

Kingdom of Cambodia

FY2021 Ex-Post Evaluation Report of Japanese Grant Aid Project

“The Project for Expansion of Water Supply System in Kampot”

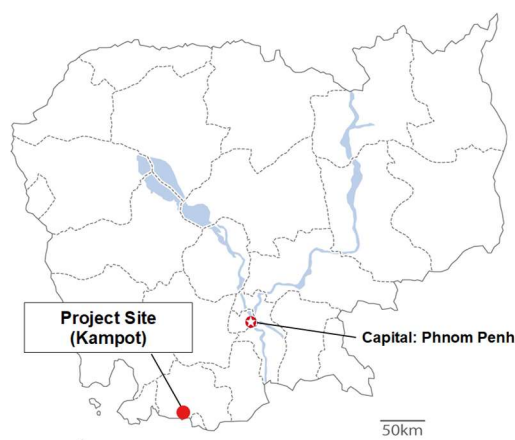
External Evaluator: Masumi Shimamura, Mitsubishi UFJ Research and Consulting Co., Ltd.

0. Summary

This project expanded and improved water supply facilities in Kampot City to improve access to safe water and stable water supply services for the local residents. This project, which aims to improve water supply capacity, is consistent with Cambodia’s development policy, development needs, and project plan and approach were appropriate. The project is also consistent with Japan’s development cooperation policy, and collaboration with other projects within JICA and organizations outside of JICA has taken place as well and concrete results have been generated. Therefore, relevance and coherence of the project are high. In terms of project implementation, both project cost and project period were within the plan and thus efficiency of the project is very high. As for project effects, quantitative indicators set at the time of planning have all far exceeded the target values. Regarding impacts, interviews with local residents in the surrounding area indicate that improved access to safe water and stable water supply services have improved the living environment of the residents. In addition, the project has contributed to the promotion of water supply connections for poor households, and with the expansion of water supply area, it is expected to have further positive impacts on the society as well. Therefore, the project has generated more effects than planned, and effectiveness and impacts of the project are very high. No negative impacts on natural environment and land acquisition have been reported. Resettlement did not take place. Regarding operation and maintenance, slight issues have been observed in the current status, however, there are good prospects for improvement/resolution. Therefore, sustainability of the project effects is high.

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

1. Project Description



Project Location



Sedimentation Basin at the
Water Treatment Plant

1.1 Background

In Cambodia, after the civil war, with the support of Japan and other donors, development support of water supply facilities in the capital city of Phnom Penh and development support of human resources for operation and maintenance have been provided to improve water supply capacity. On the other hand, water supply capacity in local cities other than the capital was still low, and safe water supply to the entire population was not realized. In Kampot City, the capital of Kampot Province, the existing water treatment plant was fully rehabilitated and reconstructed in 2006 with the support of the Asian Development Bank (hereinafter referred to as “ADB”). JICA also implemented a technical cooperation project “The Project on Capacity Building for Water Supply System in Cambodia (Phase 2)” (May 2007–April 2011) with the aim of improving capacity of the staff of the waterworks in eight local cities including Kampot City. In this way, in Cambodia, both in terms of hard measures and soft measures, water supply capacity of local cities was being improved, however, there was an urgent need to expand water supply facilities to further improve water supply capacity.

1.2 Project Outline

The objective of this project is to improve access rate to safe water and provide stable water supply services by expanding and upgrading water supply facility systems in Kampot City, thereby contributing to the improvement of living environment of local residents.

Grant Limit / Actual Grant Amount	2,985 million yen / 2,408 million yen
Exchange of Notes Date /Grant Agreement Date	June 2015 / June 2015
Executing Agency	Ministry of Industry, Science, Technology &Innovation: MISTI
Project Completion	August 2018
Target Area	Kampot City
Main Contractors	Sumitomo Mitsui Construction Co., Ltd. / Swing Corporation (JV)
Main Consultants	Nihon Suido Consultants Co., Ltd. / Kitakyushu City Water and Sewer Bureau (JV)
Preparatory Survey	May 2014–March 2015
Related Projects	<p>[Technical Cooperation]</p> <ul style="list-style-type: none"> • The Project on Capacity Building for Water Supply System (Phase 1) (2003–2006) • The Project on Capacity Building for Water Supply System in Cambodia (Phase 2) (2007–2011) • The Project on Capacity Building for Urban Water Supply System in Cambodia (Phase 3) (2012–2017) <p>[ADB]</p> <ul style="list-style-type: none"> • Urban Water Supply Project (2014–present) <p>[GRET] (NGO in France)</p> <ul style="list-style-type: none"> • Urban Water Supply Project

2. Outline of the Evaluation Study

2.1 External Evaluator

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

2.2 Duration of Evaluation Study

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

Duration of the Study: November 2021–February 2023

Duration of the Field Study: May 9–28, 2022, September 6–18, 2022

3. Results of the Evaluation (Overall Rating: A¹)

3.1 Relevance/Coherence (Rating: ③²)

3.1.1 Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of Cambodia

At the time of planning, Cambodian government's *the Rectangular Strategy Phase III (2013–2018)* and *the National Strategic Development Plan (2009–2013)* set out its goal to achieve 80% access to safe drinking water in urban areas by 2015. The government also aimed to increase its ratio to 100% by 2025 in its *the National Strategic Development Plan (2014–2018)*, and the then Ministry of Industry & Handicraft (hereinafter referred to as “MIH”) was taking the lead in promoting the development of water supply facilities in local cities as an important issue.

At the time of the ex-post evaluation, Cambodian Government's *the Rectangular Strategy Phase IV (2019–2023)* points out the importance of further investment in water supply infrastructure development and rehabilitation. Furthermore, *the National Strategic Development Plan (2019–2023)* states the target to realize 100% access to safe water in urban areas by 2025. Cambodian government also aims to provide affordable water supply services, ensuring quality, safety and sustainability. Thus, the implementation of the project is also consistent with the development policy of Cambodia at the time of the ex-post evaluation.

3.1.1.2 Consistency with the Development Needs of Cambodia

At the time of planning, Kampot City's water supply rate was only 47% due to lack of supply capacity of water treatment plants, inadequate maintenance of distribution pipe network, and aging of some distribution pipes, making it urgent to improve water supply facilities.

At the time of ex-post evaluation, the importance of safe and stable water supply is also high, and further strengthening the water supply capacity of Kampot Waterworks remains a challenge. Specifically, demands for water have increased significantly due to development of resorts, hotels, and villas in the areas served by Kampot Waterworks. In addition, water supply area has expanded in 2021 to include Boeung Touk commune adjacent to Kampot City. Furthermore, construction of a multipurpose port has begun in May 2022, and a distribution center is scheduled to be developed, which is expected to continue to generate strong demand for water in the future.

3.1.1.3 Appropriateness of the Project Plan and Approach

One of the major changes since the time of planning is the strong and growing demand for

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

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

water in the areas served, as described above. Water supply capacity of Kampot Waterworks has been increased by a local private company to meet the increasing water demand year by year after project completion. Specifically, a new water treatment facility with water supply capacity of 5,000 m³ per day has been constructed (the facility has begun supplying water in April 2022). This is due to the expansion of Kampot water supply area and the rapid development of the existing water supply area, which could not have been anticipated at the time of planning. Therefore, project plan and approach were considered to be appropriate.

In terms of equity, consideration is given to the poor. Specifically, in order to ensure that the poor have equitable access to safe and affordable water, consideration is given to allow households holding “ID Poor cards” issued by the Ministry of Planning to connect to water pipes free of charge during project formulation and implementation. In addition, water tariff structure is also designed to take into account the poor.

3.1.2 Coherence(Rating: ③)

3.1.2.1 Consistency with Japan’s ODA Policy

At the time of planning, Project Development Plan of Japan’s *the Country Assistance Program for Cambodia* placed “development of water supply and sewage infrastructure” as one of the important development issues. In addition, JICA identified “promotion of social development” as a priority area in its *the Country Analysis Paper to Cambodia*, and analyzed the high needs for water and sewage infrastructure in particular. The project aims to improve access rate to safe water and provide stable water supply services through expansion and improvement of the water supply facility system, which was consistent with Japan’s development cooperation policy at the time of planning.

3.1.2.2 Internal Coherence

This project has collaborated with technical cooperation projects “The Project on Capacity Building for Water Supply System in Cambodia (Phase 2)” (May 2007–April 2011) and “The Project on Capacity Building for Urban Water Supply System in Cambodia (Phase 3)” (November 2012–November 2017) for operation and maintenance of water supply facilities and water service operations, and concrete synergistic effects have been generated. (See Impacts for concrete synergistic effects.)

In addition, the Cambodian side has established a system for Cambodia’s own human resource development of waterworks staff in local cities based on Japan’s cooperation to date, and ripple effects can be confirmed. Specifically, staff of Phnom Penh Water Supply Authority (hereinafter referred to as “PPWSA”), whose capacity for water service operation management, and operation and maintenance, etc. was strengthened through the “The Project on Capacity

Building for Water Supply System (Phase 1)” (2003–2006), etc. have served as lecturers to conduct technology transfer in the soft component (capacity development component) of the project, contributing to the capacity building of Kampot Waterworks staff. (See BOX 1.)

3.1.2.3 External Coherence

This project has collaborated with the support by the ADB and the GRET, a French NGO, and has generated concrete synergistic effects. Rehabilitation and expansion of water supply facilities was conducted by the ADB’s Urban Water Supply Project,³ and it was expected that maintenance costs of Kampot Waterworks would be reduced through collaboration with the project. In addition, the GRET’s support included construction of distribution pipes, and it was anticipated that the number of people supplied with water would increase and non-revenue water volume would decrease in collaboration with this project. JICA has confirmed the specifics of the supports provided by these organizations and the areas to be supported during project formulation stage, and developed a project plan to avoid overlap with these projects and to generate synergies, and thus generation of long-term effects has been confirmed. (See Impacts for specific synergistic effects.)

In terms of consistency with international frameworks, Cambodian government is committed to achieving SDG Goal 6 by 2030. It states that water tariff is set with consideration for the poor so that all people can access to safe water supply, sanitation facilities, and enjoy a safe, hygienic, and environmentally friendly living conditions. This project is part of efforts to achieve this goal.

The project is consistent with Cambodia’s development policy and development needs, and the project plan and approach were appropriate. The project is also consistent with Japan’s development cooperation policy, and coordination with other projects within JICA has taken place, and concrete results can be confirmed. Furthermore, with regard to collaboration with organizations outside of JICA and consistency with international framework, collaboration with organizations outside JICA has taken place and concrete results can be confirmed. Therefore, relevance and coherence of the project are high.

3.2 Efficiency (Rating: ④)

3.2.1 Project Outputs

This project expanded and upgraded water supply facilities in Kampot City to improve access rate to safe water for local residents. Tables 1, 2 and 3 compare the planned and actual outputs

³ The size of ADB’s support is 22,848,000 SDRs (SDR stands for Special Drawing Rights, an international reserve asset created by the International Monetary Fund (IMF)).

of major outputs.

Table 1: Comparison of Major Planned and Actual Outputs (Construction of Facilities)

Plan		Actual/ Comparison
Category	Facility Size	
Intake Facility	8,250 m ³ /day, Intake Pump Station, Intake Pump Facility	As Planned
Raw Water Transmission	Raw Water Transmission Pipeline Diameter 400 mm, Raw Water Transmission Pipeline Length 5.4 km	Raw Water Transmission Pipeline Diameter 400 mm, Raw Water Transmission Pipeline Length 5.3 km
Water Treatment Facility	7,500 m ³ /day, Coagulation-Sedimentation Rapid Sand Filtration	As Planned
Transmission and Distribution Facilities	Transmission and Distribution Pump Station/Facility, Distribution Pipe diameter 63 mm–400 mm, Distribution Pipe Length 88.7 km, Elevated Water Tank 300 m ³	Transmission and Distribution Pump Station/Facility, Distribution Pipe Diameter 63 mm–400 mm (Changes in the Breakdown of Diameter and Length), Distribution Pipe Length 88.9 km, Elevated Water Tank 300 m ³

Source: Results from questionnaire survey of Kampot Waterworks

Table 2: Comparison of Major Planned and Actual Outputs (Installation of Facilities)

Plan			Actual/ Comparison
Category	Equipment	Quantity	
Quality Analysis	Jar Tester	One set	As Planned
	Distillation Apparatus	One set	As Planned
	Turbidity Meter	One set	As Planned
	Turbidity Continuous Monitoring Meter	One set	As Planned
	Laboratory Table	One set	As Planned
	Residual Chlorine Analyzer	One set	As Planned
	Uninterruptible Power System	One set	As Planned
	pH Meter (glass electrode)	One set	As Planned
	pH Meter (BTB)	One set	As Planned

	Portable Conductivity Meter	One set	As Planned
	Conductivity Meter	One set	As Planned
	Spectrophotometer	One set	As Planned
	Reagents	One set	As Planned
	Glassware	One set	As Planned
	Microbiological Measurement Equipment	One set	Added
Mechanical Equipment	Vibration Checker	One set	As Planned
Water Supply Equipment	HDPE Pipes Socket Fusion Equipment	One set	As Planned
	Equipment and Materials for Water Service Connections for Poor Households	900 sets	As Planned

Source: Results from questionnaire survey of Kampot Waterworks

Table 3: Comparison of Major Planned and Actual Outputs (Consulting Services)

Item	Actual/ Comparison
Detailed Design, Tendering Assistance, Construction Supervision	As Planned
Capacity Building Program (Soft Component) <ul style="list-style-type: none"> • Operation and Maintenance of Water Treatment Facility • Operation and Maintenance of Transmission and Distribution Facility • Production Management 	As Planned

Source: Results from questionnaire survey of Kampot Waterworks

There were some changes from the original plan regarding construction of the facility. Transmission pipeline length and distribution pipe length were modified based on the findings of accurate extensions from field survey and measurement survey during detailed design. Distribution pipe diameters were revised to appropriate sizes based on a review of the pipe network calculations. All of these changes were based on accurate survey results after the preparatory survey and were appropriate changes.

A set of microbiological measurement equipment was added to the procurement equipment. The equipment is a very effective way for Kampot Waterworks to properly monitor water quality and provide clean water that complies with Cambodia's water quality standards, and its addition to the project scope was appropriate.

Regarding other project scopes, it was confirmed through interviews with the executing agency, Ministry of Industry, Science, Technology & Innovation (hereinafter referred to as “MISTI,”) and Kampot Waterworks that there were no major changes.

Concerning the work to be undertaken by the Cambodian side, installation of materials and equipment for service connections and water meters for poor households has been completed for 416 (46%) of the 900 sets of materials and equipment provided as of the time of the ex-post evaluation⁴. There is a time lag between the 2008 survey by the Ministry of Planning, which was the basis for the figure of 900 sets, and this figure does not necessarily reflect the number of poor households when the project was implemented. In other words, subsequent economic and social development of the project area may have improved the overall living conditions of local residents and has reduced the number of poor households. In fact, it is unlikely that the poor are being left behind, as Kampot Waterworks has been continuing its efforts to connect water pipes by conducting promotional and awareness-raising activities to promote connection to local residents, including poor households. At the time of planning, it would have been difficult to foresee a decrease in number of poor households.



Office Building and Elevated Water Tank



Water Distribution Flow Monitoring Panel

⁴ The remaining materials and equipment will continue to be used to connect poor households in the existing water supply area of Kampot Waterworks, and with the expansion of water supply area, the plan is to use them when poor households in the new water supply area apply for connection work.



Water Quality Testing Equipment



Chemical Feeding Facility



Distribution Pump



Distribution Pump Station Control Room

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost was initially planned to be 3,005 million yen (2,985 million yen on the Japanese side, 20 million yen on the Cambodian side). In actuality, the total project cost was 2,428 million yen⁵ (2,408 million yen on the Japanese side, 20.7 million yen on the Cambodian side), which is within the plan (81% of the planned amount). The costs borne by the Cambodian side include the costs of land acquisition, installation of electricity to the new intake and water treatment facilities, and conducting surveys and removing unexploded ordnance.

⁵ Amounts less than one million yen were rounded down.

3.2.2.2 Project Period

The overall project period was planned as 38 months, from July 2015 (start of the detailed design) to August 2018 (completion of construction/procurement) as opposed to 36 months in actuality, from September 2015 (start of the detailed design) to August 2018 (completion of construction/procurement), which is within the plan (95% of the planned period). Table 4 summarizes the comparison of planned and actual project period.

Table 4: Comparison of Planned and Actual Project Period

Plan	Actual
July 2015–August 2018 (38 months)	September 2015–August 2018 (36 months)
Breakdown: Detailed Design and Tendering Period	
Detailed design: 7.5 months Tendering period: 3.5 months	September 2015–April 2016 (8 months)
Breakdown: Construction and Procurement Period	
Construction and Procurement Period: 27 months	April 2016–August 2018 (29 months)

Source: Information provided by JICA and results from questionnaire survey of Ministry of Industry, Science, Technology and Innovation

Note 1: The starting point of the project period is the start of the detailed design, and the definition of project completion is the date of completion of construction/procurement. The project period does not include the defect liability period for both planned and actual.

Therefore, efficiency of the project is very high.

3.3 Effectiveness and Impacts⁶ (Rating: ④)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

At the time of planning, “served population,” “daily average water supply volume” and “number of domestic service connections” were set as quantitative effects of the project. Table 5 summarizes baseline, target and actual values between 2019 and 2021 for each indicator. As the project completion is August 2018, the target year to be compared is 2021, three years after completion. The target achievement rates are shown in parentheses in the table.

⁶ When providing the sub-rating, Effectiveness and Impacts are to be considered together.

Table 5: Quantitative Effects of the Project

Indicators	Baseline Value 2013 Actual Value	Target Value 2021 3 Years After Completion	Actual Value		
			2019	2020	2021 (Note 3)
Served Population (person) (Note 1)	23,657	55,874	52,840	61,610	67,875 (121%)
Daily Average Water Supply Volume (m ³ /day)	4,252	10,339	10,426	12,839	13,147 (127%)
Number of Domestic Service Connections (Note 2)	4,834	11,417	10,568	12,322	13,575 (119%)
Reference Value (Note 4)					
Number Connected to the Poor Households out of Total Number of Domestic Service Connections	—	—	239	324	416
Non-Revenue Water Rate (%)	17.78	—	8.90	8.65	8.45

Source: Information provided by JICA and results from questionnaire survey of Kampot Waterworks

Note 1: If population growth within the water supply area continued as projected, the water supply rate is expected to reach 92% in 2021, up from 47% in 2013.

Note 2: The target value includes the number of households that can be newly connected to the water supply pipeline network as a result of the construction of new water treatment facilities (6,014 households), as well as the use of excess capacity in existing facilities (569 households).

Note 3: The water supply to the Boeung Touk commune adjacent to the project area started in 2022; therefore, it is not included in the actual figures for 2021.

Note 4: Indicators that were not included in the original plan but were added at the time of the ex-post evaluation.

The actual values for each of the indicators set at the time of planning have increased every year since the project was completed, and all have far exceeded the target values. The achievement rates for the actual values in 2021 are 121%, 127%, and 119% for “served population,” “daily average water supply volume,” and “number of domestic service connections,” respectively, far exceeding the targets. As mentioned above in “3.1.1.3 Appropriateness of the Project Plan and Approach,” the large increase in water demand was due to the rapid development of Kampot City, which was not anticipated at the time of planning. For this reason, after project completion, a new water treatment facility with water supply capacity of 5,000 m³ per day was constructed by a local private company, and its water supply was started in April 2022. The water supply capacity of Kampot Waterworks is being further enhanced to meet the further increase in water demand and the expansion of the water supply area.

As mentioned in “3.2.1 Project Outputs,” “number connected to the poor households out of total number of domestic service connections,” which is mentioned as a reference value, is 416 in 2021 (46% of 900 sets of materials and equipment provided). In addition, as a reference value, “non-revenue water rate” obtained from Kampot Waterworks is on a downward trend,

and the actual value in 2021 is 8.45%, which suggests that its water service operations are in very good condition.

3.3.1.2 Qualitative Effects (Other Effects)

Qualitative effects were classified as impacts.

3.3.2 Impacts

3.3.2.1 Intended Impacts

As impacts of this project, state of generation of “improvement of insufficient water pressure from water taps,” “improvement of sanitation environment and alleviation of water shortage concerns for local residents who have been using rainwater, etc.,” “improvement of water leakage in the existing water supply areas” and “promotion of water connections to the poor” were evaluated.

1) Improvement of insufficient water pressure from water taps

According to Kampot Waterworks, water pressure before the project was 0.1 bar,⁷ but after the project, water pressure was increased to 1 bar. Water supply time before the project was about 18 hours a day, but after the project, 24 hours water supply has been realized.

In addition, as a result of interview survey conducted with 14 local residents⁸ in the water supply service area, all the respondents who use water from Kampot Waterworks indicated that they are satisfied with water supply service, as water volume and water pressure are sufficient and water supply is stable 24 hours a day, 365 days a year, without any difference between rainy and dry seasons. When asked the residents who were not connected to water pipes the reasons, three residents (all of whom were not “ID Poor card” holders) said that they were not connected because the initial cost⁹ for connection was high.

2) Improvement of sanitation environment and alleviation of water shortage concerns for local residents who have been using rainwater, etc.

Results of interviews with local residents in the water supply service area confirmed that

⁷ 1bar is the force that can push water up to a height of 10m.

⁸ The 14 local residents consisted of three men (one in 30s, one in 50s and one in 60s) and 11 women (two in 30s, one in 40s, five in 50s and three in 60s). Interviews were conducted to the following four categories of residents.

- Residents who have been connected to the water pipe before the project and can compare the differences before and after the project. (three residents: one woman in 30s, one woman in 50s and one woman in 60s.)
- Residents who have newly connected to the water pipe after the project. (three residents: one woman in 30s, one man in 50s and one woman in 50s.)
- Target residents of the connection support system for the poor. (four residents: one man in 30s, two women in 50s and one woman in 60s.)
- Residents who are unconnected. (four residents: one woman in 40s, one woman in 50s, one man in 60s and one woman in 60s.)

⁹ Initial fee of 356,800 Riel (about USD89) is charged, consisting of a connection fee of 319,000 Riel and a deposit of 37,800 Riel.

sanitary conditions of the residents have improved after the project. Following responses were obtained: “after connecting to the water pipe after the project, frequency of showering, washing hands, and washing has increased,” “because tap water is clean, it does not make my hair sticky or skin itchy after showering, so I can use water with peace of mind,” “because tap water is clean, I drink it without boiling it,” “since I started using tap water, I no longer have diarrhea,”¹⁰ “after connecting to the water pipe after the project, water is available 24 hours a day, and there is no need to worry about water shortage.”

3) Improvement of water leakage in the existing water supply areas

According to Kampot Waterworks, it is monitoring water flow data using the water distribution flow monitoring system installed by the project. Staff in charge are appointed to each water distribution block to check and manage water distribution pressure and flow volume. In addition, water distribution maps, piping history, customer information, etc., have been prepared to reduce non-revenue water rate and improve water leakage based on the past history. The trend of non-revenue water rate has been decreasing year by year as shown in Table 5, indicating that the situation is improving.

Kampot Waterworks plans to continue the following efforts to keep the non-revenue water rate below 8%.

- Strengthen water distribution block management
- Replace water meters in each distribution block
- Replace existing old water pipes with new pipes
- Install water distribution pipes with the same diameter as the replacement mentioned above when connecting to a new water supply area

4) Promotion of water connections to the poor

Kampot Waterworks has introduced preferential treatment for the poor by installing water supply connection equipment and water meters free of charge for poor households.¹¹ As mentioned earlier in “3.2.1 Project Outputs,” Kampot Waterworks has been carrying out promotion and awareness-raising activities by holding public forums and other briefings for local residents to promote water connection among the poor, and plans to continue these activities in the future.

Through interviews with local residents in the water supply service area, it is confirmed that living conditions have improved after the project from those eligible for the connection

¹⁰ It should be noted that it is difficult to prove a causal relationship between the project and improvement of waterborne diseases such as diarrhea.

¹¹ Normally, a connection fee of 319,000 Riel and a deposit of 37,800 Riel, for a total of 356,800 Riel (about USD89), are charged, but the poor can connect to the water pipes with only a deposit (about USD9).

support program for the poor (households holding the “ID Poor card”). Following responses were obtained: Before the project, fetching water (drawing water from wells or purchasing water) was time-consuming and labor intensive (time required per fetch varied from about 30 minutes to about three hours,¹² depending on the respondent), and children also had to fetch water. However, after the project, they were able to spend more time on housework and taking care of their children and grandchildren (two respondents), work full time (one respondent), sell their harvested crops and food (one respondent), and earn extra income by selling fish caught in the river (two respondents).

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Natural Environment

The project was classified as Category B based on the *JICA Guidelines for Confirmation of Environmental and Social Considerations* (April 2010) since it does not fall under any sensitive sectors/characteristics or sensitive areas, and its undesirable effects on the environment were considered to be not significant. According to MISTI, the Initial Environmental Impact Assessment (IEIA) report was prepared and submitted to the Ministry of Environment on November 1, 2016, and was approved by the Ministry on November 11, 2016.

According to Kampot Waterworks, water quality, air quality, noise and vibration, waste, safety management, and sanitation management were monitored in accordance with the environmental monitoring plan, and there were no major problems, such as exceeding the standards. In addition, environmental mitigation measures including cleaning up public roads and work areas after daily construction work, separating waste, assigning traffic control personnel at the construction site, and instructing workers on handling hazardous chemicals were conducted, and facilities were constructed in an environmentally friendly manner.

As a result of environmental monitoring, no negative impacts on the natural environment have been reported, and no complaints have been received from local residents. Based on interviews with local residents in the water supply service area and the results of the project site inspection, it can be considered that there were no major problems with the natural environment.

¹² Respondents varied in the time it took to fetch water. Residents who had gone to the pond to fetch water said it took them about 30 minutes. Residents who purchased water from neighbors connected to the water supply pipes said that it took them about 10 minutes to get to their homes, but sometimes water pressure was so low that only a little water came out of the faucet, and sometimes they had to wait for two to three hours until the container became full.

2) Resettlement and Land Acquisition

According to Kampot Waterworks, land acquisition has occurred from one landowner for a site (9,656m²) for the construction of a new water treatment plant. The construction site was vacant, there were no one making a living or informal residents on the construction site, and the land was purchased from the landowner at market price. According to Kampot Waterworks, land acquisition process was carried out smoothly in accordance with Cambodia's domestic procedures and the *JICA Guidelines for Confirmation of Environmental and Social Considerations*, and there were no complaints from the landowner, including the purchase price, and there were no problems. Resettlement did not occur.

3) Gender Equality

As a result of questionnaire survey of Kampot Waterworks and interviews with local residents in the water supply service area, it was confirmed that women's employment has been promoted after the project. Female residents responded "by reducing the time spent fetching water, women are now able to sell their harvested crops and food products," and "women can earn additional income by selling fish caught in the river."

4) Marginalized People

It was confirmed that poor households are connected to the water supply system, and their access to safe and affordable water has been realized. As mentioned earlier in "3.3.2.1 Intended Impacts" under "4) Promotion of water connections to the poor," the project has installed water supply connection equipment and water meters to the poor free of charge, and has introduced preferential treatment for the poor. In interviews with residents in the water supply service area, residents eligible for the connection support system for the poor (households with "ID Poor cards") responded that they were very satisfied with the water service, and water tariff was reasonable, and that they were able to pay it without delay.

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

The project has enabled the poor to access safe and affordable water. Interviews with residents eligible for the connection support system (households with "ID Poor cards") indicated that they are satisfied with being able to use clean water anytime without worrying about water tariff.

6) Unintended Positive/Negative Impacts

<Synergies with other projects in JICA>

Questionnaire survey and interviews with MISTI and Kampot Waterworks have confirmed that through collaboration with other projects within JICA,¹³ Kampot Waterworks has gained high customer satisfaction for its water supply services, improved water leakage situation, reduced non-revenue water rate, and operated water services in net positive. Results of interviews with local residents in the water supply service area indicated a high level of satisfaction with the service provided by Kampot Waterworks from all respondents who use the waterworks' tap water. In addition, as shown in Table 5, non-revenue water rates have been decreasing year by year, and as mentioned later in "3.4.4 Financial Aspect," Kampot Waterworks' water service operations have been running profits and is financially sound.

Various Standard Operating Procedures (herein after referred to as "SOPs") developed under the soft component of the project were coordinated with "The Project on Capacity Building for Water Supply System in Cambodia (Phase 2)" regarding SOP creation, improvement, and guidance, and Kampot Waterworks is now able to update its customer ledgers, asset ledgers, and financial statements based on the SOPs. (See "3.4.3 Technical Aspect" and "3.4.4 Financial Aspect" below.)

Kampot Waterworks has introduced a Systematic Utility Management System, hereinafter referred to as "SUMS" in "The Project on Capacity Building for Urban Water Supply System in Cambodia (Phase 3)." Its water service operations can now be managed by utilizing SUMS, and MISTI is strengthening its monitoring system. (See "3.4.2 Institutional/Organizational Aspect" below.)

<Synergies with organizations outside of JICA>

According to Kampot Waterworks, its maintenance costs have reduced through collaboration with the ADB's Urban Water Supply Project. For example, it explained that reduction in power consumption volume has been realized – before collaboration, power consumption volume in the maximum month had been 54,440kw/month, whereas it was reduced by about 25% to 40,609kw/month. In addition, one flowmeter installed in the project had failed due to a lightning strike, and Kampot Waterworks is planning to replace it with a flowmeter procured under the ADB project. (See "3.4.7 Status of Operation and Maintenance" below.)

Kampot Waterworks also explained that the number of people supplied with water has increased in collaboration with the assistance provided by GRET. In addition, flowmeters

¹³ "The Project on Capacity Building for Water Supply System in Cambodia (Phase 2)" and "The Project on Capacity Building for Urban Water Supply System in Cambodia (Phase 3)"

installed in the project enabled leak detection in GRET-supported areas and existing water supply areas, leading to decrease in non-revenue water rate for Kampot Waterworks.

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

3.4 Sustainability (Rating: ③)

3.4.1 Policy and System

MIH, which at the time of planning had jurisdiction over water service operations, was renamed MISTI in April 2020 and continues to be responsible for the oversight of water service operations. According to MISTI, *the National Strategic Development Plan (2019–2023)* goal of 100% access to safe water in urban areas by 2025 is maintained. There is also no change in the policy of taking care to ensure that the poor have equitable access to safe and affordable water.

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

3.4.2 Institutional/Organizational Aspect

Operation and maintenance of the project after completion is undertaken by Kampot Waterworks under the supervision of MISTI and Department of Industry, Science, Technology & Innovation (hereinafter referred to as “DISTI”) in Kampot Province, which is a sub-national organization of MISTI in Kampot Province.

MISTI, Kampot DISTI, and Kampot Waterworks are in constant communication and working closely together. For example, Kampot Waterworks prepares an annual operation and maintenance plan and submits it to DISTI and MISTI for final approval before conducting operation and maintenance work. In addition, DISTI is informed in advance of any extension of water distribution pipes or new connections. Furthermore, Kampot Waterworks reports its financial status, including revenues and expenses, to DISTI and MISTI every three months.

SUMS, which was introduced in “The Project on Capacity Building for Urban Water Supply System in Cambodia (Phase 3)” is now being utilized by public water utilities, including Kampot Waterworks, for customer information management, finance, accounting, etc., and MISTI has established a system to monitor the public water utilities.

Kampot Waterworks has 56 staff members. It consists of one Director, one Deputy Director, four members in Administration Section, 16 members in Business Section, four members in Finance Section, 16 members in Production Section and 14 members in Connection Section. Its work allocation and number of staff are shown in Table 6. According to Kampot Waterworks, they currently have necessary personnel to operate and maintain the water supply facilities. It

was pointed out that in light of vigorous increase in water demand, number of staff will need to be increased in the future.

Table 6: Work Allocation and Number of Staff of Kampot Waterworks

Position/Section	Work Allocation	Number of Staff (Person)
Director	General Management	1
Deputy Director	Assistant to the Director	1
Administration Section	General Affairs, Human Resources Management, Planning and Administration	4
Finance Section	Tariff Collection, Accounting and Finance	4
Business Section	Customer Management, Water Meter Reading, Billing	16
Production Section	Water Treatment Plant Operation and Maintenance, Water Quality Control	16
Connection Section	Leakage Investigation and Repair, Pipe Network Management, Pipe Extension, Renewal	14
Total		56

Source: Results from questionnaire survey of Kampot Waterworks

From the above, no particular problems have been identified regarding the institutional/organizational aspect of operation and maintenance.

3.4.3 Technical Aspect

According to Kampot Waterworks, there is limited qualification for water service operators in Cambodia, and at the Waterworks, there is no technical qualification holders for the operation and maintenance staff with the exception of one Production Manager, who majored in electrical engineering. However, staff in charge of operation and maintenance have accumulated necessary experiences and knowledge through the soft component of this project, training by the JICA technical cooperation projects as well as guidance through on-the-job-training. Thus, they are improving their technical level sufficient to carry out daily operation and maintenance work.

Training record in the soft component of the project (capacity strengthening related to operation and maintenance of water treatment facilities and water distribution facilities, and production management) is shown in Table 7. According to Kampot Waterworks, in addition to

the project consultant and Kitakyushu City staff, PPWSA staff accompanied the project and participated as instructors. The training participants explained that “PPWSA staff explained effectively with their own experiences and the participants were able to deepen their understanding” and “participation of PPWSA staff made the training more contextualized in Cambodia,” indicating that technology transfer was effectively conducted.

[BOX 1: Developing Effective Support Based on a Long-Standing Relationship of Trust with JICA]

In this project, PPWSA staff have participated in the training of staff of Kampot Waterworks. PPWSA has enhanced its capacity by receiving technology transfers from Kitakyushu City related to water service operation and maintenance through past JICA projects and cooperation, and PPWSA staff members are now in a position to provide technology transfers to local waterworks as trainers. In other words, PPWSA is disseminating its own good practices to local public waterworks. PPWSA’s technical capabilities and know-how have been developed through past JICA projects, etc. The longstanding relationship of trust and cooperation between JICA and PPWSA has extended to support for local public waterworks. Through capacity development, Kampot Waterworks has solidified its appropriate management foundation of the water service operations, reduced non-revenue water rate, and ensured good operation and maintenance, thereby improving access to safe water. It is expected that further collaboration and cooperation beyond the framework of individual projects like this project will continue based on the longstanding relationship of trust and cooperation between JICA and the Cambodian side.

According to Kampot Waterworks, lecture contents and materials from the soft component are shared with all operation and maintenance staff, including newly hired staff. However, it was pointed out that the water distribution flow monitoring system introduced in this project is a Japanese system newly introduced to the Waterworks, and since the understanding of the Waterworks staff is still at a general level, it sometimes takes time to respond to system malfunctions, etc., and further capacity building is needed.

As mentioned earlier in “3.3.2.2 Other Positive and Negative Impacts” for the various SOPs¹⁴ developed under the project, the project has collaborated with “The Project on Capacity Building for Water Supply System in Cambodia (Phase 2),” which enabled the Waterworks to

¹⁴ SOPs related to water treatment and quantity control, facilities management, water quality inspection, distribution facilities management, distribution flow monitoring system, and production management were created under the project.

update its customer ledgers, asset ledgers, and financial statements based on the SOPs. SOPs are always available at the site of the Waterworks and are utilized as reference in their daily operations.

Table 7: Training Record

	Course		Number of Participants
Primary	Operation and Maintenance of Water Treatment Facilities		12
	Operation and Maintenance of Water Distribution Facilities		4
Secondary	Operation and Maintenance of Water Treatment Facilities	Water Treatment	13 (4)
		Water Quality	2
	Operation and Maintenance of Water Distribution Facilities		4
	Production Management		4

Source: Information provided by JICA and results from questionnaire survey of Kampot Waterworks

Note: The numbers in parentheses indicate the number of participants who also attended the production management course. Training was conducted in February 2018 (primary) and July–August 2018 (secondary).

From the above, technical staff in charge of operation and maintenance appear to have sufficient technical capacity to conduct usual operation and maintenance tasks, and there are no particular problems.

3.4.4 Financial Aspect

Operation and maintenance costs of the project are covered by the revenues of the Kampot Waterworks, but approval from MISTI must be obtained each year in order to be expended. Therefore, after estimating the amount required each year, Kampot Waterworks requests to MISTI through DISTI, the sub-national organization of MISTI in Kampot Province, for approval after scrutiny by MISTI. The amounts requested and approved by MISTI and actual expenditures for maintenance and management costs related to Kampot Waterworks' operating system and water distribution facilities are shown in Table 8.

Table 8: Maintenance Cost of Operating Systems and Water Distribution Facilities for Kampot Waterworks

(Unit: million Riel)

	2018	2019	2020	2021
Amount Requested to MISTI	288.3	388.4	452.3	730.6
Approved Amount	288.3	388.4	452.3	730.6
Actual Expenditure	351.8	420.2	659.8	759.0

Source: Results from questionnaire survey of Kampot Waterworks

Note 1: Personnel costs are not included in the operation and maintenance costs.

Note 2: Actual expenditures exceeded the approved amount due to emergency expenditures that were not anticipated at the time of planning.

Kampot Waterworks' water tariff revenues are shown in Table 9.

Table 9: Water Tariff Revenue of Kampot Waterworks

(Unit: million Riel)

2018	2019	2020	2021
3,204.4	4,995.7	6,172.6	6,286.8

Source: Results from questionnaire survey of Kampot Waterworks

According to Kampot Waterworks, water tariff collection rate is 98%. Water users can pay at the counter located in the same Waterworks building or make a transfer through mobile banking system.

Water tariff structure of Kampot Waterworks is shown in Table 10. Water tariffs are regulated by the MISTI Ministerial Decree. The tariff structure is designed to be accessible to the poor, taking into consideration customers with low water volume usage fees.

Table 10: Water Tariff Structure of Kampot Waterworks

(Unit: Riel/m³)

Amount Used (m ³)	0–3	4–7	8–15	16–50	51–
Tariff	1,100	1,200	1,300	1,400	1,500

Source: Results from questionnaire survey of Kampot Waterworks (MISTI Ministerial Decree 154/2020)

Financial data for Kampot Waterworks are shown in Table 11. Its water service operations have been running profits and it is financially sound.

Table 11: Financial Data for Kampot Waterworks

(Unit: million Riel)

	2018	2019	2020	2021
Income from Selling Water	3,204.4	4,995.7	6,172.6	6,286.8
Income from Water Connection	408.5	988.3	581.0	367.7
Other Income	113.7	114.1	133.5	126.7
Total Income	3,726.6	6,098.1	6,887.1	6,781.3
Salary and Other Allowances	642.5	1,405.5	1,091.3	1,155.6
Repair and Maintenance (Operating System)	75.3	106.7	157.0	166.4
Repair and Maintenance (Distributing System)	276.5	313.5	502.8	592.6
Repair and Maintenance Vehicles	35.8	38.2	36.0	56.2
Diesel for Business	27.4	46.1	56.0	65.0
Raw Material for Water Treatment	227.4	337.8	419.1	471.9
Electric Power	766.2	793.6	944.4	953.3
Diesel for Production	37.0	65.8	61.4	72.6
Printing	10.5	14.2	15.3	18.4
Administrational Expense	333.5	364.0	413.3	371.3
Training	6.4	6.9	3.2	0
Other Expenses	0	1.7	0.9	26.4
Total Operation Expense	2,438.5	3,493.9	3,700.4	3,949.7
Household Connection Equipment	351.4	850.6	499.9	334.8
Other Expense	7.7	7.9	17.5	6.6
Expense Other than Business Operation	8.0	8.0	8.0	8.0
Sub Total	2,805.6	4,360.4	4,255.9	4,299.1
Profit Before Depreciation	920.9	1,737.7	2,631.1	2,482.2
Depreciation, Interest	467.0	568.5	608.7	610.6
Grand Total Expense	3,272.6	4,928.9	4,864.6	4,909.7
Profit Before Tax	454.0	1,169.2	2,022.5	1,871.6
Tax on Profit	37.3	61.0	68.8	67.8
Net Profit	416.7	1,108.2	1,953.7	1,803.8

Source: Prepared based on the results from questionnaire survey of Kampot Waterworks

Note 1: Some figures do not match due to rounding.

From the above, there are no particular problems with financial aspect of operation and maintenance.

3.4.5 Environmental and Social Aspect

As a result of confirming with MISTI and Kampot Waterworks, there were no unexpected environmental and social considerations.

3.4.6 Preventative Measures to Risks

According to MISTI and Kampot Waterworks, as mentioned earlier in “3.1.1.2 Consistency with the Development Needs of Cambodia,” water demand is increasing rapidly due to rapid

development in the supply area, and water demand is expected to increase significantly in the future due to construction of a multipurpose port and development of distribution centers. For this reason, a contract with a local private company has been concluded to build a new water treatment facility with water supply capacity of 5,000 m³/day. It is expected to reach its maximum production capacity (18,800 m³/day) by 2025, and studies are underway to further increase production capacity.

3.4.7 Status of Operation and Maintenance

Facilities developed by the project are in normal operation, and both water pipes to the elevated water tank and distribution pipe network are fully functional and well utilized. Based on the maintenance and inspection guideline, Kampot Waterworks conducts daily patrols and inspections of facilities and equipment, implements periodic maintenance, and keeps records.

According to Kampot Waterworks, two of the flowmeters installed in this project are out of order. The flowmeter at the S1 location was damaged by a lightning and the flowmeter at the S6 location was disconnected. According to Kampot Waterworks, the flowmeter at the S1 location will be replaced by the on-going ADB's Urban Water Supply Project. The flowmeter at the S6 location is under consideration for a measure to deal with the situation, depending on the budget. Kampot Waterworks pointed out that since the other flowmeters are functioning properly, it is possible to calculate water volume to the block of failed flowmeters and no real problems have occurred.

Spare parts are stored at Kampot Waterworks' warehouse and inventory lists are being updated. There are no particular problems with procurement of spare parts, and there are sufficient stocks of important spare parts.

From the above, there are small problems in the operation and maintenance status at the time of the ex-post evaluation, but as a whole, there is no problem because facilities are properly operated and maintained.

Slight issues have been observed in the current status of operation and maintenance, however, there are good prospects for improvement/resolution. Therefore, sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project expanded and improved water supply facilities in Kampot City to improve access to safe water and stable water supply services for the local residents. This project, which aims to improve water supply capacity, is consistent with Cambodia's development policy, development

needs, and project plan and approach were appropriate. The project is also consistent with Japan's development cooperation policy, and collaboration with other projects within JICA and organizations outside of JICA has taken place as well and concrete results have been generated. Therefore, relevance and coherence of the project are high. In terms of project implementation, both project cost and project period were within the plan and thus efficiency of the project is very high. As for project effects, quantitative indicators set at the time of planning have all far exceeded the target values. Regarding impacts, interviews with local residents in the surrounding area indicate that improved access to safe water and stable water supply services have improved the living environment of the residents. In addition, the project has contributed to the promotion of water supply connections for poor households, and with the expansion of water supply area, it is expected to have further positive impacts on the society as well. Therefore, the project has generated more effects than planned, and effectiveness and impacts of the project are very high. No negative impacts on natural environment and land acquisition have been reported. Resettlement did not take place. Regarding operation and maintenance, slight issues have been observed in the current status, however, there are good prospects for improvement/resolution. Therefore, sustainability of the project effects is 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

Two of the flowmeters installed by the project are out of order. One of these is scheduled to be replaced under ADB's on-going Urban Water Supply Project, while the other is being discussed at Kampot Waterworks, depending on how the budget fits into the project. Therefore, it is important for Kampot Waterworks to promptly coordinate with MISTI to secure budget and replace the flowmeter as soon as possible.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

Consideration and Efforts to Ensure Access to Safe and Affordable Water for the Poor

In the project formulation and implementation, consideration is given to ensure that the holders of the "ID Poor card" issued by the Ministry of Planning (the poor) can connect to the water pipes free of charge and water tariff is set at a level that the poor can afford. In addition, Kampot Waterworks has been conducting promotional and awareness-raising activities to encourage local residents, including poor households, to connect to water pipes. Combination of these

considerations and efforts has resulted in access to safe and affordable water for the poor, and Kampot Waterworks' services are highly supported by the poor. In order to promote water service connection for the poor in urban water supply projects, it would be effective to include equipment and materials for water service connections for poor households in the project scope so that connection fee for the poor can be reduced or exempted, as in this project. It is also considered effective for water utilities to include poverty considerations in their water tariff structure and to conduct promotional and awareness-raising activities.

Expansion of Development Effects Through Synergies with Other Donor Support and JICA Technical Cooperation, etc.

Through collaboration with the ADB project, French NGO support, and JICA technical cooperation projects, this project has generated concrete synergistic effects, such as reduction of maintenance costs, increase in served population, enhanced water leak detection, and reduction of non-revenue water rates. All of these have led to the realization of sound management of Kampot Waterworks. Regarding collaboration with other donors, at the project formulation stage (during the preparatory survey), contents of other donors' support and their target support areas were specifically confirmed. The fact that the project plan was prepared in such a way as to avoid overlap with these projects and to create synergies was a factor in increasing effectiveness of collaboration. In addition, participation of Kitakyushu City Water and Sewer Bureau, which has more than 20-year history of cooperation with Cambodia in both this project and technical cooperation projects and is familiar with the local situation, enabled JICA to strengthen consistent program management. The project has been implemented in the following sequence: "The Project on Capacity Building for Water Supply System in Cambodia (Phase 2)" (2007–2011) and "The Project on Capacity Building for Urban Water Supply System in Cambodia (Phase 3)" (2012–2017) and this project (September 2015–August 2018), with Kitakyushu City Water and Sewer Bureau participating in all projects on the technology transfer side. Furthermore, some of the technical staff received training in all or several of these technical cooperation projects and this project (soft component), and follow-up and aftercare was provided across projects, which increased collaboration among JICA projects. In addition, the project has also contributed to utilization of private sector in water service operations, as water supply capacity was increased in cooperation with a private company to meet further increases in water demand after project completion. This suggests that a program approach utilizing various actors is effective as a strategic support approach in the water supply sector.

[BOX 2: Cambodia's Continuous Efforts in the Water Supply Sector]

One of the major success factors of this project is the collaboration with other donors and JICA technical cooperation projects. In addition, Cambodia's own efforts to strengthen the base of local public waterworks are considered to have been largely contributed to the success. Looking back at efforts in water supply sector in Cambodia, H.E. Ek Sonn Chan, former PPWSA Director General, who restructured water service operations in Phnom Penh Capital City through the reform of PPWSA, strengthened local public waterworks including Kampot Waterworks when he was a Secretary of State of MIH (2013–2018), the predecessor of MISTI, and the mechanism established through these efforts is considered to have been carried forward today. At that time, H.E. Ek Sonn Chan, together with MIH, PPWSA staff members and JICA experts for the Project on Capacity Building for Urban Water Supply System in Cambodia (Phase 3) visited local public waterworks as part of a “Provincial Tour” (2014–2016) to diagnose the management situation, operation and maintenance status, and direct and supervise immediate actions. The local public waterworks have also noted increased momentum and further commitment to improve their management. In 2016, MIH's Department of Potable Water Supply was upgraded to the General Department of Potable Water. Furthermore, Department of Technics and Project Management, which comprehensively oversees all water service operations (technical aspect) and project implementation including this project, was newly established, and successive staff assigned to this department have worked enthusiastically to achieve good results. In addition, during project implementation, MIH's Department of Potable Water Supply / General Department of Potable Water visited the project site every month to check the progress of the project and to further strengthen commitment of contractor, consultant, and Kampot Waterworks. The “Provincial Tour” resumed in 2022, and MISTI, which oversees the provincial public waterworks, keeps track of quantitative and qualitative performance of each public waterworks and provides guidance and advice, etc. in a timely manner. Such a system has led to competition among public waterworks in order to improve performance, and is considered to be a factor in achieving high results in this project as well.

End