Ex-Post Project Evaluation 2021
Package II-4 (Tunisia, Mozambique)
Evaluation Reports

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JAPAN INTERNATIONAL COOPERATION AGENCY

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The Republic of Tunisia

FY2021 Ex-Post Evaluation Report of
Japanese ODA Loan Project
"National Television Broadcasting Center Project"

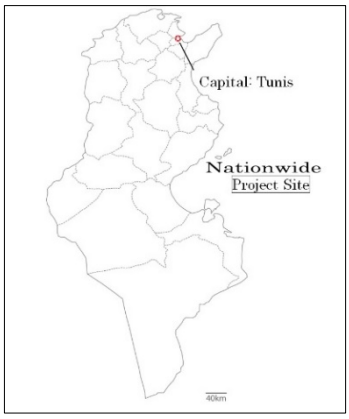
External Evaluator: Kenichi Inazawa, Octavia Japan, Co., Ltd.

0. Summary

This project aimed to enhance television broadcasts by introducing broadcasting equipment and by transferring technologies to the new television broadcast center of the Tunisia Television Establishment (Etablissement de la Télévision Tunisienne) responsible for public broadcasting, thereby contributing to the realization of highly reliable public television broadcasting, the increase in opportunities to provide information to the public through television broadcasting, and the promotion of mutual understanding between Japan and Tunisia. "Consistency with the development plan" and "consistency with development needs" are confirmed in this project. Regarding coherence, it can be said to be coherent in terms of "consistency with Japan's ODA policy" and "internal coherence." As for "external coherence," there are commonalities between this project and the projects of other donors in terms of realizing smooth broadcasting, improving broadcasting quality and increasing information provision opportunities. Therefore, its relevance and coherence are high. Regarding efficiency, even though there was an additional output, the outputs were mostly as planned. The project cost was also almost as planned. However, the project period was significantly longer than planned. Therefore, the efficiency of the project is moderately low. With respect to effectiveness and quantitative effect indicators, the actual values are above the target values. Additionally, an educational channel has been newly established. Through interviews, it was confirmed that the work efficiency of TV program production and the quality of program contents have improved, and so have the technical level and motivation of operative staff. With regard to impacts, the interviews also confirmed that this project has increased information provision opportunities, improved program quality, and improved viewers' trust in the Tunisia Television Establishment as a source of information. Therefore, this project has achieved its objectives more than it is planned. Therefore, effectiveness and impacts of the project are very high. No issues have been observed in the policy/systems, institutional/organizational, technical or financial, including the current status of the operation and maintenance system, and sustainability is ensured. In addition, preventive measures have been taken regarding environmental and social considerations and risks. Therefore, the sustainability of the project effects is very high.

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

1. Project Description



Project Location
(Source: JICA)

Procured Signal Distribution System
(Source: Tunisia Television Establishment)

1.1 Background

Prior to the start of this project, the broadcast area of the Tunisia Television Establishment (solely responsible for public broadcasting in Tunisia) was 99.7% of the country. As it almost covered the entire Tunisia, and the percentage of households with television sets reached 90.2%, television broadcasting had a large impact. However, the building of the Tunisia Television Establishment in the capital Tunis was built in 1955 originally for the purpose of radio broadcasting, and the studios inside the building were small and dilapidated. Broadcasting equipment was antiquated, which constrained program production. Therefore, the expansion and modernization of television broadcasting by introducing modern broadcasting equipment and expanding studio facilities was an urgent issue.

1.2 Project Outline

The objective of this project was to enhance television broadcasts by introducing broadcasting equipment and materials and by transferring technologies to the new television broadcast center of the Tunisia Television Establishment responsible for public broadcasting, thereby contributing to the realization of highly reliable public television broadcasting, the increase in opportunities to provide information to the public through television broadcasting, and the promotion of mutual understanding between Japan and Tunisia.

Loan Approved Amount/ Disbursed Amount	4,075 million yen/4,069 million yen	
Exchange of Notes Date/ Loan Agreement Signing Date	March 12, 2007/March 12, 2007	
Terms and Conditions	Interest Rate	0.4%

	Repayment Period (Grace Period Conditions for Procurement	40 years 10 years) Tied (Special Terms for Economic Partnership (SETP))
Borrower / Executing Agency(ies)	The Government of the Republic of Tunisia/ Tunisia Television Establishment[1]	
Project Completion	July 2019	
Target Area	Entire Tunisia	
Main Contractor(s) (Over 1 billion yen)	Sumitomo Corporation	
Main Consultant(s) (Over 100 million yen)	None (over 100 million yen)	
Related Studies (Feasibility Studies, etc.)	None	
Related Projects	[Grant Aid Project] - "The Project for the Improvement of TV Programs of Tunisian Television" (grant aid contract signed in 2015) [Other International Organization, Aid Agency, etc.] - "Technical advice by dispatching experts" (German public broadcasting station (ZDF))	

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Octavia Japan, Co., Ltd.

2.2 Duration of Evaluation Study

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

Duration of the Study: November 2021-February 2023

Duration of the Field Study: No international travel was involved, and surveys were conducted remotely with a field survey assistant.

[1] When this project began, the Tunisia Television Establishment belonged to the National Radio and Television Broadcasting Corporation (Établissement de la Radiodiffusion-Télévision Tunisienne (ERTT)) along with the National Radio Station. However, the Ben-Ali administration decided to split the ERTT into a television station and a radio station. As a result, the Tunisia Television Establishment was established on August 31, 2007. Since then, the Tunisia Television Establishment has been in charge of state-owned television broadcasting. Therefore, the term "Tunisia Television Establishment is used throughout this report.

2.3 Constraints during the Evaluation Study

(Remote Field Survey Utilizing a Field Survey Assistant)

Due to COVID-19, the external evaluator did not travel internationally for this study. With the local survey assistant, the external evaluator conducted the site visits remotely, collecting information/data and conducting interviews with the individuals concerned. The external evaluator analyzed the information collated so as to conduct evaluation analyses and make appropriate judgements.

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

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

3.1.1 Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of Tunisia

Before the start of this project, the *10th Five-Year Plan* (2002-2006) formulated by the government of Tunisia called for construction of a new broadcasting center of the Tunisia Television Establishment and enhancement of its facilities, with the aim of enhancing program contents by modernizing the television broadcasting facilities. In addition, increasing the number of television broadcasting channels and further enhancement of television production were identified as one of the priority areas in the *11th Five-Year Plan* (2007-2011).

At the time of the ex-post evaluation, the government of Tunisia attaches great importance to the communication technology and digital economy fields in its *Five-Year National Development Plan*[4] (2016-2020). Specifically, the following are advocated: "Technology development in the audiovisual field and formulation of monitoring, research, and management policy concerning digital technologies," "strengthening the principle of national sovereignty through the development and enhancement of terrestrial digital radio and television broadcasting networks," "expansion of audiovisual environment by switching to the existing terrestrial digital television broadcasting network and high-definition TV," "rationalization of frequency spectrum usage, promotion of research and operation plans." The government is also planning to improve governance in the field of information and communication technology and strengthen supervision and monitoring of projects to be implemented through *Digital Tunisia 2020*,[5] a national strategic plan for this sector.

Based on the above, enhancement of TV broadcast program production was a priority before the start of this project, and improvement in the audiovisual environment by developing and

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

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

[4] Currently at the time of the ex-post evaluation, the next national development plan is being formulated; however, its announcement has been delayed for political reasons.

[5] This is a strategic document released by the Ministry of Communication Technologies and Digital Economy in response to the "Tunisia Digital Summit" held in 2017. Based on this document, the Tunisia Television Establishment aims to formulate a "master plan" and create a digitization guideline by the end of 2022.

strengthening terrestrial digital radio and TV broadcasting networks and by switching to high-definition TV continues to be a priority at the time of the ex-post evaluation. Therefore, this project is consistent with the policies and measures of the national and sector plans.

3.1.1.2 Consistency with the Development Needs of Tunisia

Before the start of this project, as per the priorities areas stipulated in the *10th Five-Year Plan* (2002-2006), enhancement of the environment surrounding television broadcasting was expected at the Tunisia Television Establishment, such as the introduction of modern television broadcasting equipment, production of high-quality programs, diversification of programs, and more broadcast time. The Tunisia Television Establishment's broadcast area was 99.7%, almost covering the entire Tunisia. The percentage of households with television sets reached 90.2%, and television broadcasting had a large impact. However, the broadcasting center was built in 1955 originally for the purpose of radio broadcasting, and the studios inside the center were small and dilapidated. Broadcasting equipment was antiquated, which constrained program production. Therefore, the expansion and modernization of television broadcasting by introducing modern broadcasting equipment and expanding studio facilities was an urgent issue.

At the time of the ex-post evaluation, the government of Tunisia is assisting and spending for the Tunisia Television Establishment, which is responsible for public broadcasting, to modernize television broadcasting equipment and expand the content of broadcasting. In addition to the support provided by this project, the Tunisia Television Establishment is responding to the need for modernization by enhancing broadcasting equipment with the support of the Tunisian government so as to diversify its broadcasting. The examples include: the IT program production system was updated to high definition (hereinafter referred to as "HD") in 2015; the main channels of the Tunisia Television Establishment, the 1st Tunisia National Channel and the 2nd National Channel (hereinafter referred to as "Watanya 1, Watanya 2") broadcasting servers were updated to HD specifications in 2020-2021; IT information system (Newsroom computer system; NRCS) was updated to HD in 2021; and distribution by digital platform (DPF) began.[6]

Based on the above, the government of Tunisia has provided financial support to the Tunisia Television Establishment in order to improve the quality of public broadcasting and meet the diversifying needs of viewers both before the start of this project and at the time of the ex-post evaluation. The Tunisia Television Establishment has also been working on expanding and modernizing broadcasting equipment. Therefore, this project is consistent with the development needs.

[6] Factors behind this are diversified needs and contents of TV program production and changes in the environment surrounding TV broadcasting. For example, watching Internet videos (e.g., YouTube) has become very popular in recent years, and the Tunisia Television Establishment is working harder than ever to modernize program broadcasting equipment, diversify contents, increase information provision opportunities and improve quality.

3.1.2 Coherence (Rating: ③)

3.1.2.1 Consistency with Japan's ODA Policy

Before the start of this project, the government of Japan formulated the *Country Assistance Plan for Tunisia* (October 2002). In this paper, the following were listed as sectors and themes that were particularly important of the main development issues: (1) raising the level of industry; (2) developing and managing water resources; and (3) environment. Regarding (1), it was promoted that "Japan would assist economic infrastructures, centered on the information and communication sector, in which Japan could employ its strengths." In addition, the *Medium-Term Strategy for Overseas Economic Cooperation Operations* (April 2005) formulated by JICA specified "poverty reduction," "foundation for sustainable growth," and "human resources development" as the priority areas of assistance.

This project aims to enhance television broadcasts through the introduction of broadcasting equipment and technology transfer, increase opportunities to provide information to the public through television broadcasting and contribute to the improvement of the industry, the information and communication sector and to the national development, which is in line with the *Country Assistance Plan for Tunisia* and the *Medium-Term Strategy for Overseas Economic Cooperation Operations*. Therefore, it is consistent with Japan's ODA policy.

3.1.2.2 Internal Coherence

Program contents were provided by Japan[7] in the Grant Agreement (G/A) for the "Project for the Improvement of TV Programs of Tunisian Television" (a grant aid project) signed between Japan and the government of Tunisia in 2015. It gave Tunisian viewers an opportunity to learn about Japanese culture, traditions and lifestyles. As will be discussed in 3.3.2.1 Intended Impacts, provided program contents were rebroadcast every year and were well received by viewers. While this project supported the hardware (introduction of program broadcasting equipment, etc.), the grant aid project took care of the software (contents). It is presumed that cooperation and synergy were created between the two projects.

3.1.2.3 External Coherence

Before the start of this project, the Tunisia Television Establishment signed a technical cooperation agreement with the German public broadcasting station (ZDF). Under this agreement, one expert was dispatched to the corporation to provide technical advice, through which the corporation improved the technical aspect of the broadcasting equipment operation. Since the start of this project, the European Union (EU) has provided the Media Support Program

[7] The main part of the project was provision of 10 high-quality educational program software (177 packages) and 21 documentary program software (138 packages) in Japan.

(PAMT/MEDIA UP) to the Tunisia Television Establishment. To be more specific, broadcasting-related equipment (e.g., camcorders for video editing, laptop PC equipment, etc.) has been provided to improve the means of producing TV programs through the "African Centre for Training of Journalists and Communicators."[8] Although specific cooperation/coordination was not foreseen at the time of planning, such support and this project have commonality, from the viewpoint of realizing smooth broadcasting, improving the quality of broadcasting and increasing information provision opportunities.[9] In relation to the international framework, this project aimed to expand television broadcasting and provide the people of Tunisia with equal access to information by procuring and installing broadcasting-related equipment for the Tunisia Television Establishment. Therefore, it is consistent with the Sustainable Development Goal, "10. Reduce inequality within and among countries."

<Summary of Relevance and Coherence>

"Consistency with the development plan" and "consistency with development needs" are confirmed in this project. Regarding coherence, "consistency with Japan's ODA policy" and "internal coherence" are observed. Concerning "external coherence," from the perspective of realizing smooth broadcasting, improving the quality of broadcasting, and increasing information provision opportunities, there is a commonality between this project and other donors' projects. Considering the above, the project's relevance and coherence are high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

This project was to procure and install equipment necessary for expanding and modernizing broadcasting equipment. Table 1 shows the plan and actual outputs of this project.

Table 1: Planned and Actual Outputs of This Project

Plan (at the time of the appraisal: 2007)	Actual (at the time of the ex-post evaluation: 2021-2022)
1) Procurement and installation of program production equipment - Infrastructure network for program production facilities	1) Procurement and installation of program production equipment → Implemented almost as planned. (Two high-

[8] African Centre for Training of Journalists and Communicators (CAPJC) is in charge of training for the medias in Tunisia. Established in 1983, the center aims to improve the abilities of professional journalists through re-education courses and various specialized programs.

[9] On the other hand, this project aimed to introduce the latest digital technology in response to the global trend of digitization of television broadcasting. As mentioned above, although it was not confirmed that this project cooperated or coordinated with the other international organizations' assistance, introduction of high-quality program contents from outside Tunisia is expected to further progress in the future. This project bears the foundation, and it can be said that significance of implementing the project is high.

- Studio equipment and materials - Server system	definition (HD) outside broadcasting vans [10] (hereinafter referred to as "HD outside broadcasting vans") were introduced as an additional output.)
2) Consulting Services - Construction supervision - Technical guidance and training - Support for exchange with Japanese broadcasting stations	2) Consulting Services → Reduced. (Only the equipment installation assistance, coordination between the Tunisia Television Establishment and the supplier, and support for exchange with Japanese broadcasting stations were implemented.)

Source: JICA's documents (at the time of the appraisal), Project Completion Report, answers to the questionnaire (at the time of the ex-post evaluation)

The differences between the plan and the actual outputs shown in Table 1 are explained below.

1) Procurement and Installation of Program Production Equipment

It was almost as planned. The HD outside broadcasting vans were added because they were judged to be necessary for the production of high-resolution TV programs and quality assurance, as the ones owned by the Tunisia Television Establishment were antiquated. Another factor is that HD outside broadcasting vans were expected to be used in various fields such as sports, culture, and events.[11] According to the interview with the staff in charge of the HD outside broadcasting vans, "Since the audio and video devices were separate in the old outside broadcasting vans, we needed to carefully link the audio and video. The new outside broadcasting vans have the audio and video incorporated together, and the technology and quality of the generated signal are significantly higher. You can see the difference between old and new, and I think the viewers are highly satisfied. The time and cost of producing programs have decreased. I think we have the better environment for quality broadcasting (e.g., sports live broadcasting) that is one step ahead in the highly competitive media industry." Based on such a comment, it is observed that expectations for the two HD outside broadcasting vans introduced as additional output and their operational results are high.

2) Consulting Services

The initial plan included "construction supervision" and "technical guidance and training" in the activities, but these were excluded. "Construction supervision" was affected by the Jasmine

[10] It is also called OB VAN HD1 and HD2 mobile control unit.

[11] The vehicle is a 26-ton trailer, and the towed vehicle is equipped with all TV relay equipment. It is suitable for sports broadcasts from stadiums because it has the ability to connect ten 3G-HD cameras and two slow motion cameras for recording at all times. It also has a function that can be used for recording studio programs by using it next to the studio of the Tunisia Television. HD outside broadcasting vans were planned to be procured utilizing the remaining funds of the Japanese ODA loan, which was agreed by JICA. The procurement cost was approximately 129 million yen, which is approximately 2.3% of the total project cost; it is judged to be not relatively significant.

Revolution (Arab Spring),[12] which will be explained in the 3.2.2.2 Project Period. Specifically, due to political instability, the procurement and delivery of program production equipment were done ahead of schedule, and as a result, the Tunisia Television Establishment ended up taking charge of the construction supervision.[13] "Technical guidance and training" was also affected, and it was done by the supplier of this project. (Details of the implementation will be explained in "3.4.3 Technical Aspect.")

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost planned at the time of the appraisal was 6,520 million yen (of which 4,075 million yen was to be borne by the Japanese ODA loan). The actual amount was 6,529 million yen (of which the ODA loan covered 4,069 million yen), which was almost as planned (approximately 100% of the plan).[14]

3.2.2.2 Project Period

At the time of the appraisal, the project was planned to run from March 2007 to September 2013 for six years and one month (73 months).[15] On the other hand, it actually lasted from March 2007 to August 2020 for 13 years and six months (162 months), which was significantly longer than the initial plan (approximately 222% of the plan). The main reasons were the following. Immediately after the start of this project, the financial situation of the central government of Tunisia worsened, and it was decided to conduct the bidding in two parts (Phase 1 and Phase 2). Phase 1 tendering was completed early, and preparations for Phase 2 tendering were in progress. However, the Jasmine Revolution (Arab Spring) occurred in January 2011 and affected the project's progress. As a result, Phase 2 started in 2012, more than five years after the signing of the loan agreement, and the tendering announcement was pushed to the middle of 2014, resulting in a significant delay. More specifically, after the Jasmine Revolution, the provisional government re-examined the priorities of public work projects, including this one, causing confusion and

[12] High unemployment rate and inflation were factors behind people's dissatisfaction which led to demonstrations and riots. Anti-government protests spread nationwide, and President Ben Ali fled to Saudi Arabia.

[13] The Tunisia Television Establishment requested JICA to "exclude construction supervision." JICA agreed and decided to dispatch a procurement support expert to the Tunisia Television Establishment as a support measure. With the support of procurement support experts, the Tunisia Television Establishment reviewed procurement equipment list and prepared for bidding. In addition, JICA Tunisia Office conducted interim supervision and progress monitoring.

[14] The exchange rate at the time of the appraisal was 1 Tunisian dinar = 88 yen, while the average exchange rate during the project was 55.55 yen. When calculating the yen conversion amount by applying this rate, the actual amount will be 5,620 million yen (in this case, approximately 86% of the plan). However, since no factors other than the exchange rate fluctuation were identified during the implementation of this project, the fluctuation is thought to have been affected by the Jasmine Revolution, and thus, it was not taken into consideration (i.e., the exchange rate of 88 yen at the time of the appraisal was applied) when calculating the actual amount. As a result, it was approximately 100% of the plan.

[15] At the time of the appraisal, the completion time of this project was defined as "at the end of the warranty/support period."

taking time for various procedures, and human resource reshuffles of the Tunisia Television Establishment caused a delay in the organizational decision-making process, which also affected the preparation and implementation of tendering.

On the other hand, in this ex-post evaluation, it is thought to be appropriate to consider the period of turmoil of the Jasmine Revolution as an external factor. One year and one month (13 months), from December 2010 (at the time of the riot and large-scale anti-government demonstration) to December 2011 (at the time of the establishment of the coalition government and the election of the new president), can be considered a period affected by external factors, delaying the project progress.[16] Specifically, as it can be said that the timing of the tendering and procurement was directly affected, it is realistic to exclude this period. Therefore, as mentioned above, while the actual period was approximately 222% of the plan, it was practically 149 months (= 162 - 13 months), excluding the directly affected period (13 months). The project period was 149 months as compared to the plan of 73 months; in other words, it can be judged to have significantly exceeded the initial plan (approximately 204%).

3.2.3 Results of Calculations for Internal Rates of Return (Reference only)

The IRR was not calculated at the time of the appraisal because this project was not of the nature of increasing profitability. Therefore, it was not recalculated at the time of the ex-post evaluation.

<Summary of Efficiency>

As discussed above, while there was an additional output, this project was implemented mostly as planned. Although the project cost was almost as per the plan, the project period significantly exceeded the plan. Therefore, the efficiency of the project is moderately low.

[16] Reasons for recognizing it as an external factor include “they were not events that occur continuously or not frequently in the project area” and “they were not assumed as risks at the time of the appraisal.” (Source: JICA Ex-post Evaluation Reference 2021)

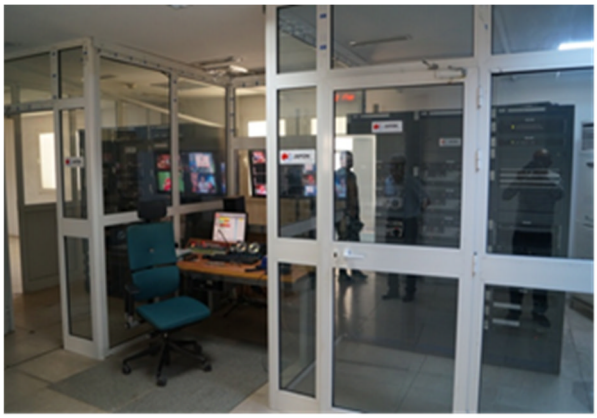


Photo 1: Procured Video Cassette Recorder LET (playback/recording/transfer)
(Source: Tunisia Television Establishment)

Photo 2: Outside Broadcasting Vans Procured as Additional Outputs (2 Units)
(Source: Taken during the field survey)

3.3 Effectiveness and Impacts[17] (Rating: ④)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

This project aimed to enhance television broadcasts by introducing broadcasting equipment and transferring technologies.[18] Table 2 shows its effectiveness and quantitative effect indicators (baseline, target, actual values).

Table 2: Quantitative Effect Indicators of This Project (Baseline, Target, Actual values)

Indicator	Baseline value (2005)	Target value (2013: Completion Year)	Actual value			
			2018	2019	**2020 (Completion Year)**	2021
1) Number of programs produced (unit: programs)	45 (TV 7) 55 (Canal 21)	55 (TV 7) 60 (Canal 21)	120 (Watanya 1) 84 (Watanya 2) **Total: 204**	140 (Watanya 1) 94 (Watanya 2) **Total: 234**	134 (Watanya 1) 90 (Watanya 2) **Total: 224** 200 (Watanya Education)	96 (Watanya 1) 64 (Watanya 2) **Total: 160** 200 (Watanya Education)
2) Total	7,155	7,870	8,760	8,760	8,760	8,760

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

[18] (Reference information) At the time of the ex-post evaluation, there are nine television stations in Tunisia other than the Tunisia Television Establishment. (1. El Hiwar El Tounsi, 2. Nessma TV, 3. Hannibal TV, 4. Carthage +, 5. Attessia TV, 6. Al Janoubia TV, 7. Telveza TV, 8. Tunisna TV, 9. El Insen TV)

broadcast time (unit: hours)	(TV 7) 3,640 (Canal 21)	(TV 7) 5,840 (Canal 21)	(Watanya 1) 6,570 (Watanya 2)	(Watanya 1) 6,570 (Watanya 2)	(Watanya 1) 6,570 (Watanya 2) 8,760 (Watanya Education)	(Watanya 1) 6,570 (Watanya 2) 8,760 (Watanya Education)

Source: JICA's documents (baseline and target values), answers to the questionnaire and interviews (actual values)

As quantitative effect indicators of the project, the "number of programs produced" and "total broadcast time" were set at the time of the appraisal. Although the target year was set to 2013 (project completion year), the actual completion time is 2020; thus, the actual values around 2020 were collected in this survey. The analyses of both indicators are shown below.

1) Number of Programs Produced

The actual value of the sum of Watanya 1 and 2 (134 + 90 = 224) for the year of completion (2020) was about twice the target value (55 + 60 = 115). In 2011, immediately after the Jasmine Revolution, the channel names of the Tunisia Television Establishment were changed from the previous TV 7 and Canal 21 to Watanya 1 and Watanya 2. Watanya 1 is centered on news, breaking news, political debates, election specials, talk shows, and sports (soccer, basketball, volleyball, tennis, athletics, etc.).[19] Watanya 2 is centered on drama, entertainment, literature and the arts.[20] The reason why the actual value was significantly larger than the target value is as follows. Before the start of this project, the Tunisia Television Establishment used only three editing devices for all program production, from news to entertainment. Broadcasting was done in an analog broadcasting control room, and produced programs were recorded on cassette tapes, which were complicated to use. As it was mostly done manually, it took an enormous amount of time from production to broadcasting. However, with the introduction of broadcasting equipment (e.g., 12 digital non-linear editing devices for TV programs, seven of the same devices for news, etc.) by this project, the number of productions increased dramatically. The two HD outside broadcasting vans are also fully operational at program production sites, which has led to an improvement in the quality of broadcasting, especially in sports broadcasts such as soccer.

The actual values of the years before and after the completion year also exceeded the target values; however, in 2021, the number of programs produced decreased to 160 due to COVID-19. While it was largely affected by the fact that programs dealing with infectious disease control as well as health and hygiene were broadcast for long hours, it was because programs that involved

[19] According to the Tunisia Television Establishment, viewers are generally in their 40s or older, many are not only in urban areas but also in rural areas, and that sports programs are popular regardless of generation.
[20] Similarly, many viewers are children and young people who prefer to watch the popular situation comedy "Choufli Hall" in Tunisia, and many women who prefer to watch dramas from the past.

the participation of general viewers (game shows, debate programs, etc.) were postponed.

"Watanya Education," shown in the table, is an educational TV channel for children who cannot go to school or have to self-isolate at home due to the spread of COVID-19. The Tunisia Television Establishment has strengthened its cooperation with the Ministry of Education of Tunisia and has been broadcasting 200 TV programs annually since 2020. As mentioned above, while the total number of programs produced decreased in 2021, the Tunisia Television Establishment has been taking measures to accommodate the needs of the viewers in light of the spread of COVID-19. The content ranges from children's programs to mathematics, physics, and literature. According to the Tunisia Television Establishment, the introduced studio equipment (program production room, virtual studio, graphic production, post-production room,[21] etc.) is particularly contributing to the start of this educational channel. It can be said that this project is contributing to program establishment.

2) Total Broadcast Time

The actual values of the completion year (2020) exceeded the target values. The breakdown of 8,760 hours for Watanya 1 is 24 hours a day x 365 days. That is, it is broadcast 24-hour, including late-night programs. Watanya 2's 6,570 hours is calculated as 18 hours x 365 days. It is not broadcast during nighttime (6 hours). According to the Tunisia Television Establishment, the program production-related equipment introduced in this project (e.g., signal distribution center, master control system, recording equipment, distribution system, broadcasting server system) is leading to modernized broadcasting and long hours. As is the case with Watanya 1, Watanya Education is broadcast 24 hours a day (8,760 hours a year).

Table 3 shows changes in average audience rating.[22] It can be seen that it is on an upward trend year by year. In particular, the rating of Watanya 2 rose significantly around 2020. The reason is that the Tunisia Television Establishment has redesigned its program strategy centered on broadcasting dramas, entertainment programs from the past, and documentary programs with a high degree of sociality and culture, thereby reorganizing the programs. One of the factors in this is the introduction of program production equipment by this project. The use of new program production equipment has made it possible to organize programs efficiently, and the versatility of broadcasting equipment has led to better strategic planning. Through interviews with the Tunisia

[21] A space used for editing video and music, recording and correcting narration and sound effects, and mastering.

[22] A private company specializes in statistical analyses is cooperating in the numerical calculation. The survey is conducted every day from 5 pm to midnight. Based on different age groups and categories by social status and occupation, gender is evenly distributed nationwide; the number of viewers is grasped by combining multiple statistical methods. The Tunisia Television Establishment calculates the audience rating based on the number of viewers data received from this company. The rating for Watanya Education has not been calculated yet because it was recently started. According to the Tunisia Television Establishment, the audience rating of Watanya Education is lower than that of Watanya 1 and 2 due to the nature of it being an educational channel.

Television Establishment, it is observed that the corporation is working on program production and organization that meet the needs of viewers. It seems that new programs are well received by viewers.[23]

Table 3: Changes in the Average Audience Ratings of Watanya 1 and Watanya 2

(Unit: %)

	2016	2017	2018	2019	2020	2021
Watanya 1	18.58	11.49	9.95	7.96	12.25	12.33
Watanya 2	5.69	3.22	3.24	5.80	20.49	20.55

Source: answers to the questionnaire

3.3.1.2 Qualitative Effects (Other Effects)

(Improvement of Program Production Capacity and Contents Expansion by Introducing Modern Broadcasting Equipment[24])

As mentioned above, there were only three editing devices for TV program production before the start of this project, which constrained program production and editing. In the interviews with the Tunisia Television Establishment, the following comments were received: "The number of programs produced has increased with the introduction of new program production equipment and HD outside broadcasting vans;" "The produced programs are stored on the server as digital files. The editing process and quality have improved significantly, and I think the quality of the contents delivered to the viewers is also high;" "When broadcasting equipment with the latest technology was introduced by this project, operative staff of the Tunisia Television Establishment had the opportunity to take multiple training[25] sessions. Through training, they were able to broaden their technical aptitude and enhance creativity (senses). As a result, I think their motivation to work at the field level has increased." Therefore, it is considered that this project supports the improvement of work efficiency of TV program production, the improvement of the quality of program contents provided to viewers, and the improvement of skills and motivation of operative staff.

[23] On the other hand, the popularity of Internet videos (e.g., YouTube) is increasing among the people, and the Tunisia Television Establishment is beginning to have a sense of crisis. The Tunisia Television Establishment's policy is to focus on expanding the broadcasting of sports programs in the future. In particular, the HD outside broadcasting vans introduced by this project will be effectively utilized for sports broadcasting and live broadcasting, creating an opportunity to differentiate from the world of the Internet.

[24] The term "contents expansion" refers not only to the number of TV programs broadcast, but also to the content (quality) of the program.

[25] The "training" mentioned here was conducted as part of this project and outside this project. The details of the implementation will be explained in "3.4.3 Technical Aspects."

Photo 3: Master Control System for the TV Channels
(Source: Tunisia Television Establishment)

Photo 4: Server System
(Source: Tunisia Television Establishment)

3.3.2 Impacts

3.3.2.1 Intended Impacts

1) Contribution to the Realization of Highly Reliable Public Television Broadcasting and the Increase of Information Provision Opportunities to the Public Through Television Broadcasting

In this survey, employees of the Tunisia Television Establishment were interviewed about the recent situation surrounding television broadcasting and how it relates to this project, and the following comments were received:[26] "The program production and editing staff have become able to handle multiple tasks (editing, mixing, image editing, voice recording) simultaneously;" "Before the start of this project, program production and editing took a significant amount of time, which has now been shortened. It has become possible to spend more time on program qualities;" "Tunisia Television Establishment is the only television station in the country that owns HD outside broadcasting vans. Especially in the production of programs for major events such as sports, the use of these HD outside broadcasting vans is effective."

From the above comments, it is considered that this project has increased the opportunities for information provision, has improved the quality of programs, and has enhanced the viewers' trust in the Tunisia Television Establishment as a state-run broadcasting and information source.

[26] (Reference information) As a result of interviews with randomly selected general viewers (3 people), the following comments were received: "Probably, most people watch TV around 8 pm. I often watch news programs around that time. I watch Watanya channel mostly to obtain information;" "Other than news programs, I feel programs on society, health, culture and entertainment are increasing compared to before;" "I have been watching a popular drama (Choufli Hall) for a long time. I think it's a well-made drama;" "On political shows, I think Watanya Channel is more neutral than other private television stations. There are few reports of specific political parties. I think it's because the channel is not influenced by any particular political party or businessperson." Regarding the neutrality of broadcasting, the Tunisia Television Establishment expressed, "(Apart from the introduction of program broadcasting equipment by this project), the important points for television to gain trust of viewers are the neutrality in politics, strict ethical standards and legitimacy." As discussed above, while the number of channels and broadcasting time of the Tunisia Television Establishment increases (increasing opportunities to provide information), the philosophy as a state-owned broadcaster is observed in trying to gain trust of the people, that is, working on highly reliable public television broadcasting.

2) Contribution to the Promotion of Mutual Understanding Between Japan and Tunisia

As mentioned above, Japan provided the government of Tunisia with 291 TV programs as Cultural Grant Aid. According to the Tunisia Television Establishment, they have been highly valued by the viewers; 183 of them were rebroadcast every year from 2019 to 2021, given that they were generally well received when they were broadcast. In an interview with the Tunisia Television Establishment, a comment was received such as: "Japanese TV programs broadcast on the Watanya channel include theater (drama), dance, music, etc.; you get to learn what are popular in Japan. Young viewers are interested in educational programs, especially those dealing with the scientific field. I think that viewers are highly satisfied because they get to learn about Japan."[27] Through the provision of Japanese TV programs, Tunisian people have more opportunities to get to know Japan better and accurately. In addition, increased opportunities for people to have interests in Japan are leading to mutual understanding between the two countries. It can be said that the hardware support (introduction of programming equipment and HD outside broadcasting vans) and the software support (provision of TV programs) of this project present a great opportunity to enhance mutual understanding.

[27] (Reference information) Similarly, when we interviewed randomly selected general viewers (three people), comments such as the following were received: "I find programs covering Japanese food, architecture, infrastructure facilities (tunnels, bridges, etc.) and new home appliances interesting" and "Watching Japanese programs, I think, is a catalyst for mutual understanding between Tunisia and Japan."

Column Box: Role and Contribution of This Project in the Time of COVID-19

The role and contribution of this project during the time of COVID-19 are discussed here. This project was completed in 2019 before COVID-19 spread; however, after it spread in 2020, the Tunisia Television Establishment had difficulty producing and broadcasting programs. As discussed earlier, the number of programs produced decreased (224 in 2020 → 160 in 2021), and most of the live programs, especially those with the participation of general viewers (game shows, debate programs, etc.), were canceled. On the other hand, broadcast time increased, and as at the time of the ex-post evaluation, it is broadcast 18 hours or 24 hours a day. The audience rating of the Watanya channels is also on the rise, almost in line with the timing of the COVID-19 pandemic. This is due to the fact that many people spend more time watching TV at home due to COVID-19. The Tunisia Television Establishment has reorganized its programming to capture the needs of viewers who started watching TV programs for longer hours, increasing the number of popular entertainment shows. In addition, many educational institutions had to close during the pandemic, which increased anxiety, especially among students who had to take entrance examinations, which was becoming a social problem. The Tunisia Television Establishment took this issue seriously, focused on cooperation and coordination with the Ministry of Education to overcome the situation, and launched an education channel. The Tunisia Television Establishment made a number of comments, suggesting that the introduced broadcasting equipment has been very useful for program production and organization of the new channel.

From the above, it is considered that the programs broadcast by the Tunisia Television Establishment continued to be trusted by viewers in the time of COVID-19. The delivery of broadcasting equipment was completed in 2019, and the timing coincided with the pandemic. Had this project not been implemented, viewers (citizens) would have been more anxious after 2020 as the infection spread, because of restricted access to correct information/knowledge and limited means of obtaining information. Under such circumstances, it can be said that the significance of implementing this project was great.

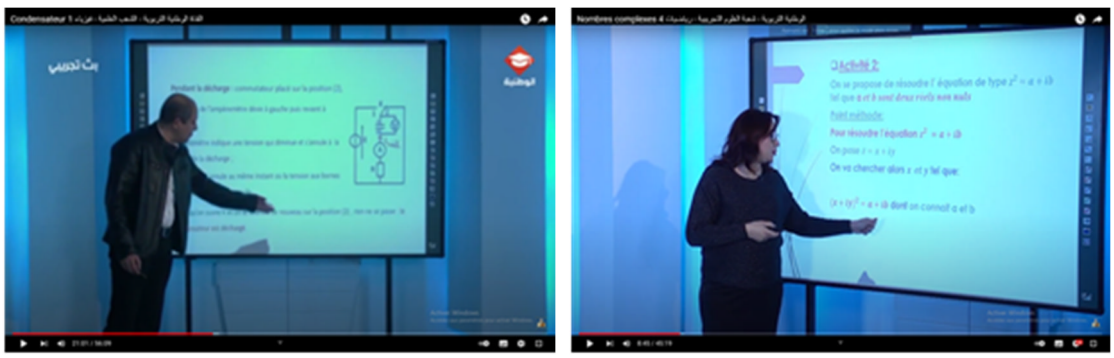


Photo 5: Classes on the Education Channel (Source: Tunisia Television Establishment)

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Natural Environment

This project was classified as Category C because the undesired impact on the environment was determined to be minimal, as it did not fall under the sectors/attributes likely to have negative impacts or the vulnerable areas listed in the *Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations* (enacted in April 2002).

The questionnaire, interviews and site inspections confirmed that program production equipment and HD outside broadcasting vans that had been procured had specifications suitable for the local environment and climatic conditions and that they do not have any adverse effect on the environment. The environmental monitoring is handled by the "Transportation and Building Department," an organization within the Tunisia Television Establishment. As for the HD outside broadcasting vans, engine oil, etc., are changed, and air conditioner filters are inspected regularly. There has been no impact on the natural environment, including air pollution, noise/vibration and ecosystem around the Tunisia Television Establishment's building. Therefore, it is considered that there has been no negative environmental impact until the time of the ex-post evaluation.

2) Resettlement and Land Acquisition

Resettlement and land acquisition did not occur in this project.

3) Gender Equality, Marginalized People, Social Systems and Norms, Human Well-being and Human Rights

Specific or direct examples of how this project—provision of broadcasting equipment—has affected gender equality, people inhibited from equitable social participation/human rights, social system norms, and human well-being could not be confirmed in this study. According to the Tunisia Television Establishment, it has increased the number of channels and broadcasting hours in recent years, and it aims to improve its position as a highly reliable public television broadcaster and work to correct the information disparities. If viewers have more opportunities to obtain neutral news and broadcasting by watching the Tunisia Television Establishment's TV channels and continue to have interests, it is thought to contribute to the correction of information disparities. As a result, it is believed to benefit viewers (including the vulnerable) and businesses widely and equally, increase the choices in people's lives, and generate events that lead to changes in social systems and norms and human well-being. This project is considered to play a role in such a process.

<Summary of Effectiveness and Impacts>

Regarding the effectiveness and quantitative effect indicators, the actual values exceeded the target values. The audience rating is also on the rise. In addition, an education channel has been

established. Two HD outside broadcasting vans, which was an additional output, demonstrate high operating rates at program production sites, being a factor behind the increase in the audience rating. Through the interviews, it was confirmed that the work efficiency of TV program production, quality of the program contents offered to the viewers, as well as the technical level and motivation of the operating staff have improved. Regarding impacts, it was confirmed through interviews that this project has increased information provision opportunities and improved the quality of programs. Viewers likely have more trust in the state-run broadcast as a source of information. Therefore, this project has achieved its objectives more than it is planned. Therefore, effectiveness and impacts of the project are very high.

3.4 Sustainability (Rating: ④)

3.4.1 Policy and System

According to the *Five-Year National Development Plan* (2016-2020), the government of Tunisia has announced a policy to promote the fields of communication technology and digital economy with contents such as the following: "technology development in the audiovisual field and digital technology monitoring, research, formulation of management policy;" "strengthening the principle of national sovereignty through the development and strengthening of terrestrial digital radio and television broadcasting networks;" "expansion of the audiovisual environment by switching to the existing terrestrial digital TV broadcasting network and high-definition (HD) TV" and "rationalization of frequency spectrum utilization, promotion of research and operation planning." It can be said that this project contributes to the Tunisia's policies related to the broadcasting sector and aims to enhance television broadcasts. Therefore, it is in line with the policies and directions of the government of Tunisia.

3.4.2 Institutional/Organizational Aspect

The executing agency is the Tunisia Television Establishment. In August 2007, after the start of this project, the radio division and the television division were separated due to the organizational restructuring, and as of the time of the ex-post evaluation, the Tunisia Television Establishment is in charge of national television broadcasting.[28]

Maintenance work for the procured program production equipment includes maintenance and inspection of audio/video/information technology (IT) equipment (conducted regularly as

[28] At the time of the ex-post evaluation, the governmental organization that oversees the Tunisia Television Establishment is the Directorate General of Enterprises and Public Facilities of the President Office of Tunisia. The Tunisia Television Establishment belongs to an organization subordinate to the President Office. The Directorate General of Enterprises and Public Facilities regularly checks the organizational structure and personnel of the Tunisia Television Establishment to take corrective measures if necessary; but it does not dictate the content of programs to be broadcast.

preventive and normal maintenance), server management, checking the startup of digital terminal-related devices such as program/news production systems, database and software updates, and data deletion. The technical maintenance staff (13 people) of the Tunisia Television Establishment are in charge. The HD outside broadcasting vans are maintained and managed by a subcontractor (outsourced). Vehicle and hydraulic pressure, air-conditioning-related maintenance and inspection, and cleaning are carried out regularly.

The Tunisia Television Establishment has 1,080 employees (as of the end of 2021). Through the questionnaire and interviews with the Tunisia Television Establishment, it was confirmed that there was no excess or deficiency in the number of technical maintenance staff. It was also confirmed that there were no major problems with the maintenance carried out by the external specialized company in terms of personnel or consignment.

From the above, it is judged that there is no major problem in the operation and maintenance system of this project at the time of the ex-post evaluation.

3.4.3 Technical Aspect

With regard to the technical aspect of the operation and maintenance, technical maintenance staff working at the Tunisia Television Establishment have qualifications and expertise in the fields of audiovisual system maintenance, video systems, and IT. In addition, they have been attending training in Tunisia and Japan to acquire the latest technology and knowledge. For example, through training at the Japan Broadcasting Corporation (NHK) (two months over the period of 2010-2012, one person participated) and Sony (two months over the period of 2010-2012, two people participated), staff had the opportunity to improve their expertise in the fields such as latest audiovisual, video, and IT during the implementation of this project. In addition, they received equipment operation and maintenance manuals and technical advice/guidance from suppliers, such as Yamaha, JVC, Panasonic, NEC, and FOR-A. These manuals stipulate the procedures for operating equipment on a normal day as well as in the case of failures, and they are being used on site.[29] Additionally, training is given at the Arab Broadcasting Union (ASBU)[30] (it is held almost every year for a period of one to two months, with more than 10 participants). Staff can acquire knowledge and skills such as TV studio engineering, digital sound, live IP, 5G network, TV studio lighting and cloud, which they get to utilize on site. On-the-job training (OJT) is also given to newly hired staff from time to time, which provides opportunities to acquire knowledge and skills in the fields of audiovisual system maintenance, video systems, and IT.

Based on the above, it is judged that the technical level related to the operation and maintenance

[29] In addition to the Japanese companies, other companies, such as Grass Valley, AVID, Studer and Clear-com, have provided the Tunisia Television Establishment with support for the equipment operation and manuals on operation and maintenance.
[30] The headquarters is in Tunis.

is sufficient.

3.4.4 Financial Aspect

Table 4 shows the operation and maintenance budget for the procured program production equipment and HD outside broadcasting vans.

Table 4: Operation and Maintenance Budget of This Project (Last 3 Years)

(Unit: Tunisian dinar)

2019	2020	2021
750,000	600,000	970,000

Source: Tunisia Television Establishment

The project budget of the Tunisia Television Establishment and the operation and maintenance budget for the procured broadcasting equipment, etc., come from the government budget. For example, at the time of the ex-post evaluation, the government subsidy is approximately 42%, and the revenue from subscription[31] and CM fees is approximately 58%. There are no subsidies from other organizations. Regarding the operation and maintenance budget shown in Table 4, the Tunisia Television Establishment commented, “Tunisian dinar has depreciated against US dollar and euro in the last few years, so it may be difficult to judge whether the amount is sufficient to procure equipment and spare parts. Nevertheless, the minimum necessary amount has been secured.” The operation and maintenance budget from the central government to the Tunisia Television Establishment has been allocated without any problems, and it has not been affected by the recent COVID-19 and is not facing budget cuts. At the time of the ex-post evaluation, the financial statements of the Tunisia Television Establishment (last few years) had not been internally approved for external publication; thus, quantitative situation analysis was not possible. Nevertheless, there is no change in the composition ratio of subsidies, subscription fees, and CM fees, and it has not been reduced. Furthermore, the Tunisia Television Establishment has budgeted approximately 4 million dinars to update the server system (partly) of the newsroom and information studio at the center during 2022, and thus, it can be observed that the Tunisia Television Establishment is sufficiently working on equipment renewal.

Based on the above, it is considered that there is no particular financial problem in operation and maintenance.

[31] The subscription fee of the Tunisia Television Establishment and the radio corporation is included in the electricity and gas bill issued by the Tunisian Electricity and Gas Corporation (hereinafter referred to as “STEG”) and is collected as a fee (tax) from the service users. In other words, all households that are invoiced by the STEG pay the subscription fee. The annual subscription fee collected by the STEG and paid to the national treasury (general account) is approximately 25 million TND. The central government allocates 30-35% to the Tunisia Television Establishment and 10-15% to the radio corporation.

3.4.5 Environmental and Social Aspect

No particular environmental and social mitigation measures have been taken during the project implementation or after the project completion, and no impact is foreseen for the time being.

3.4.6 Preventative Measures to Risk

At the time of the ex-post evaluation, no change was observed in the environment surrounding the broadcasting sector in Tunisia, and there was no major change in the government policy. No particular risks, external conditions or events need to be controlled in particular, both at present and in the future. It was also confirmed through the questionnaire and interviews that program broadcasts of the Tunisia Television Establishment had not posed any risk or concern (e.g., events that damage the feelings and values of viewers) in terms of correction of information disparities and approaches to empowerment for women including girls.

3.4.7 Status of Operation and Maintenance

At the time of the ex-post evaluation, there is no particular concern about the maintenance status of the procured program production equipment and HD outside broadcasting vans. No failures or malfunctions are observed. As mentioned above, regular maintenance work such as the following is being carried out: maintenance, inspection and preventive maintenance of audio, video and information technology (IT) equipment; server management; checking of the activation of digital-terminal-related devices, including program/news production systems; databases and software updates; and data deletion. In addition, the subcontractor (outsourcing) regularly performs maintenance and inspection of hydraulic pressure and air conditioning of the HD outside broadcasting vans, as well as cleaning.

Spare parts are stored within the Tunisia Television Establishment. Although it varies depending on the type, the process can take time if the part needs to be procured from abroad. They are often procured from the US, EU and Japan. According to the Tunisia Television Establishment, some program production equipment takes a long time, about 60 days on average, to procure, transport and receive. However, according to the Tunisia Television Establishment, there is no parts shortage.

Based on the above, the operation and maintenance status of this project is generally good.

<Summary of Sustainability>

No issues have been observed in the policy/systems, institutional/organizational, technical, financial, and environmental and social aspects, including the current status of operation and maintenance. Future risks have been well mitigated. Therefore, sustainability of the project effects is very high.

Photo 6: Tunisian Flag and JICA's Logo on the HD Outside Broadcasting Van
(Source: Taken during the field survey)

Photo 7: Interviews in Progress inside the HD Outside Broadcasting Van
(Source: Taken during the field survey)

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed to enhance television broadcasts by introducing broadcasting equipment and by transferring technologies to the new television broadcast center of the Tunisia Television Establishment responsible for public broadcasting, thereby contributing to the realization of highly reliable public television broadcasting, the increase in opportunities to provide information to the public through television broadcasting, and the promotion of mutual understanding between Japan and Tunisia. "Consistency with the development plan" and "consistency with development needs" are confirmed in this project. Regarding coherence, it can be said to be coherent in terms of "consistency with Japan's ODA policy" and "internal coherence." As for "external coherence," there are commonalities between this project and the projects of other donors in terms of realizing smooth broadcasting, improving broadcasting quality and increasing information provision opportunities. Therefore, its relevance and coherence are high. Regarding efficiency, even though there was an additional output, the outputs were mostly as planned. The project cost was also almost as planned. However, the project period was significantly longer than planned. Therefore, the efficiency of the project is moderately low. With respect to effectiveness and quantitative effect indicators, the actual values are above the target values. Additionally, an educational channel has been newly established. Through interviews, it was confirmed that the work efficiency of TV program production and the quality of program contents have improved, and so have the technical level and motivation of operative staff. With regard to impacts, the interviews also confirmed that this project has increased information provision opportunities, improved program quality, and improved viewers' trust in the Tunisia Television Establishment as a source of information. Therefore, this project has achieved its objectives more than it is planned. Therefore, effectiveness and impacts of the project are very high. No issues have been observed in the policy/systems, institutional/organizational, technical or financial, including the current status of the operation and maintenance system, and sustainability is ensured. In addition, preventive measures have been taken regarding environmental and social considerations and risks.

Therefore, the sustainability of the project effects is very high.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

None.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

Usefulness of Considering Software Support in Addition to Hardware Support When Assisting the Broadcasting Field

Japanese TV programs were provided to the government of Tunisia during the implementation of this project. The programs have been well received by Tunisian viewers, and in recent years, they have been rebroadcast every year. The hardware support (procurement and installation of equipment to organize programs, etc.) and software support (provision of TV programs) of this project have provided the Tunisia Television Establishment and general viewers with opportunities to get to know and understand Japan better. For the aid agency (JICA), their assistance is accepted by the viewers (beneficiaries) in a visible form; it can be said that increased opportunities for the viewers to have interests are leading to enhanced mutual understanding between the two countries. For the recipient (Tunisian side), it is successfully utilizing broadcasting equipment with the latest technology and functions, increasing information provision opportunities and improving viewers' trust and interest in the programs. When formulating similar projects (supporting the broadcasting field) in the future, it is desirable that both the aid agency and the recipient should give maximum consideration to software support, such as the introduction of program contents, in addition to the hardware support and should focus on achieving high assistance effects while recognizing and imagining the creation of synergy.

5. Non-Score Criteria

5.1 Performance

5.1.1 Objective Perspective

None.

5.2 Additionality

None.

(End)

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	1) Procurement and installation of program production equipment - Infrastructure network for program production facilities - Studio equipment and materials - Server system	1) Procurement and installation of program production equipment → Implemented mostly as planned. (Two HD outside broadcasting vans were introduced as an additional output)
	2) Consulting Services - Construction supervision - Technical guidance and training - Support for exchange with Japanese broadcasting stations	2) Consulting Services → Reduced. (Only the equipment installation assistance, coordination between the Tunisia Television Establishment and the supplier, and support for exchange with Japanese broadcasting stations were implemented.)
2. Project Period	March 2007-September 2013 (73 months)	March 2007-August 2020 (149 months[32])
3. Project Cost Amount Paid in Foreign Currency Amount Paid in Local Currency Total ODA Loan Portion Exchange Rate	 4,075 million yen 2,445 million yen 6,520 million yen (4,075 million yen) 1 USD = 116 Japanese yen, 1 Tunisian dinar = 88 Japanese yen (exchange rate as of August 2006)	 4,065 million yen 2,464 million yen 6,529 million yen (4,069 million yen) 1 USD = 116 yen, 1 Tunisian dinar = 88 Japanese yen (exchange rate as of August 2006)[33]
4. Final Disbursement	July 2019	

[32] As discussed earlier, the period from December 2010 (when the riots and large-scale anti-government demonstrations occurred) to December 2011 (when the coalition government was established, and the new president was elected) was greatly affected by the Jasmine Revolution (Arab Spring). A certain period (13 months) was excluded because the project process was delayed due to external factors.

[33] As mentioned above, in this ex-post evaluation, the project cost judgement would be more realistic if the exchange rate fluctuations were not considered; thus, it is calculated based on the exchange rate at the time of the appraisal.

The Republic of Tunisia

FY2021 Ex-Post Evaluation Report of

Japanese ODA Loan Project

"Water-Saving Agriculture Project in Southern Oasis Area"

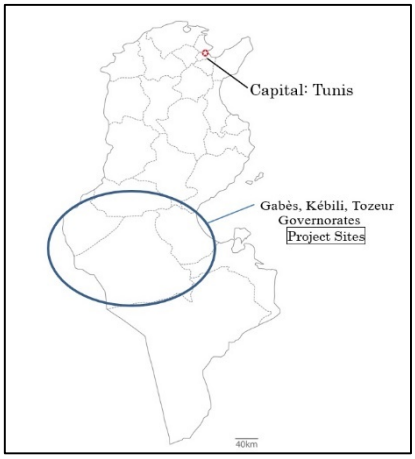
External Evaluator: Kenichi Inazawa, Octavia Japan, Co., Ltd.

0. Summary

This project aimed to save water and secure stable irrigation water by developing terminal irrigation and drainage channel facilities in the oases in South Tunisia (Governorates of Tozeur, Gabes and Kebili), thereby contributing to an increase in agricultural production and environmental protection through the efficient use of water resources. Concerning relevance, this project is "consistent with the development plan" and "consistent with the development needs." As for coherence, while it is "consistent with Japan's ODA Policy," in terms of "internal coherence" and "external coherence," there was no concrete cooperation or overlap between projects, and thus, it cannot be said that this project had a synergistic effect. Based on the above, relevance and coherence are high. With regard to efficiency, while the outputs of this project increased (from 50 to 59 sites), the project period slightly exceeded the initial plan. Nevertheless, the project cost was lower than the initial plan, therefore, efficiency is high. The actual values of the effectiveness and quantitative effect indicators were around 70% of the target values. It is said that the development of facilities, such as terminal irrigation and drainage channels are contributing to the reduction and prevention of salt damage in the fields within the project areas. Concerning impacts, while production and the unit yield of each crop have not increased significantly, the production of a new crop (olive) has begun as a result of this project; it can be observed that this project has contributed to raising farmers' awareness of water conservation and environmental conservation. Therefore, effectiveness and impacts are high. Regarding sustainability, although no major concerns exist, there are certain issues relating to the financial aspect and current status of the operation and maintenance system; therefore, sustainability is moderately low.

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

1. Project Description



Project Location
(Source: JICA)

Developed Tertiary Channel
(Hazoua CI in the Tozeur Governorate)

1.1 Background

South Tunisia is a dry area with annual rainfall of around 50 to 200 mm. Traditional oasis agriculture is practiced, and groundwater from the Continental Intercalary (CI) and terminal Complex (TC) Aquifer is pumped and used as irrigation water. Before the start of this project, almost 100% of the cultivated land was irrigated, although this is regarded as small-scale agriculture, in the Governorates of Gabes, Kebili and Tozeur, in South Tunisia. However, efficient irrigation agriculture that makes use of limited water resources was not established because of water leakage due to earth irrigation channels. As part of a project implemented previously, “Irrigation Perimeters Improvement Project in Oasis,” (L/A signed in 1996), irrigation water channels and drainage networks were constructed in irrigation areas, which were in need of urgent development, and as a result, the efficiency of irrigation water usage increased in the target areas (oases). On the other hand, to realize more efficient water-saving irrigation agriculture, there was an urgent need to save unrenewable resources through further the development of terminal irrigation and drainage channel facilities as well as expansion of the development area, so as to improve agricultural productivity and conserve water resources by effectively utilizing irrigation water.

1.2 Project Outline

The objective of this project is to save water and secure stable irrigation water by developing facilities such as terminal irrigation and drainage channels in the oases in South Tunisia (Governorates of Tozeur, Gabes and Kebili), thereby contributing to an increase in agricultural production and environmental protection through the efficient use of water and soil resources.

Loan Approved Amount/ Disbursed Amount	5,260 million yen/4,339 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 30, 2007/March 30, 2007
Terms and Conditions	Interest Rate 1.5% Repayment Period 25 years (Grace Period 7 years) Conditions for Procurement General Untied
Borrower / Executing Agency	The Government of the Republic of Tunisia/ Direction Générale du Génie Rural et de l'Exploitation des Eaux, Ministere de L'Agriculture, des Ressources Hydrauliques et de la Pêche (hereinafter referred to as "DG/GREE")
Project Completion	January 2018
Target Area	South Tunisia (Governorates of Gabes, Kebili and Tozeur)
Main Contractor (Over 1 billion yen)	None which exceed 1billion yen
Main Consultants (Over 100 million yen)	STUDI (Tunisia), SCET Tunisie (Tunisia)
Related Studies (Feasibility Studies, etc.)	Special Assistance for Project Formation (SAPROF), JICA (March 2007)
Related Projects	[ODA Loan Projects] - "Irrigation Perimeters Improvement Project in Oasis" (L/A signed in 1996) [Other International Organizations, Aid Agencies, etc.] - "Water Sector Investment Project (Financial Assistance)" (World Bank) - "Comprehensive African Agriculture Development Program" (USAID)

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Octavia Japan, Co., Ltd.

2.2 Duration of Evaluation Study

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

Duration of the Study:	November 2021–February 2023
Duration of the Field Study:	No international travel was involved, and surveys were conducted remotely with a field survey assistant.

2.3 Constraints during the Evaluation Study

(Remote Field Survey Utilizing a Field Survey Assistant)

Due to COVID-19, the external evaluator did not travel internationally for this study. With the local survey assistant, the external evaluator conducted the site visits remotely, collecting information/data and conducting interviews with the individuals concerned. The external evaluator analyzed the information collated so as to conduct evaluation analyses and make appropriate judgments.

(Evaluation Based on the Actual Situation Across the Visited Sites)

This project encompasses many sites (oases)—the total number of sites is 59, therefore, due to time constraints, not all sites could be visited during this study. Nineteen sites in total were visited: Faycel, Metouia, Mzira, Ouethref, Salem and Sboui in the Gabes Governorate (six sites), Ben Zitoun 1 and 2, Douz, El Golaa, Graad, Jemna, Ibnes and Zarcine in the Kebili Governorate (seven sites), Beni Ali, Draa Sud, Gherdgaya, Hazoua 1, Ibn Chabbat 2 and Hazoua CI in the Tozeur Governorate (six sites). The effectiveness, impacts and sustainability of the project were analyzed by means of interviews, conducted during site visits with personnel at the Regional Agricultural Development Offices (Commissariats Régionaux au Développement Agricole, hereinafter referred to as "CRDA"), the Agricultural Development Associations (Groupements de Développement Agricole, hereinafter referred to as "GDA")[1] and with farmers who were beneficiaries, as well as through site inspections.[2]

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

3.1 Relevance/Coherence (Rating: ③[4])

3.1.1 Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of Tunisia

Before the start of this project, the government of Tunisia formulated the *10th Economic*

[1] The institutional and organizational aspects of the CRDA and the GDA will be explained in 3.4.2 Institutional/Organizational Aspect.

[2] In addition to the CRDA in each Governorate (two to five people in each Governorate), a total of 20 staff of the GDAs and farmers under the GDA (a total of 103 farmers, all male) were interviewed. Interviews with farmers were mainly group interviews. (As of the time of the ex-post evaluation, there were 16,983 beneficiaries in the oasis within the areas covered by this project, of which, 5,241 were in Gabes, 2,018 in Tozeur and 9,724 in Kebili. In the southern region's oases, men are engaged in agriculture traditionally. The average age of farmers is around 60 years old).

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

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

Development Plan (2002–2006). Regarding the agricultural sector, this plan stipulated the goal of improving national food self-sufficiency, while conserving the environment and increasing the yield of agricultural products through the development and maintenance of available land and water resources. In addition, the government formulated the *Water Resource Strategy (Eau 21)* to promote water resource conservation, aiming to reduce the total amount of irrigation water by saving water and reducing the amount of water required per unit area and by expanding the irrigation areas using the saved water. The same policy was carried over to the succeeding *11th Economic Development Plan* (2007–2011).

At the time of the ex-post evaluation, the government of Tunisia, through its *Five-Year National Development Plan* (2016–2020),[5] regarded the following as priorities: agricultural development in rural areas, income improvement for farmers and fishermen, the strengthening of the food security system, an improvement in productivity and competitiveness to attract new investments, and pursuing the sustainability of natural resources in the face of climate change. The plan indicates the importance of securing and conserving water resources and saving water not only for the purposes of rural development and agricultural policies, but also for mitigating the effects of climate change as far as possible.

Based on the above, emphasis was placed on the strengthening of the food security system, agricultural development in rural areas, securing and conserving water resources, saving water, etc. in Tunisia before the start of this project, as well as at the time of the ex-post evaluation. Therefore, the project relevance is confirmed with regard to policies and measures.

3.1.1.2 Consistency with the Development Needs of Tunisia

South Tunisia is a dry area with annual rainfall of around 50 to 200 mm. Traditional oasis agriculture is practiced, and groundwater from the Continental Intercalary Aquifer (CI) and terminal Complex (TC) is pumped and used as irrigation water. Water is supplied to farmland through the shallow wells from the Complex Terminal Aquifer, located at a depth of 60m–500m and through the deep wells from the Continental Intercalary Aquifer, located at a depth of 1,000 to 2,000m or more. Before the start of this project, in the Governorates of Gabes, Kebili and Tozeur in the southern region, almost 100% of the cultivated land was irrigated, albeit on a small scale. However, efficient irrigation agriculture that makes use of limited water resources was not established due to earth terminal irrigation canals. In the “Irrigation Perimeters Improvement Project in Oasis” (L/A signed in 1996), which was implemented prior to this project, the irrigation water channel and drainage networks were installed in 88 oases, where they were needed most

[5] As of the time of the ex-post evaluation, due to the political circumstances in Tunisia, the next national development plan and other related plans are in the process of being formulated. The central government has begun drafting the new five-year plan, based on the content of the *Five-Year National Development Plan* (2016-2020), however, this may not be announced for some time.

urgently. As a result, the efficiency of irrigation water utilization has increased in the target areas (oases). On the other hand, in order to realize more efficient, water-saving, irrigated agriculture, an urgent need was recognized to save water through further expansion of the development area and the development of terminal irrigation and drainage channel facilities, i.e., to improve agricultural productivity and conserve water resources by effectively utilizing irrigation water.

At the time of the ex-post evaluation, the executing agency of this project, the DG/GREE, indicates that there is a need to renovate and modernize irrigation facilities, such as main and branch irrigation pipes, intake facilities and sluice valves in various parts of the country. The reason for this is that irrigation water pipes are getting old, not only in the southern region but also in other regions, and inefficient water use must be resolved. Apart from JICA projects, the DG/GREE is implementing the development and renovation of irrigated agricultural facilities through co-financing with the EBRD. This irrigation facility renovation project began in March 2021; around the target areas of this project, it covers a total of 2,300 ha in the Tozeur, Kebili, Gabes and Gafsa Governorates. In addition, projects aimed at the correct management of water demand and agricultural productivity are being considered in the Tozeur, Kebili, Kairouan and Sidi Bouzid Governorates. It is expected that these will establish an efficient irrigation system and improve agricultural productivity.

Based on the above, efforts to improve, renovate and modernize irrigation facilities have been implemented and are being considered throughout Tunisia, including the southern region, before the start of this project, as well as at the time of the ex-post evaluation. Therefore, this project is consistent with the development needs.

3.1.2 Coherence (Rating: ②)

3.1.2.1 Consistency with Japan's ODA Policy

Before the start of this project, the *Country Assistance Plan for Tunisia* (October 2002), formulated by the Ministry of Foreign Affairs, listed the following important sectors and themes: (1) raising the level of industry, (2) developing and managing water resources and (3) the environment. Concerning the aforementioned developing and managing water resources (2), it was stated as follows: "Japan will utilize its experience and technical capabilities to support not only the development of water sources but also comprehensive water resource management, including water supply and demand management and surface water/groundwater management. In particular, consideration will be given from the perspective of promoting underdeveloped regions and poor areas." In addition, the *Medium-Term Strategy for Overseas Economic Cooperation Operations* (April 2005), formulated by JICA, considered "a foundation for sustainable growth", "global issues", "poverty reduction," etc. as priority areas.

This project is in line with the priority sectors and the assistance policy with regard to the issue identified in the *Country Assistance Plan for Tunisia* (i.e., (2) developing and managing water

resources). In addition, this project aimed to develop and manage scarce water resources, which was a development issue, while tackling a priority area of establishing "a foundation for sustainable growth," stipulated in the *Medium-Term Strategy for Overseas Economic Cooperation Operations*. Therefore, the project is in line with Japan's ODA policy.

3.1.2.2 Internal Coherence

Before this project began, JICA extended an ODA loan for the "Irrigation Perimeters Improvement Project in Oasis" (the L/A was signed in 1996, and the project was completed in 2005). During the project preparation, around 150 sites were to be included, however, the estimated project budget was excessive, and the original budget eventually deemed as insufficient. For this reason, sites were selected in the order of relative priority of rehabilitation of terminal soil channels for irrigation and drainage maintenance; around 88 sites from four Governorates of Tozeur, Gabes, Kebili and Gafsa were concerned. As a successive project to the aforementioned project, 50 sites were selected for this project from the three Governorates of Gabes, Kebili and Tozeur, where the need and urgency for the development of terminal irrigation and drainage channels were recognized (however, this was later changed to 59 sites, as described in the section 3.2.1 Project Outputs under Efficiency). It can be said that these two projects were mutually complementary from the viewpoint of establishing a stable supply of irrigation water and the conservation of groundwater sources across the entire southern region. However, they were implemented at different times, and thus, it cannot be stated that direct cooperation and synergistic effects were created.

3.1.2.3 External Coherence

Before the start of this project, the World Bank provided support for irrigation and water supply through its "Water Sector Investment Project," and USAID assisted the agricultural sector through its "Comprehensive African Agriculture Development Program" in Tunisia. At the time of the ex-post evaluation, several donors (the World Bank, the Reconstruction Credit Institute (KfW), the African Development Bank (AfDB) and the European Bank for Reconstruction and Development (EBRD)) are providing support in similar sectors nationwide.

For example, the government of Tunisia is developing and renovating irrigation agriculture facilities across a total area of 23,000 ha mainly in the north of the country by co-financing[6] with the World Bank. In addition, the Tunisian government is implementing the "Integrated Water Resource Management Project," which aims to conserve the environment in Mornag in Ben Arous Governorate, by co-financing[7] with KfW. However, these projects do not collaborate or overlap

[6] The budget scale equates to 410 million Tunisian dinars from the Tunisian government and a loan of US$ 140 million from the World Bank.
[7] The budget is 45.5 million Tunisian dinars.

with this project, and it cannot be maintained that synergy has been created.

In relation to the international framework, this project is considered to be in line with one of the Sustainable Development Goals (SDGs), "2.End hunger, achieve food security and improved nutrition and promote sustainable agriculture," in a sense that it aimed to increase food production and improve farmers' incomes, thereby contributing to the strengthening of food security.

<Summary of Relevance and Coherence>

This project is "consistent with the development plan" and "consistent with the development needs." Regarding coherence, it is "consistent with Japan's ODA policy." On the other hand, while "internal coherence" and "external coherence" are in a mutually complementary relationship, there is no specific cooperation or overlap between the projects, thus, it cannot be claimed that synergistic effects have been created. Therefore, its relevance and coherence are high.

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

This project renovated and developed the irrigation and drainage facilities in the Gabes, Kebili and Tozeur Governorates. Table 1 shows the plan and the actual outputs of this project. In addition, a list of project areas is shown at the end of this report.

Table 1: Planned and Actual Outputs of This Project

Plan (at the time of the appraisal: 2007)	Actual (at the time of the ex-post evaluation: 2021–2022)
1) Civil Engineering Work, Procured Equipment, etc. Development of the terminal irrigation and drainage channels, etc. (50 oasis sites), procurement of vehicles, etc.	1) Civil Engineering Work, Procured Equipment, etc. Development of the terminal irrigation and drainage channels, etc. (59 oasis sites, a total irrigated area of 8,645 ha[8]), procured vehicles: 6
2) Consulting Services New detailed design of irrigation and drainage works, review of the existing detailed design, tendering assistance, construction supervision (progress management, report preparation, etc.)	2) Consulting Services → Implemented almost as planned.

Source: JICA's documents (at the time of the appraisal), Project Completion Report, answers to the questionnaire and interviews (at the time of the ex-post evaluation).

The differences between the plan and actual outputs, shown in Table 1, are explained below.

[8] Total irrigated area at the time of the ex-post evaluation. The data is actual figures cited from Project Completion Report.

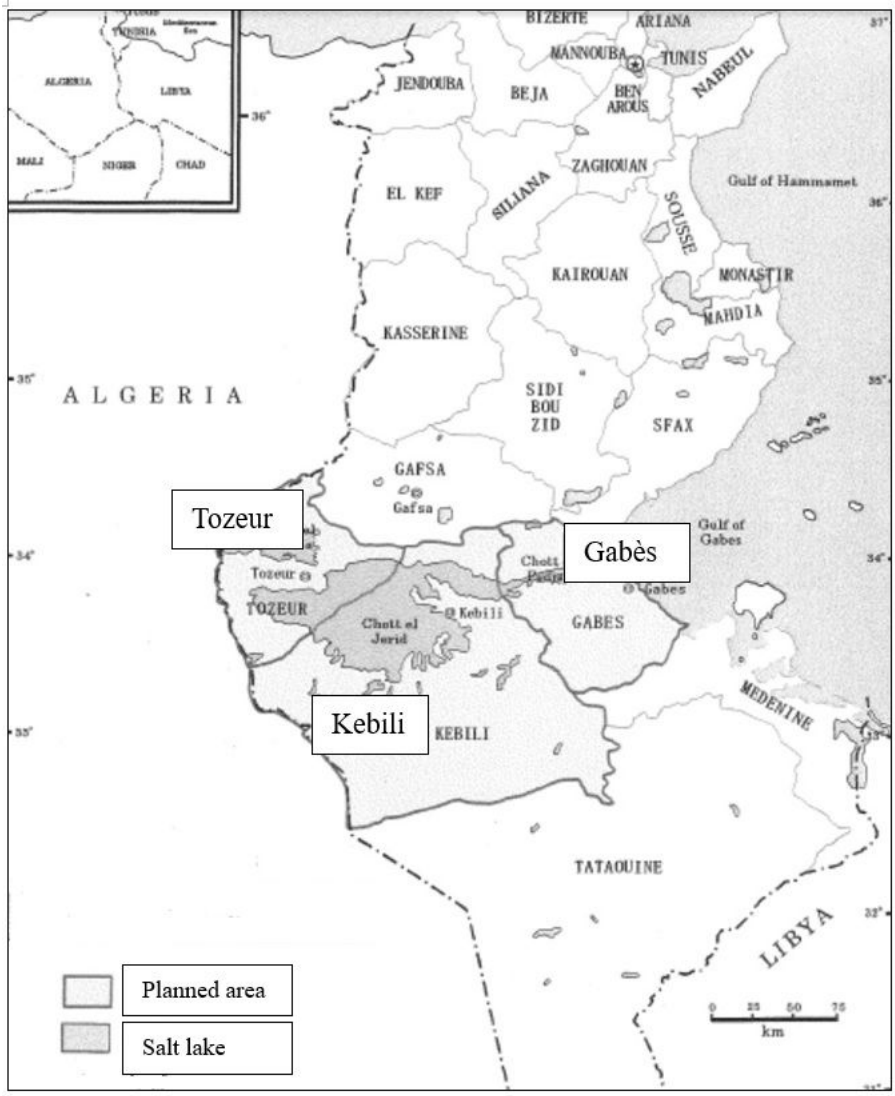
1) Civil Engineering Work, Procured Equipment, etc.

The plan at the time of the appraisal was to develop 50 sites, which became 59 sites in reality. This is because the urgency and necessity of six sites in the Gabes and Tozeur Governorates were considered[9] when the initial plan was reviewed at the time of the detailed design after the start of this project, therefore, they were selected as additional sites (50 + 6 = 56 sites). Subsequently, the CRDA of the Kebili Governorate submitted a request to the DG/GREE to include three sites[10] within the Governorate as project sites as they were in urgent need of support. In view of this, the DG/GREE submitted a request to JICA. Based on this request, the construction supervision consultant of this project investigated and examined the feasibility of the three sites. As it was judged that there should be no issue in starting construction work, the number of project sites increased from the initial plan (50 + 6 + 3 = 59 sites). At the project sites, the development of terminal irrigation channels (including the concrete lining), the installation and replacement of drainage pipes, the removal of sediment from the drainage channels, the development of drainage pumping stations,[11] etc. were carried out. In addition, a total of six vehicles were deployed: one at the DG/GREE headquarters, two at the CRDA in the Tozeur Governorate, two at the CRDA in the Kebili Governorate and one at the CRDA in the Gabes Governorate.

2) Consulting Services

Consulting Services were implemented almost as planned. As discussed above, while project sites were added, the initial terms of reference (TOR) included the new detailed design for irrigation and drainage works and a review of the existing detailed design, thus, it can be maintained that the task was performed as planned. (In other words, as the TOR were set with a view that the number of sites might increase or decrease after the start of the project, no major additional work occurred).

[9] Six sites: Zerkine young, Zrig old and Zarat 1 in the Gabés Governorate and Hazoua CI, Ettâamir and Oudia 1-2 in Tozeur Governorate.
[10] Three sites: Bchelli, Zaafrane and Dhomrana.
[11] Drainage pumping stations were only developed across seven sites where the situation was particularly urgent.



Source: Special Assistance for Project Formation (SAPROF) Report

Figure 1: Locations of Project Sites

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost planned at the time of the appraisal was 7,030 million yen (of which the ODA loan was 5,260 million yen); the actual total cost was 6,065 million yen (of which the ODA loan was 4,339 million yen), which was lower than planned (approximately 86% of the plan). When the average exchange rate during the project implementation was applied, the actual project cost was 5,206 million yen (approximately 74% of the plan).[12] As a matter of fact, other than

[12] This is the case when applying the average exchange rate during the project implementation (1 Tunisian dinar = 53.55 yen), while the exchange rate at the time of appraisal was 87.9 yen. According to the DG/GREE, "Although the number of target sites increased after the start of the project, the impact of the exchange rate was sufficient to cover the

exchange rate fluctuations, no particular factors affecting the increase or decrease in the project cost were observed during the implementation of this project. Since it is realistic to make a judgment after calculating the actual amount without considering the exchange rate fluctuations, it can be concluded that the total actual amount is 6,065 million yen (approximately 86% of the plan) by applying the exchange rate at the time of the appraisal (1 Tunisian dinar = 87.9 yen).

3.2.2.2 Project Period

At the time of the appraisal, the project was planned to run from March 2007 to December 2016, a duration of nine years and 10 months (118 months).[13] However, the actual duration was from March 2007 to April 2019, a period of 12 years and two months (146 months) which was approximately 124% of the initial plan. The main reasons for the delay were as follows, a) while the selection of a construction supervision consultant was carried out around the time of the start of the project, the procurement and contract procedures required more time; b) the Jasmine Revolution (Arab Spring)[14] occurred in 2010–2011 after the consultant had begun the work, therefore, the detailed design (site confirmation/investigation), security/safety assurance, on-site adjustments, etc. required additional time, delaying the start of the construction period; and c) the tendering procedure for the contractors required time (e.g., bids were made by contractors who did not meet the qualifications and the procedure had to be repeated), and in particular, the start date of the construction work was significantly delayed as regards the terminal irrigation and drainage channel facilities of the Tozeur Governorate site (Fatnassa) (as the contractor was finally appointed at the 4th re-bidding stage).

It is appropriate to consider the period of turmoil relating to the Jasmine Revolution as an external factor in this ex-post evaluation. The period of one year and one month (13 months), from December 2010 (at the time of the outbreak of riots and large-scale anti-government demonstrations) to December 2011 (at the time of the establishment of the coalition government and the election of the new president), will be considered as a delay in the project progress due to external factors.[15] Specifically, it can be said to have been directly affected by the timing of the bidding and procurement, thus, the decision of excluding this period is considered to be realistic and accurate. Therefore, while the actual period was approximately 124% of the plan, as previously mentioned, it was considered desirable to exclude the aforementioned period (13

construction cost (additional cost). There was a time when the Tunisian dinar was fluctuated sharply (depending on the timing of the construction). As a result, the total project cost was held down due to the influence of exchange rates."

[13] At the time of the appraisal, the completion of this project was defined as "at the time of completion of construction and renovation of the terminal and drainage channel facilities, etc., and the time when they are put into service"

[14] High unemployment rates, soaring prices and the resultant public dissatisfaction led to demonstrations and rioting. Anti-government protests spread nationwide, and President Ben-Ali subsequently went into exile in Saudi Arabia.

[15] The reasons for recognizing this as an external factor include "it was not an event that occurs continuously or frequently in the project area" and "it was not assumed as a risk at the time of the appraisal." (Source: JICA Ex-Post Evaluation Reference 2021).

months) and calculate the actual period as 133 months (= 146 - 13 months). The actual period was determined to be 133 months compared to the planned 118 months, or approximately 113% of the delay compared to the plan, the project period slightly exceeded the plan.

3.2.3 Results of Calculations for Internal Rates of Return (Reference only)

Economic Internal Rate of Return (EIRR), Financial Internal Rate of Return (FIRR)

The EIRR was calculated to be 10.6% at the time of the appraisal, considering the increase in yields of agricultural products as a "benefit," the project cost and the operation and maintenance expenses as "costs" and a project life of 25 years. The FIRR was calculated to be 0.6%, considering the revenue from services as a "benefit," the project cost and the operation and maintenance expenses as "costs" and a project life of 25 years. In this evaluation study, at the time of the ex-post evaluation, recalculation was attempted using the same conditions at the time of the appraisal, however, accurate numbers could not be calculated. This is because a) it was difficult to confirm the basis for the EIRR and FIRR calculations relating to the number of project sites planned at the time of the appraisal (50 sites),and b) as it was difficult to confirm the calculation basis used when the number of project sites changed (the initial plan of 50 sites was changed to 59 sites) during the project implementation, the actual values for the "yields of agricultural product" (EIRR) and the "revenue from services" (FIRR) could not be calculated. However, there is a high possibility that the rates would not fall below the figures calculated at the time of the appraisal (EIRR: 10.6%, FIRR: 0.6%), considering that the actual project cost, which accounts for a large proportion of the "cost," is held down by fluctuations in exchange rates, etc. and assuming that with the increase in the number of project sites the generated benefits have not decreased.

<Summary of Efficiency>

As discussed above, while the outputs of this project increased (from 50 to 59 sites), the project period slightly exceeded the initial plan, and the project cost was lower than the initial cost. Therefore, efficiency of the project is high.

Photo 1: Developed Drainage Channel
(Tabaga in Kebili Governorate)

Photo 2: Procured Vehicle
(CRDA in the Tozeur Governorate)

3.3 Effectiveness and Impacts[16] (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

In this project, by developing terminal irrigation, drainage channels, etc., conserving water and securing stable irrigation water were expected as project effects. While taking into account the fact that the number of oasis sites increased from 50 in the original plan at the time of the appraisal to 59 after the change, as previously mentioned, Table 2 shows the quantitative effect indicators (baseline, target, actual values). (Four indicators were set at the time of the appraisal: " irrigation area," "cropping intensity," "irrigation interval" and "irrigation water-carrying efficiency." The target year was set to 2018 (two years after project completion). As the actual completion year was 2019, the data two years on from that date, i.e., the actual data from 2021 were collected. An analysis of each indicator will follow the table.)

Table 2: Quantitative Effect Indicators of This Project (Baseline, Target, Actual values)

Indicator	Baseline value (2007 Actual value)	Target value (2018: Two Years After Completion)	Actual value (2021: Two Years After Completion)
1) Irrigation Area (ha) *Note 1	9,265 (*66 oases were targeted) Reference value: 7,427 (*Sum of 50 oases) Reference value: 8,646 (*Sum of 59 oases)	9,265 (*66 oases were targeted) Reference value: 7,427 (*Sum of 50 oases) Reference value: 8,646 (*Sum of 59 oases)	8,645 (*Actual is 59 oases Breakdown: 3,124 (Gabes), 2,872 (Kebili), 2,649 (Tozeur))
2) Cropping Intensity (%) *Note 2	140	160	141 (Gabes) 150 (Kebili)

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

			140 (Tozeur)
3) Irrigation Interval (days) *Note 3	6–60	6–35	19–22 (Gabes) 15–35 (Kebili) 5–14 (Tozeur)
4) Irrigation Water-Carrying Efficiency (%) *Note 4	46	68	70 (Gabes) 80 (Kebili) 68 or more (Tozeur)

Source: JICA's documents (baseline and target values), Project Completion Report, answers to the questionnaire and interviews (actual values).
Note 1: This indicates the total area in which terminal irrigation and drainage channels were developed. The actual value is the sum of the 59 oases.
Note 2: This indicates the farmland utilization rate. It is calculated by dividing the area planted with crops by the total farmland area. If the figure is more than 100%, this means that cropping is carried out more than once per year. The actual value is the average in each Governorate.
Note 3: This indicates the number of days between irrigations (water supply interval). Intermittent irrigation is a method of alternately irrigating and drying the field for several days during crop growth. Oxygen is supplied to the roots by drying the soil surface, which has the effect of adjusting the amount of fertilizer absorbed. The actual value is the average for the 59 oases.
Note 4: This shows to what extent (percentage) the irrigation water reaches the field. It is calculated by dividing the planned water intake by the actual amount of water reaching the field. The actual value is the average across the 59 oases.

1) Irrigation Area

According to JICA's document, the 9,265 ha, which was both the baseline value and the target value set at the time of the appraisal, was "the total area of 66 sites that were selected as candidates at the project appraisal stage." Similarly, JICA's document stipulated the plan: "In this project, drainage and irrigation works will be carried out at 50 sites selected from 66 candidate oasis sites. Through the consulting services, the detailed design will be reviewed for oases from the 66 sites." Therefore, while the baseline and target values (9,265 ha) were for the sum of the 66 sites, as shown in Table 3, the accurate target value was 7,427 ha for the 50 sites.[17] In any case, the target value and the actual value are compared based on the fact that the number of target oasis sites increased to 59 sites. The comparison of the target value (8,646 ha) and the actual value (8,645 ha) for the 59 sites shows that the result was as planned.

2) Cropping Intensity

The actual value has not reached the target. According to those involved in the project, such as the DG/GREE and CRDA, the target was not reached because in 2021, (1) some oases[18] did not proceed with planting, as there were a certain number of farmers who went through land inheritance procedures; (2) operation costs such as fertilizer, seedlings and labor costs increased, and some farmers could not plant; and (3) cropping did not progress due to significant changes in

[17] At the time of the appraisal, 50 sites had not yet been selected but were planned to be decided at the time of detailed design. It is thus presumed that there was no choice but to list the value for the 66 sites (9,265 ha).
[18] Remada, Fatnassa and Beni Ali in the Tozeur Governorate.

climate and temperature.[19] These factors are not highly correlated with this project (development of terminal irrigation and drainage channel facilities, etc.), so they are considered factors that cannot be controlled within the scope of the project. Under the condition that the irrigation facilities have been developed and renovated through this project and the conditions for cropping have been met, and as long as these factors do not occur, it is inferred that cropping proceeds smoothly and the cropping intensity is high.

3) Irrigation Interval

The irrigation interval indicates the water supply interval. At the time of the appraisal, the irrigatable amount was insufficient for the optimum amount of water required for each crop. Through this project, it was necessary to increase the irrigation water-carrying efficiency, to spread irrigation water to areas where irrigation water had been difficult to reach, and to meet the water demand necessary for crops taking into account the shortened water supply intervals (baseline value: six to 60 days, target value: six to 35 days). Regarding the actual values, the CRDA in each Governorate commented, "Taking the 15–35 days interval as an example, it shows that irrigation can be done in 15 days at the shortest and in 35 days even in the worst case (at the longest)" and "The shorter interval of the irrigation shows that water is distributed efficiently." The "longest supply interval" which took up to 60 days before the start of the project, has decreased. This can be considered as an effect of this project. However, the "shortest supply interval" has increased in some cases: the baseline value of six days vs. the actual value of 19 days in the Gabes Governorate; and the baseline value of six days vs. the actual value of 15 days in the Kebili Governorate. The target was not achieved in the Gabes Governorate; the reason was that while most of the oases reached the target value, at two oases (Bechima 1 and Bechima 2) under this Governorate, the shortest supply interval became longer due to the decrease in the water resource flow rate and the depletion of aquifers (available water sources are decreasing). The situation in the Kebili Governorate is similar; the illegal drilling of wells by certain farmers around farmlands has resulted in further withdrawal of water from the Complex Terminal Aquifer, exacerbating the reduction of water sources.[20] Based on the above, it can be said that the irrigation interval is greatly affected by the water resources around farmlands and the usage of wells.[21]

[19] According to the DG/GREE, the actual value of the previous year (2020) was higher than that of 2021.
[20] As a result, it is highly likely that the amount of water intake from wells that have been in use since before the start of this project has decreased.
[21] Prior to the start of this project, it was already confirmed that there were concerns regarding the amount of water in the deep wells, even in the oasis, where the irrigation interval was short. It was also pointed out that the amount of irrigation water might decrease in the future and the irrigation interval could increase. Although those involved in the project explained this situation to the farmers (beneficiaries), this may not have been sufficient. For this reason, it might have been necessary to conduct awareness-raising activities and provide explanations regarding the use of limited water resources and the aims of the project.

4) Irrigation Water-Carrying Efficiency

The target value has been exceeded, which can be regarded as the effect of the development and renovation of terminal irrigation and drainage channels, etc. as part of this project.

3.3.1.2 Qualitative Effects (Other Effects)

(Reduction and Prevention of Salt Damage Through the Development of Terminal Irrigation and Drainage Channels)

As discussed above, water within the project areas is taken from the shallow wells or deep wells of the Complex Terminal Aquifer, located at a depth of 60m–500m, and the Continental Intercalary Aquifer, located at a depth of more than 1,000m to 2,000m and more; water is distributed to farmlands through irrigation channels. The salinity of the two fossil aquifers varies with depth, with the former being approximately 5g/liter and the latter being approximately 2.5g/liter.[22] Since there is a risk of salt absorption in fields and crops, it is desirable to take water from deeper aquifers. Therefore, in order to prevent salt from remaining on the surface layer of the soil, it is important to improve the drainage channel and properly treat the wastewater at the outlet. As mentioned earlier, the implementation of this project has increased irrigation water-carrying efficiency. Stable water distribution is realized through the irrigation water channels, and the water intake from deep aquifers (aquifers with low salinity) is increasing. According to interviews with the CRDA in each Governorate, comments such as the following were received: "The retention of water has improved, and the growth of palm trees near irrigation channels and fields has improved" (CRDA in Tozeur Governorate); "After completion, salt damage has decreased. Especially in the Ghannouch oasis and the El Hamma oasis, a network of drainage channels was constructed nearby, and after the construction, the salt damage that had been observed until then disappeared. It is thought that it is the effect of this project"; "In addition to the development of terminal channels, cleaning the existing drainage facilities and removing sediments are keeping the salt damage to a minimum" (CRDA in Kebili Governorate). Based on the above, it can be inferred that this project has a high possibility of contributing to the reduction and prevention of salt damage to the fields and crops around the target areas.

3.3.2 Impacts

3.3.2.1 Intended Impacts

(Contribution to Improving Agricultural Productivity Through Efficient Use of Water and Soil Resources)

This project was expected to improve agricultural productivity in the target areas by saving water and securing the stable supply of irrigation water. Table 3 shows the quantitative effect

[22] (Reference information)The salinity standard is recommended to be below 2.0g/liter nationally and 2.5g/liter for the southern region.

indicators (baseline and target values) of the production volume of major crops and the yield of major crops per unit area, and Table 4 shows the actual values.

Table 3: Quantitative Effect Indicators of the Production Volume of Major Crops and the Yield of Major Crops per Unit Area (Baseline and Target values)

Indicator	Baseline value (2007 Actual value)			Target value (2018)		
1) Production Volume of Major Crops (ton) *Note	Date Palm	Feed Crops	Pomegranates	Date Palm	Feed Crops	Pomegranates
	63,455	53,764	2,394	83,817.5	74,315	3,843
2) Yield of Major Crops Per Unit Area (ton/ha) *Note	Date Palm	Feed Crops	Pomegranates	Date Palm	Feed Crops	Pomegranates
	8.9	37.9	3.8	12.1	55.0	6.1

Source: JICA's documents (baseline and target values).
Note: The values of pomegranates are only from the Gabes Governorate.

Table 4: Quantitative Effect Indicators of the Production Volume of Major Crops and the Yield of Major Crops Per Unit Area (Actual Values of Two Years After Completion)

Indicator	Actual value (2021)			
1) Production Volume of Major Crops (ton) *Note	Date Palm	Feed Crops	Pomegranates	Olives
	Total: 65,305 (Tozeur: 21,255, Gabes: 20,050, Kebili: 24,000)	Total: 57,340 (Tozeur: 6,750, Gabes: 25,590, Kebili: 25,000)	2,479 (Gabes only)	33,000 (Gabes only)
2) Yield of Major Crops Per Unit Area (ton/ha) *Note	Date Palm	Feed Crops	Pomegranates	Olives
	Tozeur 8.0, Gabes: 4.0, Kebili: 9.0	Tozeur: 45.0, Gabes: 30.0, Kebili: 36.0	6.7 (Gabes only)	7.6 (Gabes only)

Source: Answers to the questionnaire and documents provided by the CRDA in each Governorate (actual values).
Note: Among the crops, the values for pomegranates and olives are only from the Gabes Governorate.

Neither the production volumes of date palm, feed crops and pomegranates nor the yield of these major crops per unit area reached the target values. It can be said there was not much change from the baseline values (2007). The reasons are as follows: 1) in recent years, labor costs, fertilizers and material prices have risen, and some farmers have postponed planting; 2)production in recent years has been affected by phenomena such as rising temperatures, drying and rainfall decrease; and 3) recently, Tunisia and neighboring Algeria have been affected by an outbreak of the Bufaroua, a kind of Oligonychus Afrasiaticus,[23] which has particularly affected the growth of date palm.[24] Meanwhile, through the development of terminal irrigation and drainage channels, etc. as a consequence of this project, the water intake from deep aquifers, with relatively low salinity, has progressed, and water is distributed to fields through the developed irrigation

[23] It is also called Ghobar.
[24] This starts to affect growth before the fruit matures. It has the characteristic of surrounding the fruit with a thin net that catches grains of sand carried by the wind, thereby inhibiting growth.

channels. As a result, the water distribution management function has become stable,[25] which contributes to the reduction and prevention of salt damage in the fields, as well as maintaining the quality of agricultural products. The CRDA and GDA in each Governorate were interviewed and commented as follows: “Had this project not been implemented, the salt damage in the fields would have increased and continued, and the yield would have been greatly affected. While it is believed that there are increasing cases of illegally dug wells by farmers, they could only dig from shallow aquifers with relatively high salinity, which may have resulted in crops being planted with high-salinity water, leading to reduced production and lower quality.” The production of date palm, feed crops and pomegranates, and the yield of major crops per unit area have not increased significantly, however, the production of olives has begun in the Gabes Governorate. In addition, the production of vegetables, such as carrots, turnips and onions, is increasing.[26] According to the CRDA in the Gabes Governorate, “Vegetable production was not planned before the start of this project. In recent years, crop production has been diversifying.” This is one example of how the project has stabilized water distribution, diversifying production in the fields.

Based on the above, impacts, in terms of the production of crops and the yield of major crops per unit area, were not as high as expected at the time of the appraisal; cases of a significant increase in farmer income could not be confirmed. Meanwhile, although it is difficult to measure the actual situation quantitatively, it can be said that the developed terminal irrigation and drainage channels contribute to the maintenance of oasis agriculture, providing stable water distribution and soil stability and an improvement in the target areas.

Photo 3: Farmland
(Beni Ari in the Tozeur Governorate)

Photo 4: Salt Damage Observed in the Area Adjacent to the Target Oasis
(Suburbs of Ibnes in the Kebili Governorate, Not Covered by This Project)

[25] As discussed above, an improvement in the irrigation water carrying efficiency demonstrates the reality.
[26] Of the 3,124 ha of the irrigated area of the oasis covered by this project, 959 ha, or more than 30%, are planted with vegetables at the time of the ex-post evaluation. The vegetable planted area in the entire Gabes Governorate is 7,470 ha, which accounts for approximately 13% of the vegetable production area.

(Raising Awareness of Water Conservation Among Farmers, Contribution to Environmental Conservation)

When interviewing the CRDA in each Governorate regarding the farmers' awareness of water saving, the following comments were received: "Although there was no educational activity on water saving for farmers in this project, we believe that farmers are turning their attention to water resource conservation through the development and improvement of irrigation systems in the target areas. Considering the situation before and after the start of the project, we believe that they appreciate the stable water distribution" and "Farmers are paying more attention to water resource use and environmental issues." The interviews with farmers (beneficiaries)[27] confirmed that the level of satisfaction with this project is generally high. The farmers commented as follows: "The developed terminal channels rarely have leakage, and I think the project is contributing to water conservation" and "I think it is also a means of counteracting the decrease in the amount of water in the aquifers. The developed drainage facilities will lead to the improvement of wastewater treatment, which will result in the reduction of salt damage risk in the fields."

Regarding environmental conservation, the CRDA in each Governorate commented during the interviews: "As this project did not improve the entire irrigation system but only terminal channels in the target area, the impact on water conservation and water resources may be limited. Nevertheless, after the completion of the project, the distribution of irrigation water has become steady, and I think the environmental conservation of the entire region is progressing" (CRDA in the Gabes Governorate); "We think the incidence of localized water retention and water logging (events that cause the saturation of soil pores due to relatively long retention of water[28]) is decreasing due to the improved management of irrigation water. A certain number of farmers must have been inspired by the implementation and management of water-saving projects like this one. I think there is a growing awareness of the use of irrigation water and water resources" (CRDA in the Tozeur Governorate); and "Mosquitoes are decreasing due to reduced water retention. I also think the bad smell has gone" (CRDA in the Kebili Governorate). Based on the above, it is inferred that this project contributes to the promotion of farmers' understanding of water resource utilization and the maintenance of environmental conservation in the region.

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Natural Environment

This project does not correspond to the characteristics liable to cause adverse environmental impact or sensitive areas susceptible to the impact listed in the *JBIC Guidelines for Confirmation*

[27] Group interviews were conducted with a total of 103 farmers (36 from the Gabes Governorate, 42 from the Kebili Governorate and 25 from the Tozeur Governorate) at 19 of the oasis sites visited. Most of them were small-scale farmers.
[28] Anoxic phenomena that disturb soil fauna and vegetation.

of Environmental and Social Considerations (enacted in April 2002).Consequently, an undesirable environmental impact is judged to be insignificant, therefore, the project is classified as Category B. Concerning environmental permits, according to Tunisian domestic law, it was not mandatory to prepare an environmental impact assessment report.

It was confirmed through the questionnaire and interviews with the DG/GREE and CRDA in each Governorate, as well as site inspections, that there was no particular impact on air pollution, water quality, noise/vibration or the ecosystem during the project implementation and after its completion. In addition, no mitigation measures have been implemented in relation to the natural environment, and no complaints have been received from residents living around the target areas. In principle, water is taken from deep confined groundwater in the project areas, and water pollution had not been confirmed by the time of the ex-post evaluation.[29]

Regarding environmental monitoring, the DG/GREE headquarters is in charge of the environmental aspects of all irrigation projects in the country, and the CRDA in each Governorate is in charge of the practical aspects. However, the CRDA does not have a particular department, and regular environmental monitoring of the developed irrigation facilities has not been carried out by the time of the ex-post evaluation. As discussed above, this is because there has been no negative impact on the environment. In case any problem arises, the CRDA has a system to deal with the issue through consultation and cooperation with the local organizations of the Ministry of the Environment.

2) Resettlement and Land Acquisition

Land acquisition and resettlement were not anticipated in this project at the time of planning, and neither did they actually occur.

3) Gender Equality, Marginalized People, Social Systems and Norms, Human Well-being and Human Rights

This project aimed to secure stable irrigation water in South Tunisia and contribute improving agricultural productivity through the efficient use of water resources. Although cases in which this project had a direct impact on gender, the realization of equality, social system norms and people's well-being were not observed, the improvements in agricultural productivity and stable food supply seem to benefit many farmers and their families (including those who are vulnerable), providing them with more life choices and generating phenomena that lead to their well-being. This project is considered to be playing a role in this regard.

[29] Withdrawing water from deep aquifers poses very little risk of contamination along the way, and the process of distributing water to fields carries similarly little risk.

<Summary of Effectiveness and Impacts>

Regarding the achievement rate of effectiveness and quantitative effect indicators, 1) the irrigated area is approximately 100% when the target (8,646 ha) for 59 oases is compared with the actual value (8,645 ha), 2) the cropping intensity is approximately 20%, 3) the irrigation interval is about 60%, and 4) the irrigation water-carrying efficiency is over 100%. The average of these is calculated to be approximately 70%. With regard to qualitative effects, it is said that the development of the terminal irrigation and drainage channel facilities as part of this project has contributed to the reduction and prevention of salt damage. As for the impacts, although the production of each crop and the yield of major crops per unit area have not increased significantly, the interviews have confirmed that the production of a new crop has started, that farmers have raised their awareness of water conservation and that the project has contributed to environmental conservation. Therefore, it can be said that the expected outcome and impacts of the implementation of this project were achieved mostly as planned. There has been almost no negative impact on society (including human rights and gender equality), the environment and the economy in the long term. Therefore, effectiveness and impacts of the project are high.

Photo 5: Farmland
(Mzira Ghannouch in the Gabes Governorate)

Photo 6: Date Palm Damaged by Oligonychus Afrasiaticus
(El Oudia 2in the Tozeur Governorate)

3.4 Sustainability (Rating:②)

3.4.1 Policy and System

The *Five-Year National Development Plan*, formulated by the Tunisian government, lists the following as priorities: agricultural development in rural areas, income improvement for farmers and fishermen, strengthening of the food security system, improvement in productivity and competitiveness to attract new investments, and pursuing the sustainability of natural resources in the face of climate change. The importance of securing and conserving water resources and saving water is highlighted not only for the purposes of rural development and agricultural

policies but also for mitigating the effects of climate change as far as possible. Under such circumstances, this project contributes to the country's policies related to the agricultural sector and is in line with the policy and direction of the Tunisian government at the time of the ex-post evaluation.

3.4.2 Institutional/Organizational Aspect

The executing agency is the DG/GREE. Concerning the maintenance of irrigation facilities, including the terminal irrigation and drainage channels developed by this project, the CRDA in each Governorate, which is a local organization of the Ministry of Agriculture, has clarified the roles of relatively large-scale maintenance and repairs. In addition, in each Governorate, there are GDAs that are responsible for relatively small-scale daily maintenance and repair work. The CRDA and the GDA carry out maintenance and repairs based on an agreement; they work in cooperation with one another. Although there are certain differences depending on the scale of the organization, the CRDA in each Governorate is responsible for the operation and maintenance of large-scale irrigation and drainage channels, irrigation pump facilities and procured vehicles, while the GDA is responsible for cleaning terminal (tertiary) channels and branch channels, removing sediment, preventive maintenance, minor repairs (e.g., repairing leaks in channels), replacement of parts for irrigation pump facilities, securing parts, etc.

Through the questionnaire and interviews with CRDAs in the Tozeur, Gabes and Kebili Governorates, as well as with the GDAs, it seems that the number of staff responsible for maintaining the terminal irrigation and drainage channel facilities is kept at a minimum. Although some staff of the CRDA in each Governorate have retired in recent years, there has been limited progress in terms of hiring new recruits; the number of staff is on a downward trend.[30] It was confirmed that, in general, there was no shortage of staff at the GDAs. In any case, no incidents have been reported in which a shortage of staff has resulted in a serious lack of maintenance either at the CRDA in each Governorate or at the GDAs. As will be discussed in 3.4.4 Financial Aspect, the CRDA usually makes up for the shortfall in the GDA's maintenance costs, and the CRDA will provide support even if the GDA has limited funds or has difficulty in securing staff; thus, within this system, staff shortages rarely occur.

Based on the above, it is considered that there are no particular problems regarding the institutional/organizational aspect of the operation and maintenance of this project.

3.4.3 Technical Aspect

As for the technical aspect of operation and maintenance, it was confirmed through the questionnaire and interviews that the CRDA in each Governorate has staff with many years of

[30] This is because recruitment activities in the public service sector have been sluggish due to the worsening financial situation of the central government.

experience and advanced operational skills. On the other hand, high technical skills are not required at the GDAs, as they are mainly engaged in relatively small-scale maintenance and management. If GDAs encounter some technical problems, they asks the CRDA (or a local private company with expertise on payment basis) to assist in dealing with the problem.

The DG/GREE plans and implements training programs every year for CRDA technical staff at 24 regions in Tunisia. In the CRDAs in the Tozeur, Gabes and Kebili Governorates, recent training sessions included "How to Handle Equipment for Irrigation Pumping Facilities" and “Introduction of Solar Power Generation Equipment; the technical staff of the maintenance and management department participated in these training sessions over several days. In addition, the DG/GREE also plans and conducts training for GDA staff (mainly technical directors and financial officers) to strengthen the administrative and financial management of the GDA. The CRDA and the GDA have training programs for newly recruited staff, focusing on the operation and maintenance of irrigation water channels and pump facilities, general affairs and financial management as on-the-job training (OJT).

The CRDA and the GDA formulate maintenance plans every year. It was also confirmed that each department has a maintenance manual for irrigation facilities.

Based on the above, it can be maintained that there are no major problems with the technical level of operation and maintenance.

3.4.4 Financial Aspect

Table 5 shows the operation and maintenance budget of the CRDA[31] in each Governorate. The CRDA in each Governorate commented, “Regarding the operation and maintenance budget for the irrigation facilities managed by the national government, from time to time, the economic and financial situation becomes severe, and the budget allocation may not be sufficient, however, we prioritize the budget allocation and carry out maintenance. There has not been any particular case in which budget shortages have caused insufficient maintenance.”

Table 5: Operation and Maintenance Budget of the CRDA

(Unit: Tunisian dinar)

	2019	2020	2021
CRDA in the Gabes Governorate	1,130,000	900,000	1,150,000
CRDA in the Tozeur Governorate	1,650,000	2,778,000	2,900,000
CRDA in the Kebili Governorate	2,345,000	2,820,000	2,777,000

Source: CRDAs in the Gabes, Tozeur and Kebili Governorates.

[31] The CRDA’s operation and maintenance budget is allocated by the Ministry of Agriculture, Water Resources and Fisheries.

Table 6 shows the operation and maintenance budgets of the GDA in each Governorate. The financial resources consist of association membership fees and irrigation water usage fees that farmers in the project areas pay to the GDA every year. According to the GDA in each Governorate, "The required maintenance work cannot be covered by the collected association fees and revenue from irrigation water fees.[32] Although there is a constant shortage, the CRDA compensates for the shortfall." As shown in Table 6, while increases and decreases can be observed in each Governorate, they do not show a particular improvement or deterioration trend. In fact, as the CRDA makes up for the chronic shortage, the budget shortage is not greatly affecting the maintenance procedures, such as cleaning and sediment removal from terminal (tertiary) and branch channels, preventive maintenance and small-scale repairs, for which the GDA is responsible. Meanwhile, the CRDA considers the GDA's shortfall as "accumulated debt." The GDA requests that the CRDA makes up the shortfall, and the CRDA provides the fund, however, this is based on the assumption that it will require repayment in the future.[33] As a reference, Table 7 shows an example of accumulated debt (the case of the Tozeur Governorate). According to an interview with the CRDA in the Tozeur Governorate, "We do not see any improvement in the amount of accumulated debt to the CRDA. In addition, the utility costs (mainly the electricity charges required for the pump facilities used to pump up groundwater) and the cost of purchasing goods have been on the rise in recent years, which has led to ballooning spending and concerns." Many GDAs also commented, "Our financial challenge is paying high electricity bills, which make up 60–70% of the GDA's expenditure. "In particular, in water-saving agriculture where groundwater is pumped and used for irrigation, as in this project, the cost of electricity needed for pumping often becomes a bottleneck in terms of operation and maintenance. If the price of electricity rises, the cost borne by the GDA increases, which also affects the association fees and the irrigation water usage fees paid by farmers. Electricity costs have risen sharply in Tunisia in recent years. As shown in Table 8, at the time of the ex-post evaluation (2022), the unit price of electricity has increased (approximately two to three times higher) since before the start of this project (2007). In addition, the GDA is facing an increase in electricity bill payments due to increased electricity usage as a result of increased water withdrawal from deep wells.[34] At present, there are no major problems regarding the status of operation and maintenance due to the financial support from the CRDA that will continue. Nevertheless, a time

[32] We were unable to confirm specific information regarding the collection rates or regulations relating to association fees.

[33] It was not possible to confirm the terms of the bond issuance or the record of repayment.

[34] Pumping water from deeper locations increases power costs. Specifically, while most of the deep wells are drawn from the Complex Terminal Aquifer, due to illegal drilling of deep wells by certain farmers and the legal drilling by the GDA have lowered the depth by 45 to 90 m (67.5 m on average) depending on the location by the time of the ex-post evaluation (2022) (source: CRDA staff in Kebili Governorate). As a result, the number of pump heads has increased and consequently, pump equipment installed in deep wells consumes more energy (electricity).

may come when financial support from the CRDA can no longer be expected as now due to constraints on the national budget. Therefore, the GDA needs to make forecasts and prepare countermeasures for utility costs, specifically revenue-cost projections, to strengthen and improve its financial aspect.[35]

Table 6: Operation and Maintenance Budget of the GDA

(Unit: Tunisian dinar)

	2019	2020	2021
Gabes Governorate GDA	37,000	47,885	52,814
Tozeur Governorate GDA	192,000	160,000	160,000
Kebili Governorate GDA	150,000	120,000	210,000

Source: GDA (total amount) in the Gabes, Tozeur and Kebili Governorates

(Reference) Table 7: Accumulated Debt of the GDA to the CRDA[36]
(The Case of the Tozeur Governorate: Accumulative Amount of 16 GDAs)

(Unit: Tunisian dinar)

2018	2019	2020
188,439	196,655	206,677

Source: CRDA in the Tozeur Governorate

(Reference) Table 8: Comparisons of the Electricity Charges Before the Start of This Project (2007) and at the Time of the Ex-Post Evaluation (2022) *Note 1

(Unit: millime/kilowatt hour)*Note 2

	Daytime	Peak Hours	Evening	Nighttime
2007	77	131	107	61
2022	189	329	195	138

Source: Tunisian Company of Electricity and Gas (STEG)
Note 1: Prices before tax (7% VAT should be added)
Note 2: One millime is 0.001 TND (= approximately 0.0421 yen: exchange rate as of April 2022)

Regarding the impact of the spread of COVID-19, the GDA made the following comments: "Due to COVID-19, some farmers in the Kebili Governorate and Tozeur Governorate experienced

[35] According to the GDA in the Tozeur Governorate, one solution is to reduce utility costs through the introduction of solar power generation systems. It has been reported that there are already cases where they have been introduced in a different region of the country. In addition, since 2016, the DG/GREE has been co-financing the "Rural Drinking Water Supply Program Phase 2 (PAEPRII)" with the African Development Bank. This program aims to install 20 potable water pumping stations in 20 governorates of Tunisia, with photovoltaic power plants connected to the medium voltage (MV) power grid; the technical feasibility and economic profitability will be analyzed after 2022. With the aim of reducing the electricity costs of drinking water systems in rural areas, and depending on the results of the survey, the DG/GREE may aim to install solar power generation equipment at pumping stations, thus, the DG/GREE is considering an allocation of budget for this purpose.

[36] As for the accumulated debt before 2018, there were apparently many cases where farmers could not pay their irrigation water usage fees on time due to the continued political instability from 2011 to 2017 after the Jasmine Revolution (Arab Spring).In other words, political instability can be said to be one of the major factors behind the expansion of debt. The cumulative debt amount from 2018 to 2020 is not as large as that before 2018. (Table 8 shows that the annual average increase over the three years is 8,500 TND). This suggests that the impact of political instability before 2017 was greater.

reduced sales volumes of date palm, and their incomes have decreased. As a result, association fees and irrigation water usage fees have not been paid on time in some oases" and "Due to the spread of COVID-19, the cost required for maintenance and the purchase price of spare parts are on an upward trend." It is not likely that there will be a serious impact on the maintenance work for which the GDA is responsible because, as mentioned above, the CRDA subsidizes the expenditure. Nevertheless, it can be said that the impact of COVID-19 on the financial aspects is not minor.

In light of the above, it can be said that there are certain issues regarding the financial aspect of the operation and maintenance of this project.

3.4.5 Environmental and Social Aspect

It was confirmed through the questionnaire and interviews during site inspections that no environmental or social mitigation measures had been taken by the time of the ex-post evaluation and that no immediate impact is expected. As discussed in 3.3.2.2 Other Positive and Negative Impacts, it is considered that no significant negative impact had occurred by the time of the ex-post evaluation.

3.4.6 Preventative Measures to Risks

At the time of the ex-post evaluation, there were no cases of deregulation of groundwater development or excessive agricultural development by the competitive private sector in South Tunisia. In addition, there have been no impacts relating to the deterioration of security or extreme climate change, and neither have there been any major changes in the policies related to agriculture and water resources. No particular risks, external conditions or events that should be controlled were observed, either at present or in the future.

3.4.7 Status of Operation and Maintenance

There have been no major problems regarding the status of operation and maintenance of the terminal irrigation and drainage channel facilities that have been developed. As mentioned above, the CRDA is responsible for the operation and maintenance of relatively large-scale irrigation channels, all drainage channels and irrigation pump facilities, etc., as well as the maintenance of procured vehicles, while the GDA is responsible for the cleaning and removal of sediment from the terminal (tertiary) channels, preventive maintenance, minor repairs (e.g., the repair of leaks in channels), the replacement of parts for irrigation pumps and the procurement of parts. As a result of site visits, it was observed that the maintenance work (cleaning and sediment removal) of the drainage channels was not always sufficient in some places. The issues observed were as follows: drainage channels are not all sufficiently cleaned, and sediment is not removed; the GDA was unable to keep up with maintenance work, and the CRDA had to intervene and respond; each

CRDA has only one hydro cleaner used for cleaning the irrigation and drainage channels, which delayed the work. In addition, of the six vehicles procured, one vehicle delivered to the Kebili Governorate was out of order. It is expected that the vehicle will be repaired at the CRDA's expense.

Furthermore, according to the CRDA, although there was no major impact at the time of the ex-post evaluation, if the salinity of the groundwater pumped up by the pump increases in the future, there will be an impact (specifically, corrosion) on the pump facilities.

Spare parts are procured and stored by the CRDA in each Governorate. The CRDA purchases parts manufactured by Tunisian companies, and procurement usually takes a minimum of seven days and a maximum of one month. On rare occasions, it may take more than five months to procure equipment with advanced technology.

It has been confirmed that there are cases in which the CRDA intervenes and responds because the GDA cannot keep up with the maintenance, and cases in which the maintenance of the drainage channels (cleaning and sediment removal) by the GDA is insufficient. Therefore, it can be said that there are certain issues regarding the operation and maintenance status of this project.

Based on the above, some minor issues have been observed in the financial aspects including the current status of the operation and maintenance system. They are not expected to be resolved for the time being. Therefore, sustainability of the project effects is moderately low.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed to save water and secure stable irrigation water by developing terminal irrigation and drainage channel facilities in the oases in South Tunisia (Governorates of Tozeur, Gabes and Kebili), thereby contributing to an increase in agricultural production and environmental protection, through the efficient use of water resources. Concerning relevance, this project is "consistent with the development plan" and "consistent with the development needs." As for coherence, while it is "consistent with Japan's ODA Policy," in terms of "internal coherence" and "external coherence," there was no concrete cooperation or overlap between projects, and thus, it cannot be said that this project had a synergistic effect. Based on the above, relevance and coherence are high. With regard to efficiency, while the outputs of this project increased (from 50 to 59 sites), the project period slightly exceeded the initial plan. Nevertheless, the project cost was lower than the initial plan, therefore, efficiency is high. The actual values of the effectiveness and quantitative effect indicators were around 70% of the target values. It is said that the development of facilities, such as terminal irrigation and drainage channels are contributing to the reduction and prevention of salt damage in the fields within the project areas. Concerning impacts, while production and the unit yield of each crop have not increased

significantly, the production of a new crop (olive) has begun as a result of this project; it can be observed that this project has contributed to raising farmers' awareness of water conservation and environmental conservation. Therefore, effectiveness and impacts are high. Regarding sustainability, although no major concerns exist, there are certain issues relating to the financial aspect and current status of the operation and maintenance system; therefore, sustainability 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

- At the GDA in each Governorate, there is a constant shortage of funding for maintenance budgets, etc., and there are issues in terms of securing financial resources. Since the CRDA compensates for the shortfall, there have been no major problems regarding cleaning and sediment removal from terminal (tertiary) and branch channels, preventive maintenance, or minor repairs, etc. However, the CRDA regards the shortfall as accumulated debt and contributes on the assumption that GDA will repay the debt in the future. In particular, utility costs (electricity charges) have become a heavy burden for the GDA, thus, it is desirable that the project stakeholders (the DG/GREE and the CRDA in each Governorate) work diligently to secure and improve the GDA's financial resources, with a view to pursuing a sustainable maintenance system. In addition, the DG/GREE is currently conducting a study with a view to reducing the operation and maintenance costs of drinking water systems in rural areas under the program co-financed by another donor (Rural Drinking Water Supply Program, Phase 2); the installation of solar power generation equipment at pumping stations is being considered. It would be desirable to utilize the study results, so as to secure and improve the financial resources of the GDA.

- In some project areas, farmers are illegally drilling wells around their farms, which may be reducing the amount of water from the aquifer, the water source. This can lead to the lowering of aquifer water levels, increased irrigation intervals and salt damage. Therefore, it is desirable for the project stakeholders (the DG/GREE and the CRDA in each Governorate) to enhance awareness-raising activities and provide thorough explanations to farmers regarding the effects of drilling wells and water resource issues.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

(Importance of Awareness-Raising Activities and Explanations to the Beneficiaries Regarding the Use of Natural Resources and the Project)

As previously discussed, farmers are illegally drilling wells around their farms in some project areas, which may be reducing the amount of water from the aquifer, the water source. Although the impacts on the project areas are not considered significant at the time of the ex-post evaluation, it is considered necessary for the project stakeholders to have carried out awareness-raising activities and provided thorough explanations to the farmers (beneficiaries) on the importance of water resources and water conservation awareness before the start of this project or during the project implementation. When formulating similar projects in the future (projects that deal with irrigation and water resource conservation simultaneously), it is desirable to ensure that awareness-raising activities and explanations are provided regularly regarding the use of limited water sources (natural resources) and the aim of the project on a regular basis (e.g., if the project runs for a long period of time, these awareness-raising activities should be conducted repeatedly before the start of the project, during the implementation of the project, after the completion of the project, etc.).

(Necessity of Calculating Costs and Planning Financial Measures for Operation and Maintenance)

In water-saving agriculture in which the groundwater is pumped up and used as irrigation water, such as this project, the cost of electricity used for the pumps tends to become a bottleneck in terms of operation and maintenance. If the price of electricity rises, the burden on the organization responsible for operation and maintenance will increase, and in some cases, farmers cannot pay the association fees and irrigation water usage fees in time. In addition, from a cost-benefit perspective, it is difficult to immediately revise the electricity tariff, as farmers may not plant, and the amount of crops produced may decrease if the cost portion increases due to an increase in electricity prices. For this reason, it is considered meaningful for the project stakeholders to have projections, such as an analysis of the electricity price per cubic meter of irrigation water supplied and the association fee income to be obtained, while taking into consideration, as far as possible, the financial capacity of the farmers at the time of the project formulation. This will make it easier to have an immediate operation and maintenance plan, as well as income-expenditure projections, which will enable financial measures to be taken.

5. Non-Score Criteria

5.1 Performance

5.1.1 Objective Perspective

Before the start of this project, when selecting the consultant and contractors, the executing agency and JICA proceeded by mutually confirming progress so as not to cause any delays, based

on a mutual understanding that the detailed design and the construction period should not be affected after the selection; however, delays occurred. In this context, it was confirmed that there were no major flaws in JICA's project supervision system and that there were no particular events that led to the delays or problems regarding communication with the executing agency.

5.2 Additionality

None.

(end)

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	1) Civil Engineering Work, Procured Equipment, etc. Development of the terminal irrigation and drainage channels, etc. (50 oasis sites), procurement of vehicles, etc. 2) Consulting Services New detailed design of irrigation and drainage works, review of the existing detailed design, tendering assistance, construction supervision (progress management, report preparation, etc.)	1) Civil Engineering Work, Procured Equipment, etc. Development of the terminal irrigation and drainage channels, etc. (59 oasis sites, a total irrigated area of 8,645 ha), procured vehicles: 6 2) Consulting Services Implemented almost as planned.
2. Project Period	March 2007–February 2016 (118 months)	March 2007–April 2019 (149 months[37])
3. Project Cost		
Amount Paid in Foreign Currency	85 million yen	4,065 million yen
Amount Paid in Local Currency	6,945 million yen	2,000 million yen
Total	7,030 million yen	6,065 million yen
ODA Loan Portion	(5,260 million yen)	(4,339 million yen)
Exchange Rate	1 Tunisian dinar=87.9yen (Exchange Rate as of December 2006)	1 Tunisian dinar =87.9yen (Exchange Rate as of December 2006[38])
4. Final Disbursement	January 2018	

[37] As discussed above, the period from December 2010 (when riots and large-scale, anti-government demonstrations occurred) to December 2011 (when a coalition government was established, and a new president was elected) was greatly affected by the Jasmine Revolution (Arab Spring). This period of time (13 months) was excluded because the project progress was delayed by external factors.

[38] As discussed above, since it is realistic not to consider the exchange rate fluctuations when determining the project cost in this ex-post evaluation, the exchange rate at the time of the appraisal was used for calculation purposes.

Appendix: List of the Names of the Areas (Oases) Covered by This Project (Numbers in parentheses indicate irrigation area)

(Unit: ha)

Gabes Governorate	Kebili Governorate	Tozeur Governorate
Mahjoub (376)	Tbaga(45)	Nefta: Remada(340)
Bouchemma (156)	Ibnes (34)	Nefta: Fatnassa (294)
Mzira Ghannouch (315)	Radhouan (20)	Nefta: Beni Ali (216)
Metouia (295)	Blidet (88)	Draa Sud (198)
Sboui (42)	Zarcine (96)	Ghardgaya (40)
Oudhref (292)	B.Zitoun 1–2 (236)	Hazoua 1 (72)
Ben Ghilouf (227)	Gueliada (148)	Hazoua 2 (47)
Glib Dokhane (68)	Faouar 1 (104)	Hazoua 3 (240)
Bechima 1 (318)	Faouar 2 (150)	O.Ghrissi (78)
Bechima 2 (290)	Ghidma (96)	Ibn Chabat1 (240)
Khebayet (84)	Nouil (110)	Ibn Chabat2 (286)
Fayçal (264)	Klibia (115)	Chemsa (90)
Salem (110)	Jemna (120)	Ibn Chabat 3–4 (306)
Zerkine jenne (chabab) (137)	Mtouria (81)	Hazoua CI (54)
Zrigancienne (61)	Bourzine (94)	Ettaamir (50)
Zarat 1 (89)	Sidi Hamed (80)	Oudia 1–2 (98)
	ElGhoula (76)	
	ElGolaa (65)	
	Graad (110)	
	Bou Hamza (81)	
	Sakkouma (81)	
	Tarfaya (79)	
	Smida (65)	
	Douz (302)	
	Tarfayet El Ma (53)	
	Sabria (68)	
	Bchelli (129)	
	Dhomrana (45)	
	Zaafrane (101)	
Total: 16 oases (3,124)	Total: 29 oases (2,872)	Total: 14 oases (2,649)

Source: Project Completion Report

FY2021 Simplified Ex-Post Evaluation Report of Japanese Grant Aid Project
External Evaluator: Hisae Takahashi, Octavia Japan, Co., Ltd.

Duration of the Study: November, 2021 - February, 2023
Duration of the Field Study: May 3 - May 28, 2022

Country Name
The Republic of Mozambique

< The Project for Construction of a Health Science Institute in Nacala>

Location of the Project site
(Source: Japan International Cooperation Agency (JICA))

The Constructed Health Science Institute Nacala

I. Project Outline

Background	In Mozambique, the number of doctors, nurses, and midwives per 100,000 population in 2013 was 68.6, which was far below the African regional average of 115 and the 228 recommended by the World Health Organization (WHO). Therefore, the further increase in the number of necessary healthcare professionals remained a major issue. Particularly in Nampula Province located in the northern part of the country, which is the target area of this Project, the ratio of healthcare professionals to the provincial population was 1,468:1, which was lower than the national average (1,148:1) (2013). However, in the northern region of the country, there was only one Health Science Institute (Instituto de Ciências Saúde: ICS) - in Nampula City, where mid-level healthcare professionals were trained. Moreover, due to a lack of capacity of facilities, the annual number of trained personnel at ICS Nampula was only 260, falling short of the target number of 370, and there was a need to expand the training facilities to increase the number of mid-level healthcare professionals in the region.
Objectives of the Project	The objective of this Project is to promote the training opportunities for mid-level healthcare professional by developing the Health Science Institutes (Instituto Ciencias de Saúde: ICS) Nacala in Nacala city of Nampula Province, thereby contributing to improving the quality and quantity of healthcare professionals in Mozambique.
Contents of the Project	1. Project Site: Nacala city, Nampula Province 2. Japanese side 1) Civil works and equipment procurement: Facility construction of ICS Nacala (Buildings for classrooms, administration & teachers, toilet facilities for teachers, auditorium, cafeteria, dormitories, teacher's house, guard house, electric room, connecting corridor, and water storage tank), and equipment procurement (Equipment for laboratories, equipment for library, classrooms and administrations, vehicles, etc.) 2) Consulting services: Detail design and construction supervision, guidance for initial operations and use by the contractors 3. Mozambican side: 1) Construction related items: Removal of existing facilities and others, infrastructure development (electricity, water, internet, etc.), boundary fence repairs, construction of gates for teacher's house, (after handover) purchasing of furniture, office supplies, tableware, fabric and others, gas cylinder installation and valve connections, etc. 2) Other procedures: Approval of a design, notification of the Project registration and others, procedures related to banks (B/A, issue of A/P, payment of commissions), tax exemption, assistance in obtaining residence permits, etc. for Japanese nationals related to the Project.

Implementation Schedule	E/N Date	October 2, 2015		
	G/A Date	October 2, 2015	Completion Date	August 31, 2018 (Date of completion of construction)
Project Cost	E/N Grant Limit / G/A Grant Limit: 2,121 million yen, Actual Grant Amount: 1,986 million yen			
Executing Agency	Department of Planning Cooperation, Ministry of Health			
Contracted Agencies	Main Contractors: Dai Nippon Construction (Construction works), Nissei Trading Co., Ltd. (Equipment supplier) Main Consultants: Matsuda Consultants International Co., Ltd / INTEM Consulting, Inc. (JV) Agent: None			

II. Result of the Evaluation

Summary

The Project was implemented with the aim to promote training opportunities for mid-level healthcare professionals by developing ICS Nacala in Nacala city of Nampula Province, thereby contributing to the improvement of the quality and quantity of healthcare professionals in Mozambique. Its purpose is in line with Mozambican development policy at the time of planning and the ex-post evaluation, which has emphasized the importance of ensuring the quantity and quality of healthcare professionals, development needs to develop ICSs and Japan's development cooperation policy. Indirect contribution by the JICA's technical cooperation project is confirmed and the Project is consistent with Goal 3 of the Sustainable Development Goals (SDGs). Therefore, its relevance and coherence are high. The outputs were as planned, and the Project cost was within the plan while the Project period exceeded the plan. Therefore, efficiency of the Project is high. Regarding the operation and effect indicators that were set at the time of planning, achieved the target regarding "the number of yearly graduates" in ICS Nacala was achieved. Meanwhile, in accordance with the Ministry of Health (MoH)'s policy of improving the quality of education, the number of courses being run has been narrowed down and other measures promoted. Therefore, "the number of courses for training mid-level healthcare professionals" and "the class hours per year for practical training and clinical practice training" remained at around 70% of the planned level. The facilities and laboratory equipment developed under the Project have enabled practical training closer to practice in addition to theory, contributing to an improved effective and efficient learning and working environments at ICS Nacala. The trainees and graduates from ICS Nacala, are also highly evaluated at the hospitals where they are received. It can also be said that there are few negative long-term social (including human rights and gender equality), environmental or economic impacts. Therefore, effectiveness and impacts of the Project are high. While no issues have been observed in the policy/system, institutional/organizational, and technical aspects, some issues have been observed in the financial aspects and the current status of operation and maintenance (O&M), and 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.

Overall Rating[1]	B (Satisfactory)	Relevance & Coherence	③[2]	Effectiveness & Impact	③	Efficiency	③	Sustainability	②

<Special Perspectives Considered in the Ex-Post Evaluation / Constraints of the Ex-post Evaluation>
- None

1 Relevance/Coherence

<Relevance>

・Consistency with the Development Policy of Mozambique at the Time of Ex-Ante and Ex-Post Evaluation

One of the pillars of *the National Development Strategy (2015-2035)* at the time of the ex-ante evaluation, "Human Resource Development," identified the improvement of health care standards as a priority area. *The Human Resource Development Plan in Health Sector (2008-2015)*, *the Accelerated Training Plan (Plano de Formação, (PF)) (2011-2015)*, and *the PF II (2013-2015)* provide specific human resource development plans to address the shortage of healthcare professionals. *The Human Resource Development Plan in the Health Sector (Plano Nacional de Desenvolvimento dos Rescursos Humanos Para a Saude)(2016-2025)* at the time of the ex-post evaluation reflects the MoH's policy of improving the quality of education by directing that the standard number of students per class be reduced from 30 to 20, although the demand for healthcare professionals is very large. Since this Project aims to contribute to the improvement of the quality and quantity of healthcare professionals, it is consistent with Mozambican development policy.

・Consistency with the Development Needs of Mozambique at the Time of Ex-Ante and Ex-Post Evaluation

As described earlier in the "Background" section of the I. Project Outline, the shortage of healthcare professionals was an urgent issue to be improved in Mozambique at the time of the ex-ante evaluation. In particular, in the northern region, there was only one ICS in Nampula Province that trains mid-level healthcare professional, and ICS Nampula has been forced to run courses in excess of the appropriate number of courses to meet the demand for training healthcare professional in the northern region, in addition to the nationwide demand for training healthcare professionals. At the time of the ex-post evaluation, the number of healthcare professional remained below the level recommended by the WHO, and the demand for them and the roles, needs and expectations of ICS Nacala are still high. Based on the above, it is judged that this Project is consistent with the development needs of Mozambique.

・Appropriateness of Project Design/Approach

The operation and effect indicators, i.e., "the number of courses for training mid-level healthcare professionals" and "the class hours per year for practical training and clinical practice", were below the plan, however, this was due to the fact that the operations of ICS are being carried out in accordance with the MoH's policy. Therefore, it can be concluded that this is not because of the appropriateness of the Project design/approach.

<Coherence>

・Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation

The Country Assistance Program for Mozambique (March, 2013) included the "Nacala corridor development and improvement program" and "the basic health improvement program" in the priority areas of "regional economic revitalization including corridor development" and "human development" respectively and defined the emphasis on social infrastructure development and expanding access to health services. *The JICA Country Analysis Paper for Mozambique* also states the importance of health sector support, and this

[1] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[2] ④ : Very High ③: High, ②: slightly low, ①: Low

Project is consistent with these policies.

・Internal Coherence

At the time of ex-ante evaluation, there were no other specific projects which were scheduled to be collaborated or coordinated with; however, JICA has provided technical cooperation in human resource development of the health sector in Mozambique for years. For example, ICSs in Mozambique have utilized the curricula which were revised through "the Project for Strengthening Pedagogical and Technical Skills of Teachers of Health (2012-2016)," which supported standardization of curricula and instructional manuals and capacity building of teaching methods with the aims of ensuring the quality of human resource development in the health sector although the project was completed when this Project started. In addition, the director and several other teachers at ICS Nacala have participated in the project's training (teaching methods, etc.). According to the director of ICS Nacala, the outcomes of the project continue to be utilized at ICS Nacala, thereby indirectly contributing to the achievement of the Project's goal in terms of improving the quality of human resource development.

・External Coherence

Since the establishment of ICS Nacala, there have been no projects supported by Japanese agencies other than JICA or other organizations related to ICS Nacala. Therefore, there is no collaboration or duplication with other projects, and there is no indication that any practical adjustments were made. In relation to the international framework, this Project is consistent with the SDGs "Goal 3: Good Health and Well-being for All" from the perspective of contributing to improving the quality and quantity of healthcare professionals in Mozambique by promoting the training of mid-level healthcare professionals.

<Evaluation Result>

In light of the above, the relevance of the project is high[3].

2 Effectiveness/Impact[4]

<Effectiveness>

- Qualitative effect

"The number of yearly graduates" of ICS Nacala, which was set as the quantitative effect of this Project, has reached the target number. On the other hand, "the number of courses for training mid-level healthcare professionals" and "class hours per year for practical training and clinical practice training" in ICS Nacala were about 70% of the target values. As the MoH determines the implementation courses to be opened by each ICS based on its budget and needs, ICS does not have the right to determine them. Therefore, the direct reason why the number of courses operated was lower than planned was that the number of courses determined by the MoH was lower than planned. Meanwhile, as noted in the section on Relevance, the MoH is committed to improving the quality of education and tends to operate fewer courses and teach fewer students than in the past. Therefore, the number of courses operated at ICS Nacala was below the target due to the influence of the MoH's policy, and it should be considered that this was the result of measures taken in accordance with this policy. Moreover, the number of hours for practical training and clinical practice training is specified by the curricula, and ICS Nacala has been conducting training in accordance with the curricula. However, the number of hours for practical training and clinical practice training is also affected by the number of courses operated, and the fact that the number of courses which operated less than planned is considered a reason why it did not reach the target value. In addition, to confirm the quality of education, the graduation rate at ICS Nacala was confirmed as a reference indicator, and the rate in 2021 was 82%. At the time of planning, approximately 15% of the students were assumed to fail to graduate each year[5]. Therefore, it can be described as an appropriate situation.

- Qualitative effect: Improvement of learning environment for students and working environment for teachers

By utilizing the facilities and laboratory equipment developed under the Project, ICS Nacala is able to provide rich exercises and practical training, as well as effective and efficient classes.

< Learning environment students >

ICS Nacala is equipped with the necessary laboratory and laboratory equipment to conduct the practical training and clinical practice training as specified in the curriculum, and the required number of hours of practical training and clinical practice training are conducted based on the curriculum defined for each course. According to the students of ICS Nacala, after learning theory in a classroom, practical learning through models and experiments contributes to a better understanding of what they are learning. It was also confirmed through interviews[6] that students are very satisfied with the quality of classes conducted in a laboratory equipped with facilities and equipment, and with the learning environment that offers comfortable study facilities.

〈Working environment for teachers>

ICS Nacala has an environment that makes it possible to conduct classes efficiently and effectively. For example, the laboratory equipment allows students to visually demonstrate realistic situations. By utilizing the projectors installed in all classrooms to project materials, printing works have been eliminated, thereby contributing to saving time and cost. In addition, since the copy machine in ICS Nacala is only for black and white, it contributes to improving the quality of classes by, for example, projecting onto a projector and showing conditions (such as the color of medicines) that are closer to reality, thereby enabling easier and more effective explanations to students. In the interviews[7], teachers at ICS Nacala answered that it provides the most favorable working environment for teachers in Mozambique, with teacher's rooms for each course, a workroom, a printing room, and other spaces necessary for class preparation.

[3] Relevance is ③, coherence is ②.
[4] When providing the sub-rating, Effectiveness and Impacts are to be considered together.
[5] Source: Preparatory survey report
[6] Four group interviews were conducted with 18 students (12 male and six female) during the site survey.
[7] Individual interviews were conducted with six teachers (three male and three female) during the site survey.

<Impact>

The impact of the Project was assumed to contribute to improvement of the quality and quantity of healthcare professionals in Mozambique. At the time of the ex-post evaluation, the ratio of graduates of ICS Nacala to the total number of mid-level healthcare professional in the country was 0.6%[8], and 13%[9] compared to the total number of graduates of ICSs nationwide. At this stage, with only 168 graduates from ICS Nacala, it is difficult to judge its contribution to improving the quality and quantity of healthcare professionals in the country, but it is expected to gradually increase its contribution in the future. In addition, the hospitals where trainees learn or graduates work have given high marks to the medical services provided by the interns and graduates of ICS Nacala, as well as to the efforts of ICS Nacala to improve its operations. For example, according to healthcare professionals at the hospitals that accept student interns, students of ICS Nacala have sufficient practical knowledge and are able to handle actual treatment without confusion. Moreover, at the hospital where graduates from ICS Nacala work, it was also reported that the graduates provide healthcare services that serve as a model for other healthcare professionals. For example, they proactively explain oral care to patients experiencing dental pain, informing them how to brush their teeth, frequency and timing of brushing and so on, rather than providing only treatment. Accordingly, they serve as a model to other healthcare professionals. The hospital conducts annual evaluations[10] of healthcare professionals in each department, and graduates of ICS Nacala have had very good results. Thus, it can be said that the degree of the contribution by the Project to improving the quality and quantity of health personnel has been confirmed, albeit on a limited scale.

No negative impact on the natural environment was observed by the implementation of the Project[11]. ICS Nacala also answered that no negative impact has occurred, and the measures specified at the time of planning for items to be complied with, such as dust and noise, were properly implemented. In addition, no land acquisition or resettlement occurred. It is also confirmed with ICS Nacala that there is no negative long-term social (including human rights and gender equality) or economic impact.

<Evaluation Result>

Therefore, the effectiveness/impact of the Project is high.

Quantitative Effects

Table 1 Operation and Effect Indicators of This Project

Indicators	Baseline 2014 Baseline Year	Target 2021 3 Years after Completion	Actual 2018 Completion Year	Actual 2019 1 Year after Completion	Actual 2020 2 Years after Completion	Actual 2021 3 Years after Completion
Number of yearly graduates	0	128	0	0	0	168
Number of courses for training mid-level healthcare professionals	0	14 → 11 Note 1	0	7	8	8
Class hours per year for practical training and clinical practice training	0	10,634 → 8,349 Note 2	0	9,976	7,673	5,882
(Reference) Graduation rates (%)	—	—	—	—	—	82%

Source: Ex-ante evaluation, the preparatory survey report, questionnaire answers, interview with Ministry of Health and ICS Nacala

Note1: The number of courses to be operated in 2021 listed in the ex-ante evaluation report was 14 courses. However, according to the MoH and ICS Nacala, the target indicated at the time of planning was 11 courses, and the defect inspection report also stated that the number of courses planned was 11; hence the target value for evaluation is revised to 11 courses.

Note 2: The 10,634 hours would be the number of class hours calculated based on the assumption that 14 courses were operated. If the number of courses operated is 11, the number of hours is less than 10,634. Although the ratio of practical training and clinical practice training varies from course to course, as a rough guide, assuming an average of 759 hours per course, it would be approximately 8,349 hours for the 11 courses.

3 Efficiency

The actual output of the Project was generally as planned (as described in "I. Outline of the Project"). Although there were changes in facility specifications, etc., there were no changes that would affect the Project effectiveness. On the items covered by the Mozambican side, all have been implemented, although there were delays in internet connection and tax refunds.

While this Project was planned to cost 2,289 million yen (2,121 million yen on the Japanese side, 168 million yen on the Mozambican side), the actual Project cost was 2,101 million yen (1,986 million yen on the Japanese side, 115 million yen on the Mozambican side), within the plan (87% of the original plan: 94% of the plan on the Japanese side and 68% of the plan on the Mozambican side). The difference between the planned and actual amount borne by the Japanese side was due to exchange rate fluctuations and bidding prices. The amount to be borne by Mozambique was also within the plan in yen terms due to exchange rate fluctuations.

The Project period was 34 months (126% of the plan), exceeding the plan of 28 months. The reasons were that the method of obtaining work permits was changed at the bidding stage, requiring more days than planned to prepare the necessary documents, and that the construction period was extended due to the deterioration of the Mozambican economy in 2016, which adversely affected the local subcontractor's cash flow and procurement of materials and labor.

<Evaluation Result>

In light of the above, while the Project costs was within the plan, Project period exceeded the plan. Therefore, efficiency of the Project is high.

[8] Ratio of 168 graduates of ICS Nacala to 28,169 mid-level healthcare professionals in Mozambique. Source: Questionnaire answers, MoH *Relatorio Annual 2020*

[9] The ratio of 168 graduates of ICS Nacala to the 1,344 yearly graduates of healthcare professionals of ICSs in Mozambique. Source: Questionnaire answers, MoH *Relatorio Annual 2020*

[10] The evaluation criteria cover a wide range of items including punctuality, responses to colleagues and patients, personal appearance, contribution to teamwork, knowledge sharing with the others in addition to professionalism.

[11] The guideline for environmental and social considerations applied to this Project is the *JICA Guidelines for Confirmation of Environmental and Social Considerations* (formulated in April 2010), and the environmental category falls into C.

4 Sustainability

・Policy/Systems

In response to the shortage of human resources in the health sector, *The Accelerated Training Plan (Plano Acelerado de Formação de Téc. Especilizados)* is being implemented in 2022. The plan indicates the number of graduates to be targeted in each ICS and the fields in which they should specialize to respond promptly to the need to improve the shortage of human resources. As for ICS Nacala, the target is indicated to produce a total of 108 graduates between 2023 and 2025. Although this number is lower than the one of ICS Nacala in 2021, it reflects the policy of MoH for improving quality and ensuring the production of human resources.

・Institutional/Organizational Aspect

At the time of the ex-ante evaluation, ICS was under the jurisdiction of the MoH, but due to the decentralization policy, it was transferred to the Provincial Health Department (ISC Nacala is under the Nampula Province) at the time of the ex-post evaluation. Meanwhile, the MoH is the owner of the facilities and equipment, and the courses offered each year are decided by the MoH, and ICSs have no authority to make those decisions. ICSs are in charge of and conduct the day-to-day O&M activities of the facilities and equipment, and 75 personnel are assigned at ICS Nacala, as shown in Table 2. According to ICS Nacala, there is currently no excess or shortages of staffing, but if the courses are opened as planned, at least four teachers will be needed per course, and the required number of teachers will need to be allocated. In case of an increase in the number of courses opened, ICS Nacala has prepared and already submitted a proposal to the Provincial Service of Health to allocate five additional teachers. In terms of the institutional aspect of the O&M in the Project, the supervision and reporting systems are clear, and there are currently no excesses or shortages of personnel, therefore, it is judged that there are no major problems.

Table 2 The Number of Staff and Teacher at ICS Nacala

	As of planning	As of ex-post evaluation
Director/deputy director	3	3
Full time teacher	48	36
Staff in administrative section	20	11
Staff in Service Section	29	25
Total	100	75

Source: Documents provided by ICS Nacala

・Technical Aspect

In the Project, instruction and training in the O&M of facilities and equipment (daily inspections, cleaning and adjustment, response to minor malfunctions, etc.) were conducted. In addition, when problems occur that cannot be addressed technically, the MoH as well as the Provincial/District Service of Health provide support; hence, there are no technical concerns. However, the contract with the IT expert expired in 2021 and a new assignment is needed. Problems have occurred with WIFI setting and internal system breakdowns. While the WIFI system has been partially restored with the support of the MoH and the Provincial Service of Health, the internal system is still out of order at the time of ex-post evaluation. Furthermore, ICS Nacala conducts regular in-school refresher training for teachers to maintain and enhance their capacity. The O&M manuals have also been deployed and are being referred to and utilized as appropriate. Therefore, at the time of the ex-post evaluation, shortage of technical capacity for the O&M of facilities and equipment has not occurred, except for absence of IT specialists.

・Financial Aspect

The budget for the O&M of ICS is normally allocated by the central government (Ministry of Finance) through the Provincial Finance Department. The personnel cost equivalents are managed by the Provincial Service of Health and paid directly to the teachers and staff as salaries. However, at the time of the ex-post evaluation, ICS Nacala has not been yet registered in the national registration system (State Property Registration Document), which is required for budget allocation, and no budget has been allocated by the government since its establishment. According to the MoH, at the time of the opening of ICS Nacala, the budgeting process did not proceed as usual due to the unfavorable economic situation in Mozambique, as well as the spread of COVID-19. Therefore, the budget for ICS Nacala has been allocated by the Nampula District Service of Health within its limit for operation until the time of the ex-post evaluation, and the O&M cost (2,091,000 meticals (Mt)) in 2021, excluding personnel expenses, are lower than the amount estimated at the time of planning (4,708,000 Mt)[12], meaning shortfall of the budget (see Table 3). The problem of budget shortfalls has also been noted in other ICSs in the country, including ICS Nampula, ICS Maputo, and ICS Quelimane. While the problem of budget shortfalls is not limited to the MoH, but is similar for other Ministries as well, the MoH plans to propose a specific plan for training to development partners to receive support.

As mentioned above, ICS Nacala has not been registered in the national system and is not getting the budget that should have been allocated. Since the process of registration in the national system is under the responsibility of the Ministry of Finance and is a matter outside the control of the MoH and ICS Nacala, it is not possible to determine when the registration will be completed. Therefore, ICS Nacala currently needs to operate on a limited budget distributed by the District Service of Health, and the future plan is not clear, which is a concern for the future operation.

Table 3 The O&M Cost of ICS Nacala

(Unit: Thousand Mt)

Item	Plan	Actual			
		2019	2020	2021	2022[Note 1]
Personnel expense (full time and part time staff)	27,077	N.A.	N.A.	N.A.	18,742
Operating cost (water, electricity, gas, fuel)	2,064	816	1,083	1,049	1,550
Communication cost	385	60	0	37	209
Maintenance cost of the facilities	1,669	125	0	102	405
Maintenance cost of the equipment	590	50	85	903	1,560
Total	**31,784**	**1,052**	**1,168**	**2,091**	**22,467**

Source: Preparatory survey report, questionnaire answers

Note 1: The O&M cost for 2022 shows when ICS Nakala is registered in the national system.

Note 2: Totals may not sum due to rounding.

[12] Though personnel expenses are paid by the Provincial Service of Health, the amount could not be obtained from ICS Nacala or the Provincial Service of Health; thus, the O&M cost is shown excluding personnel expenses.

・Social and Environmental Aspect

No specific risks were assumed at the time of planning. It was also confirmed with the executing agency that there are also no specific risks envisaged for the future.

・Preventative Measures to Risk

At the time of planning of this Project, the following risks were assumed: (1) the risk that buses would have trouble transporting students to and from the training sites due to inadequate capacity and maintenance, and (2) the risk that the Project period would be affected by the time required for the refund procedures for value-added tax and import duties on the procurement of materials, equipment, and services. Regarding (1), there were no cases in ICS Nacala where a lack of buses posed a risk to transfers, and records of regular operational inspections of the buses were also confirmed during the site survey. Regarding (2), the procedure proceeded as initially planned although there was a delay, and the refund was completed without any problems. Therefore, it can be said that no particular problems have occurred with the risks assumed at the time of planning.

・Current Status of Operation and Maintenance

The utilization and maintenance of the facilities that have been developed is very good excepting some facilities which have not been utilized (the student dormitory, cafeteria buildings, internal and WIFI systems). The student dormitory has been unused since the establishment of ICS Nacala, and the cafeteria building is not regularly used except for events, which are rarely held. This is because food, utilities, and other operating expenses could not have been secured. The situation of student dormitories is almost the same in ICSs nationwide, and ICS Nacala has informed students of the unavailability of student dormitory at the time of application not to affect their convenience. The use of some equipment (microscopes, spectrophotometers, centrifuges, dental chairs, etc.) for practical trainings is limited due to lack of budget or difficulty in obtaining the necessary reagents. Parts and consumables were to be purchased through an agent list prepared by the Project. However, in Mozambique, public institutions are required to purchase from agents that win competitive bids, excepting general consumables, by the national procurement system. Thus, the prepared agent list is not utilized. In addition, the MoH has indicated a concern: the necessary parts and other items may not be available if the agents which win the bidding do not handle the products. Furthermore, some opinions on difficulties are raised for ICS Nacala alone to handle parts and consumables that are not available in Mozambique, due to the complicated procedures involved in international bidding. While some items have not been addressed due to budget shortfalls, periodic cleaning, facility repairs, and periodic inspections of facilities are being appropriately conducted.

As mentioned above, the facilities and equipment are maintained in good condition, and the planned maintenance activities are being carried out appropriately with some exceptions. On the other hand, issues were identified such as the student dormitory, cafeteria building, and IT system not being used due to budget shortfalls, and some laboratory equipment being only partially utilized due to budget and reagents shortages.

<Evaluation Result>

Therefore, the sustainability of the Project effect is slightly low.

III. Recommendations & Lessons Learned

・Recommendations to Executing Agency

(1) Working for registration in the system necessary for budget allocation

Registration to the national system required for budget allocation has not been completed for ICS Nacala. Accordingly, the planned O&M costs have not been allocated, and the program is operating on a limited budget allocated by the District Service of Health of Nampula Province. This has resulted in problems such as the inability to purchase the necessary reagents for practical lessons and the inability to conduct practical lessons using the laboratory equipment. The Nampula Provincial Service of Health needs to urge the government to request approval as soon as possible to secure the budget for the next fiscal year, and to regularly monitor its progress. The MoH is also required to assist in lobbying the government, if necessary, and cooperate in completing its registration.

(2) Measures related to the procurement system for future

Some laboratory equipment is not fully utilized for practical lessons due to lack of reagents. The main reason is the lack of budget, however, public institutions in Mozambique are required to use agents in accordance with the procurement system specified by the government. Therefore, the agent list prepared by the Project is not utilized, and when parts necessary for repairing the facility are procured from overseas, international bidding is required, which makes the procedure more complicated, and the time required longer than usual. Since it may be difficult for ICS Nacala to deal with the situation alone if an agent is only available in Maputo or if international bidding is required, it is preferable that the MoH and the Nampula Provincial Service of Health support procurement operations as needed, including the use of agent list and international bidding procedures, to facilitate the smooth purchase of parts and supplies.

・Recommendations to JICA: None

・Lessons Learned

<u>Project formation and securing the sustainability based on the target country's various systems including budget and procurement processes</u>

In ICS Nacala, registration in the national registration system, which is necessary for the budget allocation, has not been completed as of the time of ex-post evaluation, and the budget has not been allocated by the government. In addition, since agents for purchasing parts

and supplies are determined based on the national procurement system, the agent list provided is not fully utilized and this could possibly cause problems in the future. Since the budget allocation and procurement systems of the target country will affect sustainability, executing agencies, experts involved in project formation, and other related parties should fully consider whether or not the target country's systems will affect sustainability after the Project completion. Therefore, as in the case of this Project, if the target country's system may affect the budget allocation and purchase of consumables after the Project is completed, it is necessary to discuss measures with the government in advance to minimize the risks. For example, it is desirable to organize the suppliers of O&M of facilities and materials and consumables to be provided in the Project at the Project formation and implementation stage, fully taking into account the procurement system of the target country, and to confirm whether procurement is actually possible under the system of the target country. In addition, if any necessary precondition exists on budget allocation, it is also advisable to set deadlines in the agreement document to ensure that they are adhered to.

IV. Non-Score Criteria

・Performance
・Objective Perspective
None

・Additionality
None

Inside a Classroom

Room for Practical Lessons

Building for Classrooms

The Republic of Mozambique

FY2021 Ex-Post Evaluation Report of

Japanese Grant Aid Project

"Maputo Fish Market Construction Project"

External Evaluator: Hisae Takahashi, Octavia Japan, Co., Ltd.

0. Summary

The Project was implemented with the aim to increase the amount of the fishery products handled in accordance with the standard of market operation guidelines and to expand the capacity of the facilities in the public fish market in Maputo City, thereby contributing to the improvement of the environment for fish marketing and increased income for artisanal fishermen, retailers, etc. Its objective is in line with the development policy in Mozambique at the times of planning and the ex-post evaluation, which has indicated the importance of promoting artisanal fishery as a means of contributing to poverty reduction, and development needs to improve facilities and equipment at fish markets. The Project is also consistent with Japan's Assistant Policy, projects and support by the Japan International Cooperation Agency (JICA) and other agencies, and Goals 1 and 9 of the Sustainable Development Goals (SDGs). Therefore, its relevance and coherence are high. While the outputs were mostly as planned, the project costs exceeded the plan, and the project period significantly exceeded the plan. Therefore, efficiency of the Project is moderately low. The development of facilities and equipment under the Project has significantly improved the hygienic and marketing environment of fishery products at Maputo Fish Market. On the other hand, the amount of fishery products handled at the market is significantly below the target due to a combination of factors, including high selling prices compared to neighboring markets, its location, and others. Therefore, the contribution to increased income of artisanal fishermen and retailers is also likely to have been limited. Accurate data on the amount of ice that can be produced and purchased, an operation and effect indicator, could not be ascertained, and the number of cars parked legally by market users was also below the target. In light of the above, this project has achieved its objectives only to a certain extent. Therefore, effectiveness and impacts of the project are moderately low. Some minor issues have been observed in the technical, financial, and the current status of operation and maintenance (O&M) of this Project. 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 partially satisfactory.

1. Project Description

Project Location (source: JICA Website)

Inside of Maputo Fish Market

1.1 Background

The Republic of Mozambique (Mozambique) was experiencing economic growth rates of approximately 6-8% at the time of the Project planning. In Mozambique, approximately 280,000 people were engaged in the fisheries sector, mainly in artisanal fisheries. Reflecting the doubling of production in the artisanal fishery sector, the national fishery volume, which had been around 80,000 tons per year in the mid-2000s, had increased to the 160,000 ton level by 2010. In addition, artisanal fisheries development was key to the development of the fisheries industry in the country, as approximately 80% of the annual catch was caught by artisanal fishermen. Meanwhile, basic infrastructure, including fish markets, was not sufficient in the country, and significant losses after catches were the issues. Moreover, while there were four fish markets in Maputo City, none of them complied with *the Guidelines for Operation & Management of Maputo Public Markets 2008* (the Guidelines), which stipulate hygiene management in markets, and there were also hygiene issues. Therefore, improving the livelihoods of those involved in artisanal fisheries by improving the marketing of fishery products through the development of basic infrastructure was an urgent issue. Under these circumstances, the Government of Mozambique requested the Government of Japan for a grant aid project for the development of a public fish market to replace the A Ruta Continua market in Maputo City, which had problems with the market environment, with the aim of promoting the fisheries industry by promoting hygienic fishery marketing activities, and this Project was implemented.

1.2 Project Outline

The objective of this Project is to increase the amount of the fishery products handled in accordance with the standard of market operation guidelines and to expand the capacity of facilities in the public fish market of Maputo City, thereby contributing to the improvement of the environment for fish marketing and increased income for artisanal fishermen, retailers, etc.

Grant Limit / Actual Grant Amount	918 million yen / 917 million yen
Exchange of Notes Date / Grant Agreement Date	February 2012 / February 2012
Executing Agencies	Ministry of Fisheries / Maputo Municipality
Project Completion	December 2015
Target Area	Maputo City
Main Contractors	Konoike Construction Co., Ltd. / Tokura Corporation (JV)
Main Consultant	OAFIC Co., Ltd.
Preparatory Survey I Preparatory Survey II	January 2010 Outline Design Study: March - April 2011 Explanation of the Outline Design: September - October 2011
Related Projects	[Grant Aid] - The Project for Rehabilitation of Maputo Fishing Port Phase 1 (1998) - The Project for Rehabilitation of Maputo Fishing Port Phase 2 (1999) [Skillshare International (Irish NGO)] - Support for the capacity enhancement of the staff in National Institute for the Development of Small-Scale Fisheries, establishment of the council for the fishing community, and procurement of the vehicles and training fishing boats (2007-2010) [INFOSA (Dutch NGO)] - Technical assistance related to aquaculture distribution, research activities related to the artisanal fishery (2007-2010) [Iceland Aid Agency] - Support for the development of fish inspection systems, and funding to the Fisheries Development Fund for low-interest loans (2006-2007)

2. Outline of the Evaluation Study

2.1 External Evaluator

Hisae Takahashi, Octavia Japan, Co., Ltd.

2.2 Duration of Evaluation Study

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

Duration of the Study: November 2021 − February 2023

Duration of the Field Study: May 3 - May 28 and August 24 − September 3, 2022

3. Results of the Evaluation (Overall Rating: C[1])

3.1 Relevance/Coherence (Rating: ③[2])

3.1.1 Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of Mozambique

At the time of the project planning, the *Poverty Reduction Strategy Paper (PARPA II) (2006-2009)* aimed at poverty reduction through broad-based economic growth, and the promotion of poor artisanal fishermen was considered part of this effort. In the fisheries sector, the *Strategic Plan for Artisanal Fisheries Development (the Plano Estratégico para o Sector da Pesca Artesanal (PESPA)) (2007-2011)*, which aimed to improve the livelihoods of artisanal fishery communities, was formulated. The plan aimed to promote and increase the profitability of fishing activities using traditional fishing tools and methods, develop fisheries adapted to the fishing grounds in high seas fisheries, and expand marketing networks of fishery products from the perspective of both subsistence and commercial activities of artisanal fishers, and indicated the development of retail markets for fisheries products as a related measure.

The National Five-Year Development Program (2020-2024) (2020) at the time of the ex-post evaluation indicates a more diverse and competitive economy as its goal and aims to fight poverty and contribute to improving the quality of life of the population through increased employment opportunities for young people. With regard to fisheries, it indicates the strengthening of artisanal fisheries and specifies sustainable artisanal fisheries development as a priority. The PESPA's successor plan, *PESPA II (2019-2025) (2018)*, also aims to contribute to the improvement of environmental sustainability, food and nutrition security, and the country's socio-economic development, and addresses the sustainable development and promotion of artisanal fisheries, including support for infrastructure and equipment development as a strategic pillar.

As mentioned above, at both the times of planning and ex-post evaluation, the objective of the Project indicates the importance of the artisanal fishing and is in line with the Government's development plan for the country, which refers to the importance of the need to develop markets.

3.1.1.2 Consistency with the Development Needs of Mozambique

At the time of the project planning, the national fisheries production in Mozambique had doubled, with artisanal fishermen catching more than 80% of them (2010) (see Table 1); thus, artisanal fishery development was key to the development of the fisheries industry. Furthermore, the A Luta Continua Market, which mainly handled fish landed by artisanal fishermen, was the sole public market in Maputo City that specialized in handling fishery products. However, since it did not comply with the Guidelines[3] on market hygiene management, etc., hygiene was

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

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

[3] The Guidelines classify markets into Group A (the market infrastructures are well developed), Group B (the market infrastructures are developed but not yet enough,) and Group C (the market infrastructures are not yet developed),

considered a major issue.

Table 1 Trends in Fisheries Production in Mozambique

(Unit: tons)

	2010	2017	2018	2019	2020	2021
Commercial fisheries	23,474	23,906	38,831	36,745	17,234	17,740
Artisanal fisheries	139,891	314,740	355,187	380,330	413,023	425,655
Aquaculture fisheries	667	1,835	3,245	3,770	3,312	4,109
Total	164,032	340,481	397,263	420,845	433,569	447,504

Source: Preparatory survey report, questionnaire answers

Fisheries production in Mozambique has significantly increased from the 160,000-ton level at the time of planning to the 440,000-ton level at the time of the ex-post evaluation. The fisheries products supplied by artisanal fisheries account for about 90% of the total at the time of the ex-post evaluation. Therefore the artisanal fishery development is essential to promote the fishing industry, just as it was at the time of planning. Maputo Fish Market, which was relocated from the A Luta Continua Market and constructed under the Project, continues to have high needs for facilities and equipment, as it is the only public market in Maputo City that specializes in fisheries products and operates in compliance with the Guidelines. In addition, as fisheries production in Maputo City has also increased by about 1.5 times since the time of planning,[4] the selection of the Maputo Fish Market as the target of the Project was appropriate.

As described above, at the times of planning and ex-post evaluation, the development needs for the facility and equipment of the fish market were high, and the Project was consistent with these needs.

3.1.1.3 Appropriateness of the Project Plan and Approach

Although the construction of some facilities was borne by the Mozambican side, the outputs of the Project were mostly as planned. Though “the amount of the fishery products handled in the Market,” which was set as an operation and effect indicator, is significantly below the target, it can be considered that this is not due to the logic or the project plan or approach but to complex factors, such as expensive sales prices at Maputo Fish Market, the location of the market, and others as described below in “3.3.1.1 Quantitative Effects (Operation and Effect Indicators).” Therefore, it can be concluded that there are no problems with the project plan, design, logic, and approach.

depending on the grade of development of the market infrastructure. A Luta Continua market was categorized in Group C.

[4] The fisheries production around the Maputo area increased from 8,249 tons in 2010 to 12,718 tons in 2021. (Source: Preparatory survey report, questionnaire answers)

3.1.2 Coherence (Rating: ②)

3.1.2.1 Consistency with Japan's ODA Policy

At the time of project planning, Japan identified "revitalization of rural economies" as a priority area and particularly placed emphasis on supporting corridor development to reduce poverty through industrial vitalization. The Project was positioned as the core project of the "Programme for Maputo Corridor Development and Improvement" and was implemented with the aim of contributing to the improvement of the fisheries product marketing environment and the livelihoods of artisanal fishermen in the country through the development of a public fish market in Maputo City. The objective was in line with Japan's Country Development Cooperation Policy for Mozambique, which took poverty reduction through industrial vitalization as a key issue.

3.1.2.2 Internal Coherence

The grant aid "The Project for Rehabilitation of Maputo Fishing Port" (1998, 1999) supported the rehabilitation of the largest fishing port in the south of the country, and it was noted at the time of planning that some fisheries products landed at the port would also be handled at Maputo Fish Market. At the time of the ex-post evaluation, it was confirmed through interviews at Maputo Fish Market and Maputo Fishing Port that some of the fishery products landed at Maputo Fishing Port are actually handled at Maputo Fish Market. Cooperation was also identified, with Maputo Fishing Port supplying ice during periods when the ice-making machine was not functioning at the Market[5] (see 3.4 Sustainability), indicating a certain degree of coordination between the two projects.

3.1.2.3 External Coherence

At the time of planning, no complementarity, collaboration, or coordination with projects implemented by other Japanese agencies, or other developing cooperation agencies, including other donors, or support provided by the private sector was identified. According to the executing agency, however, although no specific outcomes have been set through collaboration and coordination, Maputo Fish Market was taken up by the Artisanal Fisheries Promotion Project supported by the International Fund for Agricultural Development (IFAD) as a reference for the design of a market with hygienic facilities and restaurants attached to the fish market, and the Market was utilized as a place where technical staff from different provinces exchanged experiences in fish handling and preservation.[6] In addition, the Project, which aimed to improve the livelihoods of artisanal fishermen, retailers, and others through the development of public fish markets, is consistent with "Goal 1: No poverty (end poverty in all its forms everywhere)" and "Goal 9: Industries, innovation and infrastructure (build resilient infrastructure, promote

[5] Source: Questionnaire answers
[6] Source: Questionnaire answers

sustainable industrialization and foster innovation)" from the perspective of the international framework.

As described above, the implementation of the Project is in line with Mozambique's development policy and development needs, and there are no issues with the Project plan and approach. It was also confirmed that the Project is consistent with Japan's assistance policy, JICA's grant aid project, and support from other cooperation agencies, as well as with international frameworks. Therefore, its relevance and coherence are high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

This Project was designed to implement the construction of Maputo Fish Market's facilities, civil works on the shore protection, procurement of equipment, such as an ice-making machine, consulting services, and guidance on the operation of the market and maintenance of the ice-making facility (soft component). Table 2 shows the planned and actual outputs of this Project understood at the time of ex-post evaluation.

Table 2 Planned and Actual Outputs

Facilities		Plan	Actual
Facility construction	Retail building	1,572m^2 Retail booth, stock room for chest freezers, administration office, technical staff room, reception area, toilets in office, machine room, flake-type ice-making machine, chilled rooms	1,619m^2 As planned
	Power substation	60m^2 Electricity receiving facilities, emergency generator	As planned
	Public toilet building	169m^2 Toilets for customers and staff, ticket collection area	Changed to be cover by the Mozambican side
	Garbage storage building	16m^2 Storage for garbage from raw material, place for garbage container, washing place	As planned
	Food court	494m^2	Changed to be cover by the Mozambican side
	Elevated water tank	26m^2 Pump room, water tank	As planned
	Sewerage disposal facilities	11m^2 Aeration system tank for sewerage disposal, underground infiltration facilities for treated water	As planned
	Outdoor facilities	Storm drain (U shape 334 m), storm drain (box culvert 70 m), pavement (2,282 m^2), water reservoir	Storm drain (U shape), pavement (Changed to be cover by the Mozambican side); Storm drain (box culvert), water reservoir (as planned)

Shore protection	Total length 210 m, apron, recurved parapet, storm water outlet	As planned
Equipment	Insulated fish box: 40 boxes, Cart: 5 units, processing table for fresh fish: 10 units, platform scales and unit scales: 2 each	Insulated fish box: 40 boxes, Cart: 2 units, processing table for fresh fish: as planned, platform scale and unit scale: 1 each
Consulting services, Soft component	Detailed design, construction supervision, assistance in preparing market operation manuals, guidance on maintenance and management of ice-making facilities	As planned

Source: Preparatory survey report, questionnaire answers

As shown in Table 2, while the outputs were mostly as planned, changes occurred in the expansion of retail building space of Maputo Fish Market, and exclusion of the public toilets, food courts, storm drain and pavement from the Japanese contribution (changed to be cover by the Mozambican side), and reduction in the number of piece of equipment. The reasons for the changes are as follows.

Expansion of the retail building area

In accordance with the Guidelines of Maputo City on hygiene management, the retail building area was expanded by changing the location of the water taps and adding toilets and changing rooms. Maputo Fish Market facility was designed in accordance with the Guidelines formulated by Maputo City, but the Guidelines were mainly concerned with planning theory and did not contain specific figures for the facility design. Therefore, in the preparatory survey in this Project, existing facilities and examples from Japan were cited in the design of this facility. On the other hand, at that time, Maputo City was updating the Guidelines, referring to the preparatory survey of the Project. The detailed design was revised due to the impact of the updated Guidelines of Maputo City.[7] Design changes related to the expansion of the retail building affected the delay in the Project period, but this change was unavoidable for hygiene management purposes.

Change of the party responsible for some facilities from the Japanese side to the Mozambican side, reduction in the number of piece of equipment

The tender for the public toilets, food court, storm drain, and pavement failed due to exchange rate fluctuations and bidding prices exceeding the planned prices; thus, the Mozambican side bore the cost of the above facilities to keep the project cost on the Japanese side within the plan for the re-tender. The numbers of cold storage boxes, carts, and scales were also reduced for the same reason.[8] There is no impact on the Project cost or the generating effects due to these changes.

For the soft components, the following targets and outcomes were set, and training for the

[7] Source: Documents provided by JICA
[8] Documents provided by JICA, questionnaire answers, interview with the Project consultant

operation and management of the market and maintenance of the ice-making facility.[9]

Objective: To smoothly initiate O&M functions of the concerned facilities of the fish market.
Outcome 1: Establishment of basic rules for O&M for the concerned facilities of the fish market.
Outcome 2: Improvement of collection and accounting system for fees for the use of the concerned facilities and equipment of the fish market.
Outcome 3: Establishment of maintenance and management plans for the ice-making machine, chilled rooms, emergency generator, etc.

Activities associated with each outcome were implemented as planned; the draft of the basic rules were prepared through the activities (Outcome 1); some of the collection systems were changed (Outcome 2); and the maintenance and management plans were prepared (Outcome 3).[10] According to the training participants, the content and duration of the training were mostly appropriate. However, it was noted that the person in charge of maintaining the equipment at Maputo Fish Market was an electrician and had little experience or knowledge of maintaining ice-making machine and chilled rooms; therefore, more extensive training specific to these facilities was needed.

In addition to the cooperation items from the Japanese side, the Mozambican side was also expected to handle the following items in this Project:

1) Acquisition of environmental license
2) Acquisition of land for construction
3) Measures responding to smooth progress of the Project, including exemption of taxes
4) Construction works for water supply pipe installation, electric supply, etc.
5) Smooth relocation of the Market

According to the executing agency and Project consultant, all responsibilities on the Mozambican side were carried out, though tax exemption took longer time than planned.

3.2.2 Project Inputs

3.2.2.1 Project Cost

This Project was planned to cost 1,289 million yen, consisting of 918 million yen on the Japanese side and roughly 371 million yen on the Mozambican side. Although details of the cost covered by the Mozambican side was not available,[11] the amount borne by the Japanese side was 917 million yen; thus, the project cost was within the plan. However, if the amount of

[9] Training was conducted from October to December 2015 for staff at Maputo Fish Market, Maputo Municipality, and the Organization for Fisheries and Aquaculture Development.
[10] Source: Documents provided by JICA, questionnaire answers
[11] As the items to be covered were implemented as planned, it is considered that the planned cost was spent as planned.

approximately 86 million yen[12] for the public toilets and food court, which were not covered by the Japanese side, is excluded from the planned project cost, the revised planned amount is approximately 832 million yen, which slightly exceeded the planned amount (110% of the original plan).

3.2.2.2 Project Period

The project period[13] was planned to be 19 months, but the Project lasted 45 months, from April 2012 to December 2015, which significantly exceeded the plan (237% of the plan). The main reasons were the delay in obtaining approval for the Environmental Impact Assessment (EIA)[14] and the subsequent unsuccessful bidding. In Mozambique, it is not permitted to start construction work without EIA approval, and this led to significant delays in the Project. In addition, as mentioned, the time taken to redesign the retail building area also led to delays, but the process thereafter proceeded smoothly.

Table 3 Planned and Actual Project Period by Item

	Plan	Actual
G/A	―	September 2014
Detailed design	2.5 months	(Detailed design including the tender period) April 2012 – May 2014
Tender and contract with construction companies	3 months	
Civil work and procurement period	15 months	(Civil works) July 2014 – December 2015 (Equipment procurement) May – December 2015 (Soft component) September – November 2015
Project period	19 months Note 1	45 months

Source: Preparatory survey report, documents provided by JICA and questionnaire
Note 1: Since some of the work processes would overlap, the overall project period was planned to be 19 months from the month of the consultant contract.

In light of 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.

[12] The documents at the time of planning were reviewed, however, it was difficult to calculate the breakdown of the amounts for the storm drain and pavement sections as the details could not be confirmed.
[13] The Project period is defined as the period from the month in which the contract with consultant is made to the month in which the construction works are completed.
[14] Initially, the land where Maputo Fish Market was build was also considered for the construction of a hotel, and the coordination also took longer time than expected. In the meantime, the process of obtaining EIA approval was also suspended.

3.3 Effectiveness and Impacts[15] (Rating: ②)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

At the time of the project planning, "Amount of the fishery products handled in the Market in accordance with the Guidelines," "Amount of ice that can be purchased in the Market," "Number of retailers who can handle the products in the appropriate business environment," and "Number of cars parked legally in the Market" were set as the operation and effect indicators. The actual values for these indicators after the project completion are shown in Table 4.

Table 4 Operation and Effect Indicators of This Project

	Baseline value	Target value	Actual value			
	2011	2015	2018	2019	2020	2021
		2 years after completion	Completion Year	1 year after completion	2 years after completion	3 years after completion
Amount of the fishery products handled in accordance with the Guidelines in the Market (tons/year)	0	Approx. 350 Note 1	126	116	122	121
Amount of ice that can be purchased in the Market (tons/day)	0	Approx. 2	N.A.	N.A.	N.A.	0.07 (2.7) Note 2
Number of retailers who can handle the products in the appropriate business environment (persons)	0	Approx. 100	100	100	100	100
Number of cars parked legally in the Market (cars/day)	0	Approx. 38	9	N.A.	6	8

Source: Documents provided by JICA, documents provided by the executing agency, documents provided by the parking management company, and interview with the retailers.

Note 1: The target values were estimated in a preparatory survey based on the sales volume of the old market.

Note 2: An average of 0.07 tons/day was reported from Maputo Fish Market, and an average of 0.09 tons/day was reported from Maputo Municipality. On the other hand, since it was apparent during the site survey that retailers were purchasing and using much more ice than the above mentioned amount, the local assistant interviewed the retailers (90 out of 100 retailers in total; the remaining 10 were either absent or not using ice at the time of the interview) about their average daily ice purchases, and estimates were calculated based on the results, which were approximately 2.7 tons/day.

Of the operation and effect indicators set, "the number of retailers who can handle products in the appropriate business environment" has been maintained at the target value since the Project was completed. Maputo Fish Market is equipped with facilities that meet the key principles specified in the Guidelines and has installed 100 booths for retailers. After the completion of the Project, all booths have been contracted with retailers, who are now selling their products. On the other hand, "the amount of fishery products handled in accordance with the Guidelines in the

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

Market" was limited to about 35% of the target value. In the interviews with retailers, all respondents also stated that their sales had decreased after the relocation.[16] Behind this, a combination of factors is considered to have had an impact, including the higher sales price of fishery products at the Market compared to prices at neighboring markets, a decrease in the amount of fishery products brought in by the retailers due to changes in the ways fishery products are preserved,[17] the location and convenience of the market,[18] the spread of COVID-19 after 2020, and others. The higher sales price of fishery products reflects the high quality and freshness of the fishery products handled at the Market. In the old market, it was common for unsold fishery products to be frozen and sold on another day, and fishery products which are inexpensive but not fresh were also sold. This practice continues at present in the markets apart from Maputo Fish Market, leading to a tendency whereby price is valued more than freshness.[19] Therefore, it is also effective to promote understanding of the freshness of fishery products, etc. through the promotion activities for general consumers in order to encourage them to choose fresh fishery products despite their high price.

Accurate information on "the amount of ice that can be purchased in the Market"[20] was not available. As the record obtained from Maputo Fish Market was 0.07 tons per day on average, which was well below the target (2 tons), it was estimated by using figures obtained through the interviews with retailers in this evaluation survey, which was approximately 2.7 tons per day on average. Regarding the gap between the submitted data and the interview results, Maputo Municipality responded that the data submitted by them was considerably less than they had felt, and that it is possible that Maputo Fish Market may not have recorded the information accurately. On the other hand, the installed ice-making machine has the capacity to produce approximately 2 tons of ice per day, and the consistency of the amount of ice that can be purchased in the market, obtained from interviews with retailers, has not been confirmed. It was also pointed out that some retailers may be bringing in ice cubes from outside and using them, as the flake ice produced by the ice-making machine in the Market easily melts and is more expensive. As accurate data was not available as described above, it was deemed difficult to analyze the achievement level of this indicator.

"The number of cars parked legally in the Market" was also below the target. In the old market, A Luta Continua Market, illegal parking by market users outside the market blocked traffic,

[16] As the amount of fishery products handled was significantly below the target, the increases or decreases were confirmed with the retailers at the Market to verify the reliability of the data.

[17] Maputo Fish Markets do not permit marketing of frozen fishery products, as it is not ideal from the perspective of maintaining freshness to freeze unsold fishery products and sell them the next day, or to bring in frozen fishery products and repeatedly thaw and freeze them, which was common practice in the old markets.

[18] When heading towards Maputo Fish Market from the center area of Maputo City, a U-turn is required as the Market is on the opposite side of the road.

[19] Interviews with the executing agency

[20] The Market requires the use of ice produced with appropriate water, and the use of ice produced within the Market is mandatory.

leading to traffic congestion on nearby roads. In addition, the installation of a parking lot at Maputo Fish Market was planned and implemented because the Guidelines required the installation of a parking lot at the public fish market. Currently, a certain number of cars parked on weekends and other times, but many do not use the parking lot to avoid paying the parking fee (20 Mt: approx. 45 yen/hour). On the other hand, due to the deployment of security guards and police patrols, no illegal parking or congestion has occurred on the surrounding roads up to the time of the ex-post evaluation.[21]

3.3.1.2 Qualitative Effects (Other Effects)

The qualitative effects of this Project were assumed as follows: 1) It will be possible to provide more hygienic and higher quality retail transactions of the fishery products with users; and 2) Management of usage charge collection and accounting and the O&M of the ice-making machine, chilled rooms, and emergency generator will be conducted. The status of each qualitative effect is as follows.

(1) Hygienic and higher quality retail transactions

Compared to the old market, hygiene conditions at Maputo Fish Market have improved significantly as follows.[22]

[Condition of the old market]

The retail area was located outside and the floor was not maintained (soil), which meant that the entire market flooded during rainfall, causing a hygiene issue. In addition, fishery products were placed directly on a wooden stand, so it could not be said that the fishery products were treated properly. Fish were processed in every part of the market, and scattered waste parts were a source of an odious smell.

[Improvement in the new Market]

The retail area is located indoors and is maintained hygienically even during rainfall. Furthermore, Maputo Fish Market is cleaned daily and has the necessary facilities for treating fishery products hygienically. For example, the appropriate tables for displaying fishery products make it possible to display them in a hygienic manner. In the fish processing booths that have been set up, fish are processed in defined compartments, and the waste portions are properly treated. In addition, each booths is equipped with a water tap which makes it possible to keep the retail area clean.

[21] Source: Questionnaire answer, interviews with the executing agency
[22] Source: Interviews with the executing agency, retailers and restaurant owners


Booth for Treating Fishery Products


Water Tap Installed at Each Booth


Displayed Fishery Products

As described above, Maputo Fish Market, which has the basic facilities and equipment to keep the market hygienic, has maintained a much better hygienic environment compared to the old market and other markets dealing with fishery products in Maputo City. Moreover, the quality of fishery products has been maintained in good condition thanks to the well-developed environment.

(2) Implementation of collection and accounting system, and operation and maintenance management of the ice-making machine, chilled rooms, and emergency generator

With regard to the collection and accounting system, rules for the amount and payment of rental fees have been decided through the soft component, and retailers and restaurants pay rental fees to Maputo Municipality on a monthly basis at Maputo Fish Market.[23] According to Maputo Municipality, the collection rate from the retailers is not high, and it was found through the interviews with retailers that a common understanding of the rules for the payment of rental fees has not been disseminated between Maputo Municipality and retailers (See 3.4.4 Financial Aspect).

Regarding the equipment, the generator is operated and maintained without problems. On the other hand, the ice-making machine and chilled rooms have frequently had problems since installation. While Maputo Fish Market pointed out the possibility of initial defects of the equipment, the project consultants also explained that the necessity and importance of maintenance are not fully understood by the personnel in charge of maintenance and management, and that appropriate actions are not taken in a timely manner.[24] The training required for O&M was carried out as planned, and JICA has continued to provide support through the dispatch of the expert for O&M of equipment, including the ice-making machine, after receiving reports of detects. However, it is considered that the effect in terms of appropriately operating and maintaining the ice-making machine and chilled rooms has been limited.

[23] Retailers pay a monthly rental fee of 900 Mt (approx.1,900 yen), while restaurants pay between 3,000 Mt and 6,000 Mt (approx. 6,400-12,700 yen) monthly depending on the size of the restaurant.
[24] Refer to “3.4 Sustainability 3.4.3 Technical Aspect” for details.

3.3.2 Impacts

3.3.2.1 Intended Impacts

As no impact was set for this Project at the time of planning, it was confirmed and agreed with the executing agency that “improvement of fishery product marketing environment and increase in incomes of artisanal fishermen” were appropriate for the expected impact of the Project.

(1) Improvement of the fishery product marketing environment

Significant differences were observed in the operation and freshness of fishery products at Maputo Fish Market and neighboring markets in Maputo City. For example, in other markets, fishery products are sold in an environment that is not clean, with no ice used to maintain freshness and the products displayed directly on wooden sales stands. Accordingly, the prices of fishery products in Maputo Fish Market are higher than in other markets; for example, the selling prices at other markets were approximately 60-70% of those in Maputo Fish Market. Prices have also increased compared to those in the old market.[25]

Fishery Products Displayed at a Stand in Maputo Fish Market

Fishery Products Displayed in Other Market

(2) Increase in incomes of artisanal fishermen

Data on the income of artisanal fishermen were not available, despite requests to the executing agency and the Fisheries and Aquaculture Development Agency (Instituto Nacional de Desenvolvimento da Pesca e Aquacultura: IDEPA). As 90% of fishery products in the country are caught by artisanal fishermen, an increase in sales volume is expected to affect the increase in their income. However, the current sales volume has not increased, and as has been already explained, the retailer's opinion that sales have decreased since the relocation also indicates that the contribution to the increase in incomes of artisanal fishermen has been limited.

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Natural Environment

The Project does not fall into any of the sensitive sectors, characteristics, or areas listed in

[25] Groupers and snappers, which were about 300 Mt/kg in the old market, have risen to 500 Mt in Maputo Fish Market, cod from 150 Mt to 300 Mt, and prawns from 500 Mt to 800-1,000 Mt. (Source: Confirmation at Maputo Fish Market)

JICA Guidelines for Environmental and Social Considerations (formulated in April 2004), and the undesirable effects on the environment are not considered to be significant; therefore, the Project is classified as Category B. The EIA, which was planned to be carried out and approved by Maputo Municipality, was already obtained in December 2013. In addition, the following measures were planned to address the negative impacts that were anticipated with the implementation of the Project: i) Trees that would not affect the construction of the facilities would be preserved as much as possible, ii) Coastal erosion, which was a concern due to the construction of the market, would be reduced by constructing a sea wall, iii) Air pollution would be reduced during construction through measures to reduce dust (sprinkling water, installation of sheets, etc.), and iv) Maputo Municipality would monitor seawater quality around the new market for a certain period. For i), trees were preserved basically except for the minimum necessary felling; ii) and iii) have been addressed and no issues occurred; and concerning (iv), the Ministry of Land, Environment and Rural Development takes samples once a year and analyzes the water quality, and no problems have been reported.[26]

2) Resettlement and Land Acquisition

At the time of the project planning, it was agreed among the stakeholders (retailers and restaurant owners) that Maputo Municipality would provide alternative facilities for the relocation from the old market to Maputo Fish Market in accordance with domestic law. In implementing the Project, alternative facilities were provided to 100 retailers and 48 restaurant owners in Maputo Fish Market as planned.[27] Retailers were highly satisfied with the facilities at the Maputo Fish Market compared to those at the old market as it is an indoor facility and the necessary facilities are in place. According to the executing agency, no complaints were received about the relocation; however, it was confirmed that retailers have demanded compensation upon relocation. In addition, some restaurant owners expressed opinions on the situation after the relocation, such as the fact that the food court is outdoors and therefore easily affected by weather conditions, that individual spaces have been reduced compared to before, and that rental fees have become more expensive.

3) Gender Equality

There are many female retailers who use Maputo Fish Market. Therefore, it was planned that

[26] Source: Questionnaire answers, interview with the project consultant

[27] The compensation stipulated by Maputo Municipality at the time of planning has been addressed, but since late July 2022, there have been regular demonstrations by retailers and restaurant owners at Maputo Fish Market. According to Maputo Municipality, the reasons for the demonstrations include: a demand for more compensation for the relocation of the old market to the Maputo Fish Market after a private company purchased the site of the old market, which was owned by the Maputo Municipality; and dissatisfaction with the high rental fees after the relocation. According to Maputo Municipality, it plans to explain at the Maputo Fish Market that the Municipality is not obligated to pay the retailer or restaurant owner any compensation for the sale of the old market site because the site was owned by Maputo Municipality.

the stands would be designed to be easy for women to use. They were designed at a height that makes it easy for women to work on, and according to female retailers, they have never experienced any problems when using them. Furthermore, they also mentioned that while the old market did not have gates or guards in place allowed free access 24 hours a day, Maputo Fish Market has set the opening hours and guards at the gates, which prevents intruders, creating a safe environment, especially for female retailers.[28]

4) Marginalized People, Social Systems and Norms, Human Well-being and Human Rights

No specific and direct initiatives from the perspectives of marginalized people, social systems and norms, human well-being, and human rights were articulated at the time of planning, and no relevant impact occurred during and after the implementation and completion of the Project.[29]

5) Other Positive/Negative Impacts

The constructed Maputo Fish Market has become a tourist attraction in Maputo City due to its hygienic environment and design with restaurants located on the same site although it could not be directly confirmed at the time of the ex-post evaluation due to the impact of the COVID-19. Maputo Municipality and JICA Mozambique Office have also planned, implemented, and encouraged initiatives to further attract tourists to the Market. For example, initiatives have been implemented to make the market an even more attractive tourist destination by arranging wall paintings and seafood shows.[30]


Wall Painting to Promote Tourist Attraction

Thanks to the construction of the public fish market that meets the standards of the Guidelines set by Maputo Municipality, the hygienic conditions of the Market have significantly improved. Due to the unavailability of data, it was difficult to analyze the achievement status on the amount of ice that can be purchased at the Market, which is essential for the sale of fishery products. In addition, the amount of the fishery products handled at the Market is significantly below the target due to a combination of factors, including the high sales price compared to neighboring markets and the Market's location. As a result, although the fishery product marketing environment has improved, the impact in terms of contribution to the livelihoods of artisanal fishermen and retailers was limited due to the limited sales volume of fishery product. In light of the above, this Project has achieved its objectives only to a certain extent. Therefore, effectiveness and impacts of the Project are moderately low.

[28] Ex-ante evaluation, questionnaire answers and interviews with the retailers
[29] Questionnaire answers
[30] As for the seafood show, the date and time of the show had been fixed, however, it has not been implemented due to the COVID-19.

3.4 Sustainability (Rating: ②)

3.4.1 Policy and System

The Regulation for the Management and operation of the Fish Market has been developed as a set of rules for the management and operation of markets dealing with fishery products, and it describes a code of conduct for markets. Maputo Fish Market has also set the closing times and outsourced cleaning services, which were not available at the old market, to maintain a safer and more hygienic market in response to the Regulation and the Project's proposals for market operation, and both have contributed to maintaining the hygienic environment in the Market.

3.4.2 Institutional/Organizational Aspect

Maputo Fish Market is owned by the IDEPA, an organization under the Ministry of Fishery. Meanwhile, Maputo Municipality oversees the O&M of the Market, and the operation body which is organized under Maputo Municipality is conducting the O&M activities. Twelve staff members (one market manager, two technicians, two accountants, three cleaning-related staff, and four administrative staff) are also assigned by Maputo Municipality.[31] According to the market manager, the required number of personnel is in place, but there is a lack of personnel with sufficient technical competence on ice-making machine and chilled rooms. (See 3.4.3 Technical Aspect for more information.) Maputo Municipality works closely with Maputo Fish Market and supervises its proper operation. The reporting system and cooperation are good, and there have been no cases of problems.

3.4.3 Technical Aspect

At the time of planning, Maputo Municipality already had experience in operating a total of 39 public markets. In addition, as Maputo Fish Market does not install equipment that requires advanced operational technology, it was assumed that there would be few technical problems related to O&M. However, technical training was provided as the ice-making machine, for which there has not been the extensive operational experience in Maputo Municipality, has been newly installed. In fact, at the time of the ex-post evaluation, no technical maintenance problems have arisen, except for the ice-making machine and chilled rooms. Regarding these facilities, it is difficult for the Market to respond to and repair problems when they occur; thus, such work is outsourced. However, no maintenance records could be confirmed at the time of the site survey, and concerns on technical issues, such as cases of inadequate responses to problems with the ice-making machine and malfunctioning for certain periods, were identified. The Market is explaining that the "quality of the ice-making machine itself" is the issue since the problems have occurred frequently since its installation, while the project consultant explained that "the problems are due

[31] Source: Interviews with the staff of Maputo Fish Market (as of May 2022).

to lack of basic maintenance.[32]" As the ice-making machine is essential for the operation of the Market, preparations are underway to procure a new ice-making machine with JICA's support, considering the past circumstances. The installation is contingent on the signing of a maintenance contract with a company specializing in ice-making machines and chilled rooms and the establishment of a system.

3.4.4 Financial Aspect

At the time of planning, it was estimated that Maputo Fish Market would generate operational revenues of approximately 253,350 Mt per month, but the Market has been running at a loss (see Table 6). According to Maputo Municipality, this is because a certain number of retailers have not paid the rental fee since the opening of Maputo Fish Market, and this ratio has been increasing every year.

Table 6 Profit and Loss for Operation of Maputo Fish Market

(Unit: Mt/month)

	Plan	2020	2021
Operation income			
Retail area rental	90,000	41,817	35,492
Coking service shop (restaurant) rental	144,000	108,926	97,611
Public toilet usage fee	75,000	13,682	9,357
Parking lot usage fee	79,800	-	-
Ice sales	300,000	11,822	11,423
Chilled room usage fee	24,000	192	270
Usage fee of stock room for chest freezer	9,000	-	-
Total income	**721,800**	**176,439**	**154,152**
Operation cost			
Salary	180,120	149,000	156,450
Garbage collection fee	13,200	15,000	15,000
Miscellaneous office supplies expenses	30,000	4,167	4,517
Communication expenses	10,000	5,000	5,000
Water supply cost	17,790	37,605	38,855
Electricity supply cost	127,340	49,535	50,369
Maintenance and operation cost	30,000	79,457	74,333
Total cost	**408,450**	**339,764**	**344,524**
Profit	**313,350**	**-163,325**	**-190,371**

Source: Preparatory survey report, documents provided by the executing agency, and interview with Maputo Municipality

Note: Totals may not add up due to rounding.

As Maputo Fish Market is under the direct control of Maputo Municipality, income from rental fees, chilled room charges, ice sale revenues, etc. paid by the retailers and restaurant owners goes directly to Maputo Municipality. Various costs, including salary and major maintenance, have

[32] According to the project consultant, maintenance for an ice-making machine requires timely implementation rather than complex knowledge. Therefore, they take a lack of sufficient understanding of the need for maintenance as the problem rather than expertise.

also been paid by Maputo Municipality, and 10% of the rental fees collected by Maputo Municipality are returned to Maputo Fish Market to be used for minor maintenance.[33] According to the staff of Maputo Fish Market, there are some maintenance items that have not been addressed due to budget shortfalls,[34] but there are no financial problems as Maputo Municipality covers the expenses that cannot be covered by the market's revenues. On the other hand, Maputo Municipality is concerned about the increasing annual deficit and is considering reminding the retailers who are in arrears of their rental fees and acting if they do not pay.[35] Meanwhile, several retailers explained that they were burdened with expenses, such as an increase in rental fee from 150 Mt per month at the old market to 900 Mt per month. They also need to pay the costs arising from buying ice, using the chilled rooms (20 Mt per box), and using toilets (5 Mt per time), which was free at the old market. Furthermore, as previously described, it was confirmed that the retailers recognize that daily payments, which are less burdensome for them, are not permitted, while Maputo Municipality allows for both the monthly and daily payment of rental fees. To reduce the burden on retailers, the correct understanding needs to be shared among them.

3.4.5 Environmental and Social Aspect

At the time of planning, there was a concern about odors caused by garbage and non-organic waste, such as bottles and cans, and measures were proposed to install garbage storage for the Market and to reduce waste volume by recycling through waste separation. Accordingly, garbage storage (refrigerated room) was installed under this Project. The refrigerated room was designed to dispose of garbage in plastic bags; however, it is not used due to malfunction of the refrigeration system and budgetary difficulties in purchasing the large quantities of garbage bags required. Currently, garbage is gathered in the container and collected by a company in Maputo City. According to the Market staff and retailers, fish are processed in the designated booths, waste portions are properly disposed of, and no odor is generated as waste is collected daily. It was confirmed that odors were not caused in the Market during the site survey. In addition, to prevent pollution of the surrounding seawater, a septic tank was installed to treat the combined sewage from the public toilets and wastewater from the market. No pollution issues with seawater have been reported since then.

3.4.6 Preventative Measures to Risks

No specific risks are assumed at the time of ex-post evaluation. On the other hand, although it is out of the control of Maputo Fish Market, a resurgence of COVID-19 is expected to affect sales

[33] At the time of planning, it was recommended that a part of the Market revenues would be saved monthly as a fund to cover maintenance expenditure; however, no funds were set aside until the time of the ex-post evaluation, and the funds are disbursed monthly for necessary maintenance.
[34] According to Maputo Fish Market staff, activities such as wall painting, which are supposed to take place regularly, have been postponed due to lack of budget.
[35] Source: Interview with Maputo Municipality

of retailers and restaurants in the Market, which attracts many tourists. If the situation gets worse, consideration could be given to the burden on retailers and restaurant owners, e.g., through temporary reductions in rental fees or late fees.[36]

3.4.7 Status of Operation and Maintenance

Both facilities and equipment are well maintained and used appropriately, except for the ice-making machine, chilled rooms and some other facilities or equipment. Regarding the chilled rooms, as fish are generally preserved in the frozen state in Mozambique, the retailers were not familiar with their usage, and there were frequent cases of stored fish spoiling and being discarded in the early stages of operation. The usage was then repeatedly explained to the retailers by market officials and JICA experts, and the method of preserving fish by chilled rooms is currently better understood. The garbage storage is also used as a storage room because the refrigeration system is out of order, and the large-sized chilled room is not in use due to an issue with the evaporator. The ice-making machine, as already explained, has broken down frequently since installation and has been out of operation for a certain period of time, but it has been repaired and is operational at the time of the ex-post evaluation. On the other hand, many retailers expressed that they prefer the cube type of ice, as the ice produced is in the form of flakes, which melt more easily than ice cubes and are more expensive to purchase. With regard to the ice-making machine currently planned for procurement with the support of JICA, it is desirable to solicit opinions widely from the retailers who use ice, in addition to the maintenance staff of the Market, and then to proceed with the procurement. In addition, the changing rooms for men and women installed in the Market are now only used by the market staff, as they were not properly used when they were opened to the retailers. The defect inspection that was conducted one year after the completion of the Project reported the following five defects. The responses to the findings and the current status are shown in Table 7.

Table 7 Findings during Defects Inspections and Status of Response

Identified defect	Responses and current situations
Decreased refrigerant in two chilled rooms. Filling work was carried out during defect inspection.	After that, one chilled room is still not working due to compressor failures.
The water was supplied only in the morning, resulting in a situation where the water storage tank was empty. The installation of a receiving water tank was recommended.	A tank of 60,000 liters has been installed.
The hinge at the machine loading dock of the ice-machine room was damaged, and it was instructed to clean the air-cooled condenser once/month.	Issues with the ice-making machine occur frequently. While parts need to be purchased through public procurement system, it is difficult to procure parts that are not generally distributed because agents may not deal with those parts.

[36] Maputo Fish Market charges a 100% late fee when the payment of rental fees is delayed.

Damage to the circuit breakers in the main distribution board due to overcurrent in the electrical supply to the restaurants. Circuit breakers with standards larger than those initially adopted have already been installed.	Resolved. No further problems have arisen.
Washing water after cooking from the restaurants flowed into the open culvert and caused bad odors. Routine cleaning was recommended.	Resolved. No odor has occurred since then.

Source: Defect inspection report, questionnaire answers and confirmation during the site survey

The Project also supported i) the establishment of rules for the O&M of fish markets, ii) the improvement of rental fee collection, and iii) the development of maintenance and management plans for the ice-making machine, chilled rooms, etc., to ensure the proper O&M of the Market. When confirming with the executing agency and training participants, they replied that the basic rules set out what is necessary to maintain the hygienic environment of the Market and the freshness of fishery products, that the hygienic environment of the market has improved, and that the situation has been maintained by following these rules. Regarding the rental fee collection, the effect was limited as described in 3.3.1.2 Qualitative effects (2) Implementation of collection and accounting system, and operation and maintenance management of the ice-making machine, chilled rooms, and emergency generator and 3.4.4 Financial Aspect. Moreover, in terms of the development of maintenance and management plans for ice and refrigeration facilities, etc., basic knowledge about the facility was obtained, but problems have frequently arisen in the O&M.[37] At the time of the ex-post evaluation, the Technical Department of Maputo Fish Market has carried out daily maintenance for the equipment such as cleaning, checking oil and gas, and the Maputo Municipality has outsourced the periodical maintenance and the repair of machine failures since there is not enough capacity of technical staff to respond promptly to the equipment failures. Moreover, the contracted company for the maintenance was not able to offer sufficient support; therefore, as already mentioned, it is expected that the situation will be improved by concluding a maintenance contract with a company that specializes in maintenance when a new ice-making machine is procured in the future.

As described above, some minor issues have been observed in the technical and financial aspects, and the current status of O&M. They are not expected to be improved/resolved. Therefore, sustainability of the Project effects is moderately low.

[37] Source: Questionnaire answer, and interviews with the staff who participated in the training

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The Project was implemented with the aim to increase the amount of the fishery products handled in accordance with the standard of market operation guidelines and to expand the capacity of the facilities in the public fish market in Maputo City, thereby contributing to the improvement of the environment for fish marketing and increased income for artisanal fishermen, retailers, etc. Its objective is in line with the development policy in Mozambique at the times of planning and the ex-post evaluation, which has indicated the importance of promoting artisanal fishery as a means of contributing to poverty reduction, and development needs to improve facilities and equipment at fish markets. The Project is also consistent with Japan's Assistant Policy, projects and support by the JICA and other agencies, and Goals 1 and 9 of the SDGs. Therefore, its relevance and coherence are high. While the outputs were mostly as planned, the project costs exceeded the plan, and the project period significantly exceeded the plan. Therefore, efficiency of the Project is moderately low. The development of facilities and equipment under the Project has significantly improved the hygienic and marketing environment of fishery products at Maputo Fish Market. On the other hand, the amount of fishery products handled at the market is significantly below the target due to a combination of factors, including high selling prices compared to neighboring markets, its location, and others. Therefore, the contribution to increased income of artisanal fishermen and retailers is also likely to have been limited. Accurate data on the amount of ice that can be produced and purchased, an operation and effect indicator, could not be ascertained, and the number of cars parked legally by market users was also below the target. In light of the above, this project has achieved its objectives only to a certain extent. Therefore, effectiveness and impacts of the project are moderately low. Some minor issues have been observed in the technical, financial, and the current status of O&M of this Project. 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 partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

- The relocation from the old market to Maputo Fish Market has significantly increased the burden on retailers in terms of increased rental fees, the cost of buying ice, and the usage fee for chilled rooms and toilets. With sales declining since 2020 due to the impact of the COVID-19, it may be worth considering the burden on retailers and restaurant owners through, for example, a temporary reduction in late payment fees if the impact is prolonged. Moreover, some retailers do not recognize that daily payment is also acceptable for the rental fee payment. As some retailers feel less burdened by paying fees daily rather than monthly, it is advisable that the

market operator provide retailers with another opportunity to be informed of the correct rules, so that the correct information is conveyed to them.

- Maputo Fish Market does not record or keep accurate information on the ice-making machine maintenance work, ice sales charges, etc. The Market should be required to record and keep the information to accurately understand whether facilities and equipment are being properly operated and maintained, and to use this information for future maintenance and management.
- Reflecting the high quality and freshness of the fishery products handled at Maputo Fish Market, the sales prices of fishery products at this Market are higher compared to those at other markets, which is one of the reasons why the amount of the fishery products handled has not increased sufficiently. Promotional activities for consumers are also important to encourage them to choose fresh products at Maputo Fish Market even though the sales price is higher compared to other markets. From the perspective of ensuring sustainability, as before the spread of the COVID-19, it is considered effective to promote the consumption of fresh and high-quality fishery products handled at the Market through holding fairs and other promotion activities for general consumers.

4.2.2 Recommendations to JICA

- Procurement of an ice-making machine based on the views of ice users

The ice-making machine procured by the Project produces flake ice. According to the retailers, this type of ice is prone to melting and requires frequent purchasing, and the cost of purchase is high, while flake ice is generally considered to have a higher cooling capacity. Following repeated failures of the ice-making machine in the past, Maputo Municipality and the JICA office are preparing to purchase a new ice-making machine. It is advisable to solicit opinions from retailers who use ice in addition to the market maintenance staff before selecting the ice-making machine to be procured. If flake ice is more effective than ice cubes, it may be necessary for the market staff to arrange an opportunity to explain the reasons and effectiveness before the machine is installed to gain the understanding of retailers.

4.3 Lessons Learned

- <u>Conducting training reflecting conventional practices</u>

In Maputo Fish Market, handling of frozen fishery products is not permitted from the perspective of maintaining freshness. In Mozambique, on the other hand, fish are generally preserved by freezing. Therefore, after the chilled rooms were put into operation, cases where fish spoiled due to using the chilled rooms in the same way as freezers were reported. Since then, through explanations by the market staff and experts, fish have been preserved correctly and are no longer discarded, but an understanding of refrigerated storage remains low. In addition, maintenance of equipment is generally not emphasized in Mozambique, and even after the

training was provided on the maintenance of the ice-making machine, the staff have not yet recognized the necessity of such maintenance or performed it in a timely manner. As in this Project, in case where methods and actions that differ from conventional practices are required for the O&M of facilities and equipment, it is necessary to provide opportunities where the necessity for and importance of such methods and actions are fully understood before transferring experience and technology through training, etc., and to continuously work to deepen understanding through the executing agency and relevant institutions even after training is conducted, from the perspective of ensuring sustainability.

- Selection of equipment based on procurement systems

When repairing the ice-making machine, a problem arose where the required parts were not available. In Mozambique, parts and consumables must be purchased through a tender process in accordance with national rules. Therefore, if the parts are not handled or are difficult to be handled by the agency that wins the tender, they will not be available. To avoid such situations, the executing agency and experts need to examine local procurement routes for parts when planning projects in countries/regions where a defined procurement system is imposed for the purchase of parts, etc., and select equipment so that parts will not be difficult to obtain.

5. Non-Score Criteria

5.1. Performance

5.1.1 Objective Perspective

None

5.2. Additionality

None

(end)