the consultant completed, it was determined that the impact of the changes on the project was minor and that the changes were necessary for the effective operation of the facility. As for medical equipment, the manufacturers and models were changed for 10 items due to the discontinuation of products, but these changes had little impact on the project. The soft components used the residual funds to provide additional technical guidance for connecting the piping and wiring for the work to be borne by the Beninese side on the piping and distribution system constructed by the Japanese side, and for connecting and installing the generator installed by the Beninese side to the facilities. It was determined that those were necessary additions for the effective operation of the facility based on the materials that JICA provided and questionnaire responses from the consultant.

3.2.1.2 Work Borne by the Beninese Side

When the project was planned, the water installation and construction of some annex buildings were to be completed by the end of the work that the Japanese side implemented (April 2018), but this was delayed by six months. In addition, the installation of fences and walls around the site and the entrance gate and guard station were planned to be completed three months after the completion of the work by the Japanese side (July 2018), but were delayed by three months. The reason for the delay was the delay in the contractor's work on the Beninese side. All other items for which the Beninese side was responsible were implemented as planned.[17] See Table 6 for details.

Table 6: Planned and Actual Work Borne by the Beninese Side

Planned	Actual
1. Cutting and removal of trees and underbrush on site	As planned
2. Land leveling on site	
3. Installation of electricity	
4. Installation of telephone line	
5. Water installation	Delayed but completed in October 2018
6. Construction of a part of annex buildings*1	
7. Installation of walls and fences around the site	
8. Installation of entrance gate and guard station	
9. Delivery of furniture and equipment	As planned

Source: Preparatory Survey Report, materials provided by JICA, questionnaire and interview with the consultant and the executing agency
Note *1: Among the annex buildings, family rooms (lodging, kitchen, toilet), maintenance ward, and one staff house were constructed using funds from the Beninese side.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The actual project cost for the Japanese side was 1,894 million yen, compared to the planned 1,900 million yen, and therefore fell within the plan (97% of the plan). The actual project cost for the Beninese side was 138 million yen, compared to the planned 90 million yen, and therefore significantly exceeded the plan (152% of the plan). According to the executing agency, the reason why the cost significantly exceeded the planned amount was unclear because the person in charge at that time had already left, but it is believed to be due to higher amounts and unit prices of used materials than expected.

Based on the above, the total project cost was 2,031 million yen, slightly exceeding the planned 1,990 million yen (102% of the plan).

[17] Questionnaire and interview with executing agency and the consultant

3.2.2.2 Project Period

The planned project period was from May 2015 to October 2017 (30 months), and the actual period was from March 2015 to February 2019 (48 months);[18] therefore, the actual project period significantly exceeded the plan (160% of the plan). According to the consultant, the reasons for the significant increase were 1) delays in customs procedures on the Beninese side, 2) the effects of the prolonged rainy season, and 3) delays in equipment procurement.[19]

Based on the above, the project cost slightly exceeded the plan, and the project period significantly exceeded the plan. Therefore, efficiency of the project is moderately low.

3.3 Effectiveness and Impacts[20] (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

1) Achievement of Quantitative Effects at Allada Hospital

In the plan, the year of 2020 was the target year for quantitative effect indicators, but the project completion was later than planned, so this ex-post evaluation set the year of 2022, three years after the project completion, as the target year to confirm the actual results (see Table 7). As a result, all quantitative effect indicators exceeded their targets except for the number of outpatients. The number of outpatients is believed to have been strongly influenced by COVID-19, which is mentioned below. All quantitative effect indicators exceeded the targets when the target was confirmed in 2023, considering the effects of COVID-19.

2) Effects of COVID-19

According to Allada Hospital staff, Allada Hospital was used exclusively for the admission of COVID-19 patients for approximately two years, from April 2020 to April 2022. Allada Hospital's original functions, such as general outpatient services, obstetrics and gynecology outpatient services, and inpatient services other than COVID-19, were transferred to Allada Commune Health Center (Centre de Santé Communautaire, hereinafter referred to as "CSC") in the target health zone and operated at a reduced scale. Therefore, among the quantitative effects indicators, the numbers of outpatients, inpatients, and cesarean sections decreased in 2020 and 2021.[21] During this period, about half of Allada Hospital staff remained at Allada

[18] The starting point was set as the month when the GA was signed, and the definition of completion was set as the completion of the construction and equipment installation and adjustment.
[19] Further reasons for the delays in equipment procurement included: 1) delays in payments from the contractor of equipment procurement to the suppliers for some equipment, resulting in the equipment not being shipped as scheduled; and 2) reordering of equipment due to the delivery of incorrectly ordered equipment that was not part of the contracted equipment. (Source: questionnaire the consultant completed)
[20] When the sub-rating is provided, effectiveness and impacts are to be considered together.
[21] Although Allada Hospital returned to normal operation as it was before the COVID-19 pandemic in May 2022, the

Hospital, and about the other half worked at Allada CSC, specialized hospitals, and other facilities in the target health zone.

Table 7: Quantitative Effects at Allada Hospital

Indicator	Baseline Value	Target Value	Actual Value				
	2014	2020	2019	2020	2021	2022	2023
		3 years after project completion	Year of project completion	1 year after project completion	2 years after project completion	3 years after project completion	4 years after project completion
The number of outpatients*[1] (person/year)	0	7,300	8,195	2,851	1,454	4,981	11,398
The number of inpatients (person/year)	0	2,140	5,881	419	531	4,204	9,756
The number of normal deliveries (birth/year)	0	560	534	849	1,001	996	1,421
The number of caesarean section (birth/year)	0	440	612	361	438	520	672
The number of laboratory tests*[2] (case/year)	0	15,800	No data	19,144	26,042	27,063	32,050

Source: Ex-ante Evaluation Report, questionnaire Allada Hospital completed
Note *1: The datum that Allada Hospital provided was the "number of outpatients who were on daytrips" and did not include cases that resulted in hospitalization as a result of outpatient consultation. Therefore, the following formula was used to calculate the number of outpatients for each year: the number of outpatients = number of outpatients who were on daytrips + number of inpatients - number of emergency transfer received.
Note *2: The number of laboratory tests covers all tests conducted in the image diagnosis and laboratory department (e.g., ultrasound, X-rays, etc.).

3.3.1.2 Qualitative Effects (Other Effects)

A survey was conducted on the satisfaction of Allada Hospital staff and users with the hospital's facilities, equipment, and healthcare services, with the aim of measuring the qualitative effects of "strengthening the system for implementing healthcare services."[22] The

numbers of outpatients, inpatients, and cesarean sections among the quantitative effect indicators in 2022 have not returned to their 2019 levels. It is speculated that this is partly due to the fact that the local population shunned Allada Hospital due to its exclusive use for COVID-19 patients (Source: interview with consultant).

[22] When this project was planned, the qualitative effects indicators were: "In case of emergency cesarean section for pregnant women and traffic accidents in the target area, the burden on patients and their families will be reduced because the time required for transfer will be shorter than that for transfer to hospitals in other health zones" and "The chronic congestion of hospitals in other health zones that used to receive patients from the target health zone will be alleviated." These are described in "3.3.2 Impacts" because they can be organized as impacts resulting from the strengthening of the implementation system of healthcare services in the target health zone. Satisfaction with Allada Hospital per its staff and users was not set at the time of planning but was used as a complementary qualitative indicator of effectiveness.

results of the interviews with them [23] indicated that hospital staff and users were generally satisfied with the facilities, equipment, and services (see Tables 8 and 9). Many hospital users mentioned the facilities' newness and cleanliness as positive points, and that the staff were more responsive than in other public hospitals with regard to services. Allada Hospital was designed by a Japanese architect with innovative features in its exterior appearance and natural lighting, etc. The hospital received the Architecture Master Prize, which is internationally recognized in the field of architecture, and its beautiful exterior was well received by hospital users. One hospital user mentioned comfortable temperature of the outpatient waiting area as a positive point. Many hospital staff responded "satisfied" rather than "highly satisfied," because there were dissatisfactions with some aspects,[24] while they were generally satisfied with the facilities, equipment, and services.

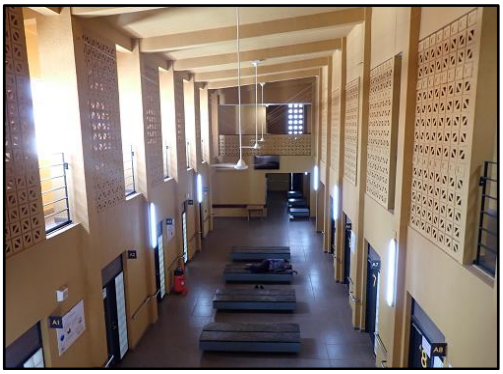


Photo 3: Waiting Area for General Outpatient (source: taken by the evaluator)

Table 8: Satisfaction of Hospital Users (20 responses)

(Unit: person)

	Highly satisfied	Satisfied	Neither satisfied nor dissatisfied	Dissatisfied	Highly dissatisfied
Facility/equipment	12	6	2	0	0
Services	17	3	0	0	0

Source: interviews by the evaluator

Table 9: Satisfaction of Hospital Staff (20 responses)

(Unit: person)

	Highly satisfied	Satisfied	Neither satisfied nor dissatisfied	Dissatisfied	Highly dissatisfied
Facility/equipment	3	13	4	0	0
Services	3	11	6	0	0

Source: interviews by the evaluator

[23] Interviews with Allada Hospital staff and users in this ex-post evaluation were conducted at Allada Hospital from February 28 to March 2, 2024, between 9:00 am and 5:00 pm. Twenty staff (10 male and 10 female) were selected, considering their gender and job category. They included 5 medical doctors (4 male, 1 female), 5 nurses (2 male, 3 female), 1 radiology technician (female), 1 laboratory technician (female), 1 pharmacist (female), 1 midwife (female), 1 social services worker (female), and 5 administrative staff (4 male, 1 female). 20 hospital users (10 male, 10 female each) were selected, considering gender and whether they were patients or their attendants. The breakdown was 9 patients (3 male, 6 female) and 11 attendants (7 male, 4 female). Inpatients and outpatients were included.

[24] Many staff members cited the lack of a dedicated pediatric ward and the small size of the facilities (each room) as points of dissatisfaction.

3.3.2 Impacts

3.3.2.1 Intended Impacts

The intended impacts of this project was to expand opportunities for the provision of healthcare services, including maternal and child healthcare, in the target health zone. The qualitative effect indicators were 1) the decrease in burden on patients and their families in case of emergency cesarean sections for pregnant women and traffic accidents in the target area because of shorter time required for transfer to Allada Hospital than that for transfer to hospitals in other health zones, and 2) the reduction of chronic congestion of hospitals in other health zones that used to receive patients from the target health zone. In addition, the analysis included whether residents were able to receive medical examinations and treatment that they had not had access to and whether Allada Hospital contributed to COVID-19 response in Benin. As for quantitative effects indicators, health indicators for the target health zone were used.

1) Quantitative Effects

Quantitative effects of impact were analyzed using in-hospital maternal mortality, early neonatal mortality, and perinatal mortality,[25] for which data were available by health zone (see Table 10).

Table 10: Health Indicators by Health Zone

Health Indicators	Year	Area				
		Allada-Toffo-Ze Health Zone	Abomey-Calavi-So-Ava Health Zone	Ouidah-Kpomasse-Tori-Bossito Health Zone	Atlantique Region	Benin
Maternal Mortality Rate (per 100,000 live births)	2017*1	**38.0**	107.3	61.5	82.5	199.4
	2022	**165.9**	129.3	111.1	133.9	215.5
In-hospital Maternal Mortality Rate (per 100,000 live births)	2014	**19.7**	78.8	49.5	57.1	154.6
	2022	**86.3**	93.2	76.4	87.7	171.8
Early Neonatal Mortality Rate (per 1,000 live births)	2014	**4.3**	3.7	4.0	3.9	6.4
	2022	**3.0**	6.4	5.0	5.3	6.3
Perinatal Mortality Rate (per 1,000 live births)	2014	**15.3**	21.2	20.3	19.5	26.7
	2022	**16.8**	21.8	18.8	19.9	25.5

Source: Ministry of Health: Health Statistics Yearbook 2014, 2017, 2022
Note *1: Maternal mortality rates were not included in annual statistics prior to 2016; therefore, 2017 figures are provided in the table.

[25] Combined mortality rate of stillbirths after 22 weeks of gestation and early neonatal deaths of less than 7 days of age.

In-hospital maternal mortality rate in the target health zone has been increasing at a greater rate than in other health zones, with the 2022 figure more than four times the 2014 figure. Comparing 2017 and 2022 figures, maternal mortality rates show a similar trend. According to Allada Hospital's hospital director, possible reasons for the increase in maternal mortality could be that high-risk pregnant women in the target health zone are now being transferred to Allada Hospital rather than to other health zones or to Cotonou and that the level of poverty among the population has increased over the years. As mentioned in "(2) Qualitative Effects," the fact that emergency patients from health centers in the target health zone have been transferred to Allada Hospital after the opening of Allada Hospital and that the number of patients transferred from the target health zone to Abomey-Calavi HZ actually decreased could explain the increase in the number of high-risk pregnancies transferred to Allada Hospital, resulting in an increase in deaths in the target health zone.[26] The early neonatal mortality rate in 2022 in the target health zone had improved since 2014, but in 2018, it was 2.4 deaths per 1,000 live births, and it slightly worsened between 2018 and 2022. From the above, it is difficult to conclude that the opening of Allada Hospital contributed to the improvement of maternal and early neonatal mortality rates.

2) Qualitative Effects

- Patients who were transferred to hospitals in other health zones would be transferred to Allada Hospital, reducing transfer time and the burden on patients and their families

Regarding the burden on the patients, interviews with physicians at three CSCs[27] in the target health zone were conducted. As a result, the respondent felt that the shorter transfer time increased the likelihood of saving lives. Furthermore, one respondent commented, "In the past, I used to worry a lot that my patients might not be saved even by transferring to another hospital for emergency care, but now I have much less anxiety since I started transferring them to Allada Hospital, and I feel less stress myself," suggesting that the psychological burden on medical doctors has been reduced.

According to interviews with CSC users regarding whether their family members would feel a reduced burden if they were admitted to Allada Hospital compared to if they were admitted to a hospital in Cotonou or Abomey-Calavi HZ, four out of nine respondents indicated that they would feel a reduced burden. Three of them cited reduced traveling expenses as a reason.

[26] Maternal mortality and in-hospital maternal mortality rates are worsening nationwide. Although information was collected on this social context, no factors explaining the deterioration of the indicators could be identified.
[27] Allada CSC, Toffo CSC, and Ze CSC

Based on the above, it can be said that the physical burden on the patient has decreased due to the shortened transfer time, and the burden on the family may be reduced in terms of reduced transportation costs. In addition, it can be said that the psychological burden on the medical doctors who order the patient's transfer has also been reduced.

- Alleviating chronic congestion in hospitals in other health zones that used to receive patients from the target health zone

  A questionnaire survey of Abomey-Calavi HZ, Ouidah HZ, Lagune Mother and Child Hospital, and Zou Regional Hospital was conducted to determine whether there has been a reduction in congestion at hospitals in other health zones since the opening of Allada Hospital.[28] All of the hospitals indicated that congestion has not decreased. According to Abomey-Calavi HZ's hospital director, the Atlantique region's growing population[29] may be one reason that congestion has not eased. On the other hand, the hospital director also noted that the number of patients transferred from the target health zone has been steadily decreasing. According to a doctor at Ze CSC, the rule is that all serious patients from each CSC are transferred to the HZ of the same health zone. This corroborates the downward trend in the number of patients transferred from the target health zone to Abomey-Calavi HZ after the opening of Allada Hospital. Based on the above, it cannot be said that this project's implementation has alleviated congestion at hospitals in other health zones, but the number of transfers from the target health zone to other health zones has decreased because of this project.

- Residents would have access to medical examinations and treatments that were previously unavailable.

  Fifteen of the 20 hospital users interviewed[30] indicated that the opening of Allada Hospital has allowed them to receive examinations and treatments that they were not able to receive before. Specifically, users mentioned that X-rays, some laboratory tests, dental care, cardiology care, and otorhinolaryngology care were now available at Allada Hospital. Based on the above, it can be said that this project's implementation has enabled local residents to receive medical examinations and treatments that were previously unavailable to them.

[28] Prior to the opening of Allada Hospital, patients from CSCs in Allada, Toffo, and Ze were transferred to Abomey-Calavi HZ, Ouidah HZ, and Lagune Mother and Child Hospital in Cotonou, all in the Atlantique region, as well as Zou Regional Hospital in Zou, located in the northern neighbor of the Atlantique region. (source: materials provided by JICA)
[29] The Atlantique region's population increased from about 1.18 million in 2014 to about 1.72 million in 2022. (source: Ministry of Health: Health Statistics Yearbook 2014, 2017)
[30] Same as footnote 23

- Allada Hospital's Contribution to COVID-19 response

  According to Allada Hospital staff, Allada Hospital was the first hospital in Benin (and one of only two in the country during the entire pandemic) to operate as a dedicated hospital for the admission of COVID-19 patients and received many COVID-19 patients even from outside the Atlantique region. On the other hand, there are no data on the number of admissions, tests performed, or discharges of COVID-19 patients accepted at Allada Hospital, so the results of treatment are unknown. Based on the above, although Allada Hospital helped isolate many COVID-19 patients, other quantitative and qualitative contributions cannot be determined in this study.

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Environment

The project was deemed to have minimal adverse impacts on the environment and was classified as Category C under *the Japan International Cooperation Agency Guideline for Environmental and Social Considerations* (issued in April 2010). However, at the time of the ex-post evaluation, untreated wastewater was dripping onto the grounds from the septic tank, which was used to collect all wastewater from the hospital for biological treatment. Two water pumps were installed in the septic tank, and according to the hospital's facility maintenance technician, the failure of both pumps was the cause of the wastewater spill. The plan was to neutralize and sterilize the laboratory and infectious wastewater before allowing it to join the general wastewater flowing into the septic tank. However, at the time of the ex-post evaluation, these treatments had not been performed, and the wastewater flowing out of the septic tank contained untreated laboratory and infectious wastewater. The two pumps in the septic tank need to be repaired to solve this problem. Spare parts must be ordered from Japan for repairs, but there is no way to procure them due to the hospital's budget shortage. Based on the above, wastewater, including laboratory and infectious wastewater, is flowing onto the grounds, and there is a strong concern about adverse environmental impacts. To resolve this situation, Allada Hospital is in discussions with JICA and in the process of preparing to apply for follow-up grant aid.

Photo 4: Wastewater Flowing out of a Septic Tank (source: takin by the evaluator)

2) Resettlement and Land Acquisition

According to the executing agency, there was no resettlement in this project. Regarding the

acquisition of the land, Allada commune planned to donate a part of the land owned by the commune to the Ministry of Health, which was carried out as planned.

3) Gender Equality

In the interviews with Allada Hospital staff and users,[31] in response to the question, "Do you think that access to facilities and services at Allada Hospital is equal regardless of gender?", 19 staff answered "yes" and one answered "I don't know." Thirteen users answered "yes," and 7 answered "I don't know." No one responded "I don't think so." One of the major reasons that users gave for answering "I don't know" was that they felt fine as their own gender but did not know how people of another gender felt about it. Based on the above, 80% of hospital staff and users do not perceive any gender-based inequality in hospital facilities or services.

4) Marginalized People

At the time of planning, women and people with disabilities were assumed to be the marginalized people in the project. The results of the interviews with female hospital staff and users did not reveal any cases in which being a woman made it difficult to access the hospital. People with disabilities could not be interviewed because none was present on the survey day, but it was confirmed that patients were using the handrails installed for them.

Based on the above, among those who are believed to be the marginalized people, the project can be said to be fairly benefiting women, but the equity of the benefits for people with disabilities could not be confirmed.

5) Social Systems and Norms, People's Wellbeing, Human Rights

Interviews were conducted with Allada Hospital staff and users to ask whether there were differences in the degree of well-being and satisfaction with life before the opening of Allada Hospital and at the time of the ex-post evaluation.[32] The results showed that 6 out of 20 staff members had better well-being and were more satisfied with their lives, and the reasons for this increase were related to the implementation of the project. Specific reasons given included a sense of pride in working at Allada Hospital and a sense of security because the work environment is better than at other hospitals. Interviews with hospital users did not reveal any cases in which the project contributed to changes in well-being or life satisfaction.[33] Based on the above, in some cases, the project has resulted in positive changes in hospital staff's

[31] Same as footnote 23

[32] Interviews with Allada Hospital staff were conducted with 20 people (10 male, 10 female) between February 28 and March 2, 2024, and with hospital users on May 22, 2024, with 10 people (4 male, 6 female). Both interviews were conducted at Allada Hospital.

[33] Because many hospital users speak the local language (Fon) rather than French, the interviews were conducted with the cooperation of a doctor at Allada Hospital who speaks the local language. However, it was difficult to explain changes in well-being and life satisfaction in the local language, and the intent of the questions may not have been correctly understood by most respondents.

subjective well-being/satisfaction.

6) Unintended Positive/Negative Impacts

- Helping improve residents' income

  Canteens and general stores are lined up in front of the main gate of Allada Hospital. These were newly opened by residents upon the opening of Allada Hospital and are often used by hospital staff and users. According to the two owners of the general store, their income has increased since they started their business at this location. One of them, who used to be in business and farming at the same time, is now able to make a living solely from her business, which has made her life easier. Based on the above, it can be said that this project contributed to the improvement of the income of residents who operate businesses in front of Allada Hospital.

- Construction plans for other hospitals modeled after the architectural design of Allada Hospital

  For several HZs that the Ministry of Health plans to build/renovate in the future, the plan is to model their construction after the architectural design of Allada Hospital. Allada Hospital was designed ingenuity considering an exterior that blends in with the surrounding landscape, natural lighting, and natural ventilation. In addition, whereas other HZs are generally built with separate buildings for each department, Allada Hospital was built to consolidate functions in a relatively large building, which is characterized by short workflow lines. These design innovations were positively evaluated, and it was decided that the construction design would be used for other HZs' construction/renovation. The architectural design of Allada Hospital will be highly likely to be used for other HZs' construction in the future.

- Implementation plan for Allada Hospital expansion project

  After the opening of Allada Hospital, it was decided to build Benin's first emergency hospital on the site of Allada Hospital with Benin's funds because the hospital has accepted many patients transferred from nearby health facilities. At the time of the ex-post evaluation, the draft drawings had been completed and the detailed layout and number of beds had been adjusted. There is a high possibility that the implementation of this project will have the impact of leading to the opening of the first emergency hospital in Benin.

In terms of effectiveness, with the exception of the number of outpatients, which was strongly affected by COVID-19, all quantitative effects indicators exceeded their targets, and the high level

of satisfaction with the facilities and healthcare services that local residents and hospital staff expressed indicates that the implementation for healthcare services has been strengthened. In terms of impacts, whereas quantitative effects could not be confirmed and there was a concern about the adverse environmental impacts, several intended and unintended positive impacts in qualitative effects were confirmed. This project has mostly achieved its objectives. Therefore, effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ②)

3.4.1 Policy and System

In *the Government Action Plan* (2021-2026), the national development plan at the time of the ex-post evaluation, the government of Benin had identified "strengthening effective health systems" as a priority issue. *The National Health Development Plan* (2024-2030), a development plan for the health sector, also includes "improving the quality of health services and care" and "developing health infrastructure and equipment" as key strategic directions. Therefore, sustainability in terms of policies/systems aspect is ensured.

3.4.2 Institutional/Organizational Aspect

The number of staff at Allada Hospital at the time of the ex-post evaluation and the standard number of staff in the HZ are shown in Table 11. Allada Hospital has more staff than the standard, but according to Allada Hospital's director, the standard total number of 135 staff in HZ is very low, and it is unlikely that any HZ would operate with this standard number of staff. The standard number of HZ staff available was at the time of planning and somewhat outdated, and may not have been appropriate as a standard value to measure staff sufficiency in HZ at the time of the ex-post evaluation.[34] According to the hospital director, there was a shortage of midwives, gynecologists, and equipment maintenance technicians at the time of the ex-post evaluation, but no hospital staff said their workload increased due to the personnel shortage. The lack of equipment maintenance technicians has caused problems in the maintenance of medical equipment, which is discussed in more detail below. As mentioned in "3.3.1. Effectiveness," at the time of the ex-post evaluation, Allada Hospital was receiving more number of patients than expected, and considering the high level of satisfaction that hospital staff and users expressed with the services provided, it can be concluded that the operating system at Allada Hospital is functioning well, although there are shortages in numbers in some professional positions.

[34] At the time of the ex-post-evaluation, the evaluator obtained a draft of the most recent document on the standard number of health professionals that the Ministry of Health was preparing, but it showed the number of each professional required per population and did not include the number of personnel needed in HZ. Therefore, after consulting with the Ministry of Health representative, it was decided that the ex-post-evaluation would refer to the number of HZ standard staff at the time of planning.

Table 11: Standard Number of Staff in HZ and Number of Staff at Allada Hospital at the Time of the Ex-post Evaluation

(Unit: person)

Profession	Standard number of staff in HZ	Number of staff in Allada Hospital at the time of ex-post evaluation
Medical Doctor	18	25
Nurse	20	42
Midwife	8	10
Assistant Nurse	20	63
Laboratory Technician	7	10
Medical Imaging Technician	4	6
Other Health Professionals	23	18
Administrative staff*[1]	35	62
Total	135	236

Source: Preparatory Survey Report, questionnaire Allada Hospital completed
Note *1: Including equipment maintenance technicians, drivers, security guards, laundry personnel, etc.

Regarding the equipment maintenance system, it was assumed that equipment maintenance technicians in Allada Hospital would be responsible for periodic maintenance, proper storage and management, and simple replacement of spare parts and that external maintenance providers would handle other problems. In practice, however, equipment maintenance technicians repair equipment that is repairable by themselves, and only the repair of equipment that is difficult to handle is outsourced to external maintenance providers. Behind this, Allada Hospital has a one-year contract with external maintenance providers, but the contract renewal process takes time, and the contract is not always available for maintenance requests to the external maintenance providers due to the lengthy time between expiry and renewal. At the time of the ex-post evaluation, there was still no effective contract with external maintenance providers. According to the hospital director, the contracts are expected to be signed soon, but this inadequacy of the maintenance system is thought to be one of the factors contributing to the facility and equipment maintenance problems discussed in "3.4.6. Operation and Maintenance System." In addition, although three equipment maintenance technicians are required,[35] there was only one at the time of the ex-post evaluation, and he was also in charge of facility maintenance, so the maintenance of the facilities and equipment was not well managed. Periodic maintenance of medical equipment instructed in the soft components is the responsibility of the equipment maintenance technician, who prepares an annual maintenance plan and engages in periodic maintenance. To carry out this scheduled maintenance as planned and prevent equipment malfunctions, there is an urgent need for additional equipment maintenance technicians. Allada Hospital plans to hire two equipment maintenance technicians, but the number of experienced medical equipment maintenance technicians in Benin is small, and it is difficult to find people to fill the positions.[36]

[35] *Mid-Term Employment Plan of Allada Hospital (2023-2027)*
[36] Interview with the executing agency

Based on the above, the equipment maintenance and management system in Allada Hospital is not functioning adequately and needs to be improved.

At the government level, in June 2023, the National Agency for Hospital Maintenance (Agence Nationale de la Maintenance Hospitalière, hereinafter referred to as "ANMH"), which maintains medical equipment and trains technicians was established.[37] According to the ANMH representative, at the time of the ex-post evaluation, activities targeting hospitals nationwide had not yet begun, but they plan to stock spare parts for medical equipment, strengthen the capacity of medical equipment maintenance technicians, and train new ones. Once these activities are implemented, the shortage of medical equipment maintenance personnel will likely be resolved.[38]

Based on the above, Allada Hospital generally has the necessary number of staff, except for some specialized positions, and the operating system for healthcare services is functioning. In terms of the maintenance and management system for medical equipment, there are issues with that envisioned at the time of planning, and there is a shortage of personnel. There is no prospect of hiring personnel. Therefore, sustainability in organization and structure is moderately low.

3.4.3 Technical Aspects

Regarding the daily maintenance[39] of medical equipment instructed in the soft components, sustainability of the techniques were confirmed through interviews with personnel in five departments of Allada Hospital (see Table 12). The results showed that although all departments cleaned their equipment as part of daily maintenance, many departments were not in compliance with other procedures, possibly because the daily maintenance checklists distributed in the soft components were not kept in any of the departments. Daily maintenance logbooks were used only in the laboratory department.[40] Equipment maintenance technicians and in-charge of each department were instructed to work together to develop an operator's manuals for each piece of equipment (containing only the information necessary for the equipment operator from the manufacturer's manual) during the implementation of the soft components. According to the equipment maintenance technician, these manuals were created before the COVID-19 pandemic but were lost while Allada Hospital was being used as a dedicated COVID-19 hospital. At the

[37] URL address: https://www.gouv.bj/article/2385/maintenance-infrastructures-sanitaires-membres-conseil-administration-anmh-installes/ (accessed on June 12, 2024)

[38] The evaluator attempted to obtain a human resource development plan from ANMH but have not been able to obtain it, and thus the actual human resource development plan has not been confirmed.

[39] Periodic inspections, spare parts replacement, etc. that require expertise and are performed by equipment maintenance technicians, are referred to as periodic maintenance whereas procedures performed by equipment operators (medical staff) before and after use of the equipment are referred to as daily maintenance.

[40] The laboratory department that maintained relatively effective daily equipment maintenance at the time of the ex-post evaluation reported that the operation and daily maintenance of laboratory equipment was conducted particularly well under the direction of the department head at the time of project completion, and it was reported that other departments should use this as a reference (source: materials provided by JICA). Understanding the importance of daily maintenance and the department head's willingness to address it may have contributed to the maintenance of the techniques.

time of the ex-post evaluation, it was confirmed that the equipment maintenance technician had begun to prepare materials to replace the operator's manuals, and that some of it was already posted next to the medical equipment.

Table 12: Status of Maintenance of Daily Maintenance Techniques Taught in the Soft Components

	Labo-ratory	In-patient Ward	Diagnostic Imaging	Specialized Outpatient	Emergency
Daily maintenance procedures	△	△	○	△	○
Availability of daily maintenance logbooks	○	×	×	×	×
Dissemination of manufacturer's manual storage location	○	○	○	○	○
Dissemination of reporting procedures in case of problem	○	○	○	○	○
Availability of operator's manuals	○	×	×	×	×
Regular equipment maintenance training and workshops	×	×	×	×	×

○：Done/existing、△：Partially done, ×：Not done/not existing
Source: inspection by the evaluator

One factor that may have contributed to the lack of sustainability of the techniques taught in the soft components was the lack of an approach to ensure sustainability in the soft components. According to the consultant, the project's soft components focused on the establishment of operating procedures by equipment operators during the limited implementation period, and repeated training was conducted, leaving the development of equipment maintenance systems, maintenance logbooks, operator manuals, etc. to the Beninese side. However, they were not fully implemented on the Beninese side, and the techniques taught in the soft components were not well maintained at the time of the ex-post evaluation. Therefore, there is room for improvement in the approach to habituation of instructional content.

Based on the above, the sustainability of the techniques related to the maintenance of medical equipment taught in the soft components is moderately low.

3.4.4 Financial Aspect

Allada Hospital's operating profit was in the red in 2019 and 2020 but has been in the black since 2021 (see Table 13). Allada Hospital's main sources of income are sales of services (consultation fees, etc.), sales of goods (drugs, etc.), and subsidies from the Ministry of Health. Because the number of outpatients and inpatients in 2023 was the largest ever recorded, as shown in Table 7, a certain level of services and goods sales are expected in 2023 and beyond. Because Allada Hospital receives a certain amount of subsidy each year from the Ministry of Health, the hospital is expected to have a stable income beyond 2023. On the other hand,

according to Allada Hospital's hospital director, personnel costs were insufficient at the time of the ex-post evaluation, contributing to inadequate staffing for some professional positions. According to the equipment maintenance technician, the equipment maintenance budget is also inadequate, and only a portion of the required amount planned in the annual maintenance management budget plan is allocated. This has caused problems with equipment maintenance and management. Based on the above, the hospital may not be able to properly allocate its budget, even though it has a positive operating income after 2021, and this is causing minor problems with the hospital operations. Therefore, Allada Hospital's financial condition has issues and is not expected to improve at the time of the ex-post evaluation.

Table 13: Financial Status of Allada Hospital

Unit: West African CFA Franc

	2019	2020	2021	2022
Income				
Services sales	390,066,233	261,172,320	184,101,472	210,567,368
Goods sales	84,125,515	0	106,063,257	148,822,285
Subsidies from the Ministry of Health	78,093,000	100,000,000	111,671,775	104,716,960
Others	3,213,200	0	11,256,356	10,468,326
Total income (A)	**555,497,948**	**361,172,320**	**413,092,860**	**474,574,939**
Expenditure				
Personnel expenses	281,526,943	167,610,446	161,500,478	125,505,506
External service fees	114,500,343	57,298,687	29,762,607	30,911,010
Purchasing of goods	66,427,379	48,925,240	82,687,241	133,159,051
Others	116,643,934	86,423,286	106,000,580	117,453,310
Total expenditure (B)	**579,098,599**	**360,257,659**	**379,950,906**	**407,028,877**
Changes in inventories (C)	-17,698,136	111,264,778	42,933,053	14,521,652
Gross operating income (D=A-B+C)	-41,298,787	112,179,439	76,075,007	82,067,714
Reversal of allowance and depreciation (E)	0	0	207,174,769	210,619,852
Allowance and depreciation losses (F)	-256,860,130	-258,077,506	-263,368,696	-259,335,625
Operating profit (D+E+F)	**-298,158,917**	**-145,898,067**	**19,881,080**	**33,351,941**

Source: Financial report of Allada Hospital

3.4.5 Environmental and Social Aspect

As mentioned in "3.3.2.2. Other Positive and Negative Impacts," there is a concern about adverse environmental impacts because wastewater is discharging from the septic tank and there is no prospect of repairing the failure of the water pump that is the cause. To solve this situation, Allada Hospital is in discussions with JICA and in the process of preparing to apply for a follow-up grant aid.

3.4.6 Status of Operation and Maintenance

At the time of the first field survey, the evaluator checked the usage status of 175 major equipment items (82 types of items) out of 683 items (189 types of items) that the project provided and found that 30 items were not in use due to malfunction. The Beninese side procured new ones to replace several broken equipment essential for medical treatment (vaccine refrigerators, automatic blood analyzers, etc.) as new. The main causes of failure vary depending on when it happened. After the opening of the hospital, around 2018-2019, a series of failures occurred in equipment without an automatic voltage regulator (AVR) installed in the project due to voltage fluctuations caused by frequent power cuts.[41] At the time of defect inspection,[42] a recommendation was made to Allada Hospital to install AVRs on motorized equipment, and at the time of the ex-post evaluation, the AVRs that Allada Hospital purchased were being prepared for installation. In 2020-2021, unused equipment was not properly stored while Allada Hospital operated as dedicated COVID-19 hospital, and the equipment maintenance technician was transferred to another health facility, so the equipment continued to be used without periodic maintenance. This was the main cause of the malfunctions in this period.[43]

According to the equipment maintenance technician, the facility also experienced many problems while Allada Hospital was used exclusively for COVID-19 patients. During the first field survey of the ex-post evaluation, several defects were observed, including damage to the ceiling panels, leaks due to roof damage, missing shower heads in the shower rooms, leaks from the plumbing in the hand washing basins, and no water coming from the hand washing basin tap. Despite these multiple problems, at the time of the second field survey, it was revealed that the government of Benin had allocated a maintenance budget for facilities and equipment to Allada commune, that there was a plan for Allada commune to repair Allada Hospital's facilities and equipment, and that repairs were likely to be made. For equipment maintenance, contracts have already been signed between Allada Hospital and Allada commune for the surgery department, diagnostic imaging department, and laundry ward, and contracts for the other departments are expected to be signed in due course. Repairs have not yet been made to the equipment in the departments which already have the contracts. Facility repairments were completed after the first field survey in March 2024. Leaks due to roof damage and water leakage from pipes identified during the first field survey were confirmed to have been repaired during the second field survey.

Based on the above, some issues have been observed in the institutional/organizational, technical, finance, 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.

[41] Materials provided by JICA, Defect Inspection Report
[42] Implemented in February 2019
[43] Interview with equipment maintenance technician of Allada Hospital

Photo 5: Leakage areas identified during the first on-site survey (confirmed repairment during the second survey) (source: taken by the evaluator)

Photo 6: Broken medical equipment stored in the maintenance room (source: taken by the evaluator)

4. Conclusion, Lessons Learned, and Recommendations

4.1 Conclusion

The objective of this project is to strengthen the implementation system of healthcare services in Allada-Toffo-Ze health zone in the Atlantique region by establishing a core hospital in the region, thereby contributing to the expansion of opportunities for the provision of healthcare services, including maternal and child healthcare. The project objective aligned with Benin's development policy and the development needs of the maternal and child health sector in the region as well as the needs for a referral hospital. Although there was no collaboration with other organizations or donors, the project objective was consistent with Japan's ODA policies for Benin, and it was confirmed that the quality of healthcare services have improved as a result of collaboration with another JICA project. Therefore, its relevance and coherence are high. Although its outputs were mostly as planned, the project cost slightly exceeded the plan and the project period significantly exceeded the plan, so the efficiency of the project is moderately low. As a result of the project's implementation, Allada Hospital has exceeded the targets for the clinical indicators set at the time of planning and received high satisfaction ratings from hospital staff and users. Although issues regarding negative environmental impacts remain, several intended and unintended positive impacts were identified. Therefore, effectiveness and impacts of the project are high. In terms of sustainability, some issues have been observed in the institutional/organizational, technical, finance, 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's effect is moderately low.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Establishment of a daily maintenance management system for medical equipment

Regarding daily maintenance necessary to prevent breakdowns of medical equipment, Allada Hospital should establish a system in which equipment operators habitually perform daily maintenance of medical equipment by the end of 2025, in collaboration with the Quality Management Team, which is leading the 5S-KAIZEN activities in the hospital, and equipment maintenance technicians. The following are specific examples of such activities: utilizing the checklists for daily and periodic maintenance and the manuals for the equipment developed under the soft components of the project, holding workshops systematically for equipment operators to learn daily maintenance methods, preparing posted materials for each equipment to show daily maintenance procedures, and preparing daily maintenance logbooks.

Assignment an appropriate number of equipment maintenance technicians

The Ministry of Health should assign at least two equipment maintenance technicians trained by ANMH to Allada Hospital as soon as possible to improve the equipment maintenance and management system at Allada Hospital.

4.2.2 Recommendations to JICA

Follow-up cooperation on equipment maintenance

At the time of the ex-post evaluation, 30 of the 175 items (82 types of major equipment) provided in the project were still malfunctioning and had not been repaired. One of the main reasons for the failure was the operation of Allada Hospital as a dedicated hospital for COVID-19 patients during the COVID-19 pandemic in 2020-2021. Although the Beninese side would normally undertake the maintenance and management of the provided equipment after the completion of the project, the external factors of the COVID-19 pandemic have hindered the maintenance of the equipment, and the current financial situation of Allada Hospital makes it difficult to repair or replace broken equipment in a short period. Therefore, JICA should provide possible assistance to ensure that all medical equipment is functioning properly. It is desirable to give priority to addressing the failure of the water pumps, which is the cause of wastewater outflow from the septic tank[44]. In addition, because the Allada commune plans to repair the equipment, it is necessary to coordinate with the commune and Allada Hospital to ensure that no repairs or replacements overlap each other. Technical guidance on daily and periodic maintenance of the equipment instructed in the soft components of the project should be included in the cooperation, including the establishment of a system to implement them

[44] To solve the problem, Allada Hospital is discussing with JICA and preparing to apply for a follow-up grant aid.

habitually.

4.3 Lessons Learned

Combination of soft components and technical cooperation projects

In the project's soft components, training was repeatedly conducted during the limited implementation period, with an emphasis on learning how to operate the equipment operation by medical equipment operators. On the other hand, the soft components did not include the establishment of a system for equipment maintenance (daily maintenance by equipment operators and periodic maintenance by equipment maintenance technicians), the preparation of maintenance logbooks and operator's manuals, or the establishment of a system for workshops among staff after the project was completed; these were left to the Beninese side. This was one reason that the techniques taught in the soft components were not well maintained. Although it would have been ideal to include in the soft components a system for monitoring the implementation of daily maintenance in each department based on the maintenance logbooks and a system for conducting periodic workshops, as the consultant suggested to the hospital, it was difficult to ensure how to operate the equipment operation and establish a system for equipment maintenance within the limited implementation period of the soft components. Based on the above, for similar projects involving the procurement of medical equipment, it is recommended to establish a sustainable equipment maintenance and management system by combining soft components and technical cooperation projects, etc., so that support can be provided not only for technical guidance on equipment operation and maintenance techniques, but also for the establishment of mechanisms and systems to ensure the sustainability of the instructed techniques.

5. Non-Score Criteria

5.1 Performance

5.1.1 Objective Perspective

According to the questionnaire responses from the consultant, many problems occurred in the equipment procurement process, such as delays in payment from the ordering party to suppliers and incorrect orders. However, the consultant was able to receive advice from JICA officials from time to time by providing them with progress reports on subsequent reorders of equipment, shipping times, arrival times at the site, and other matters. As a result, the delayed procurement of equipment was facilitated. Based on the above, it is concluded that JICA appropriately communicated with the consultant and provided support to them.

5.2 Additionality

None.

(End)