Ex-Ante Evaluation Report

1. Basic Information

(1) Country: United Republic of Tanzania (Tanzania)

(2) Project Site / Target Area: Urban West Region, Unguja Zanzibar

(3) Name of the Project

（ODA Loan）

Zanzibar Urban Water Distribution Facilities Improvement Project

（Technical Cooperation）

The Project for the Management of Groundwater Resources in Zanzibar

Loan Agreement: February 4th,2022

2. Background and Necessity of the Project

(1) Current State and Issues of Urban Water Supply Sector Development in Tanzania, and Positioning of the Project

Tanzania is a United Republic formed by Tanzania (mainland) and Zanzibar (archipelago). Zanzibar has its own judicial system, legislation, and administrative autonomy and has its own President, separate from the Government of Tanzania. The government organization in Zanzibar, the Revolutionary Government of Zanzibar (RGoZ) has established its own long-term development plan “Zanzibar Vision 2050 (2020)”, a five-year development plan “Zanzibar Development Strategy (ZADES, 2020–2025)”, and a budget plan.

Zanzibar's largest island, the Unguja islands’ public water system began its operation in the 1920s during British rule. The RGoZ took over the operation in 1963 when Zanzibar gained independence. In 1982, RGoZ started providing water service free of charge as part of social protection policy. This lead to financial difficulties of RGoZ which made them unable to expand and renew its water supply facilities. With frequent leakage due to aging pipes, the quality of service has dropped significantly, for example with reduced supply hours and low water pressure. Under the Water Act established in 2006, the management of the public water system was transferred from the RGoZ to the Zanzibar Water Authority (ZAWA), and water service once again became a paid service in 2007 under ministerial order (Water Regulations, 2007) of the Ministry of Water, Energy and Mining (MoWEM), the supervisory authority for ZAWA.

The Urban West Region, which has the largest population in Unguja, has a high annual population growth rate of 4.3% (2012 population census), and the

population of the region is predicted to reach 1,311,000 in 2037 (preparatory survey by JICA). As the population grows, water demand is expected to further increase, but Zanzibar relies on groundwater for its water supply, so it has no accurate data on the amount of available water resources and does not know its potential yeild. Risks such as saltwater intrusion make it difficult to immediately launch new water source development projects. It is therefore necessary to start by renewing the water distribution network with 60% of water loss and by increasing the revenue water ratio to alleviate the pressure on water resources and enable ZAWA to manage water facilities properly.

Further, JICA conducted "Data Collection Survey on Enhancement of Water Administration and Water Utility Management System in Zanzibar in the United Republic of Tanzania " (hereinafter referred to as "Data Collection Survey") in 2022, and it revealed that (i) many leakages were happening in the old distribution pipes that is located downstream of the area that is covered by ODA Loan project, (ii) uneven water pressure and the limited water supply hours caused the low customer satisfaction, (iii) they largely depend on the government subsidies for operation and maintainance cost, and (iv) there are symptons of saltwater intrusion due to increased water demand.

In order to address these issues, based on the results of the cost-benefit analysis conducted in the preparatory study, Japan decided to implement the ODA Loan project " Zanzibar Urban Water Distribution Facilities Improvement " (hereinafter referred to as "the ODA Loan Project") for the Werezo water distribution system in Urban West Province, where high investment efficiency was confirmed and the water supply hours is below 6 hours. The African Development Bank (hereinafter referred to as "AfDB") carried out "Zanzibar Urban Water and Sanitation Project" (hereinafter referred to as "ZUWSP") in a parallel co-financing scheme, which is for replacing the existing distribution facilities in the Saateni water distribution system, which is next to the Welezo water distribution system. By minimizing the water loss through these projects, the existing demand can be met, and the future demand is expected to be met by the development of new water sources.

In order to maximize the effects of the ODA Loan Project, immediate action is required to address the issues identified in the Data Collection Survey. However, ZAWA's capacity for non-revenue water management and groundwater resource management is not sufficient, and further the overall level of its capacity as a water utility needs to be raised. Therefore, JICA decided to implement the " The

Project for the Management of Groundwater Resources in Zanzibar " (hereinafter referred to as " the Technical Cooperation Project") in conjunction with the ODA Loan Project to prevent saltwater intrusion and sustain the impacts of the ODA Loan Project by strengthening ZAWA's capacity for groundwater resources management and operation and maintenance of facilities.

(2) Japan and JICA's Cooperation Policy for the Urban Water Supply Sector, and Positioning of the Project

Japan's Country Development Cooperation Policy for the United Republic of Tanzania (September 2017) proposes the improvement of basic public services, including water service, under the priority area of "Improvement of governance and public service delivery." The JICA Country Analysis Paper for the United Republic of Tanzania (March 2018) proposes special considerations for Zanzibar and proposes supporting the urban water supply sector through the use of past cooperation achievements. The ODA Loan Project and the Technical Cooperation Project (hereinafter referred to as " the Project") are consistent with these policies.

As JICA promotes "Practical Integrated Water Resources Management to Resolve Water-related Issues in the Field" and "Supporting the growth of water utilities – Urban water supply –" as the thematic issue in water sector of Global Agenda, the project aims to support for enhancing basic water supply services. Through the improvement of their services in the target area, the project also contribute to SDGs 6 (ensure availability and sustainable management of water and sanitation for all).

The Kumamoto Water Initiative, announced by Prime Minister Kishida at the 4th Asia-Pacific Water Summit in April 2022, calls for the Japanese government to provide approximately 500 billion yen over five years to accelerate water-related initiatives in the Asia-Pacific region and the rest of the world toward achieving the SDGs by 2030 and carbon neutrality by 2050. The Project will contribute to the initiative.

(3) Other Donors' Activities

1) African Development Bank (AfDB)

The AfDB's Country Strategy Paper for Tanzania (2021–2025) lists the development of sustainable infrastructure for a competitive economy as its priority area, and the AfDB's strategy is to cooperate with the water sector in Tanzania to develop and improve water and sanitation facilities. Specifically, the AfDB aided in the development of boreholes, reservoirs, and water distribution

facilities in the Saateni and Mnarawambao water distribution system in the area neighboring the target area in this Project through ZUWSP, which is co-financed in parallel with the current Project (L/A signed in 2013, 21 million dollars). Construction for the project was completed in 2020.

2) Government of India (EXEM-IB)

The Indian government agreed in 2016 to provide the Zanzibar water sector with a maximum 92 million dollar loan. It began conducting a preparatory survey in March 2018 and began operations in 2021. In this project, water supply facilities will be repaired and upgraded, and the planned region is primarily regions outside the target region for the Urban West Region ZUWSP and this Project. Completion of the project will be December, 2022 in two units, the others will be May, 2023. In this project, EXEM-IB will provided a soft component (technical assistance) to operators for one year after completion of the project.

3) Government of Germany (KfW)

The German government, through the German Reconstruction Finance Corporation (KfW), as part of its support to the Zanzibar Water Investment Program, will conduct a feasibility study (F/S) for groundwater use through a hydrogeological survey on Pemba and Unguja islands over a six-month period beginning in December 2022. The focus of the study is to grasp the status of water resources management through water demand estimation, and the total budget for the study is expected to be EUR 600,000 (approximately JPY 82 million).

3. Project Description

(1) Project Description

① Project Objective

The objective of the Project is to provide safe and stable water supply services in the Project area, Urban West Region in Unguja Island (Welezo West Zone, Welezo High Zone and Migombani West Zone), Zanzibar, through development and renewal of water supply facilities, thereby improving the living environment of the area. In addition this project improves ZAWA's ability for groundwater resources management and its ability to operate and manage for facilities that form basis for non revenue water management, thereby to provide sustainability of preventing saltwater intrusion to groundwater and impact of the ODA Loan Project.

② Project Component(s)

1) ODA Loan Project

① Renewal of existing water source well, construction of reservoir, installation of transmission pipes, and installation/renewal of water distribution/service connection pipes (International Competitive Bidding)

② Installation of remote monitoring/control equipment (International Competitive Bidding)

③Procurement for vehicles, water meter device and water quality test device (Local Bidding)

④ Consulting Services (Detailed Design, Assistance for bidding, construction supervision, capacity building for operation and maintenance regarding water distribution facilities) (short list)

2) Technical Cooperation Project

① Input

1) Japanese side

a. Dispatch of Experts (Total 74.5MM) :Chief Adviser/ Water resource management planning, Hydrogeologist/ Saltwater Intrusion, Groundwater monitoring/ GIS Database, Topography and geology/ Remote sensing, Water balance analysis, Geophysical prospecting/ Observation well supervisor, Water use, NRW, Customer Management, Water Facility Operation and Maintenance

b . Training in Japan/ Third country (groundwater resource management)

c. Provision of equipment: vehicles, electrical conductivity meters, water level meters (permanent and portable), flow meters, desktop computer, software necessary for groundwater management, etc.

2) Tanzania side

a. Counterpart assignment, their allowance and travel expenses in Urban west region

b. Suitable office space with necessary equipment and emergency power supply for JICA Experts

② Project purpose

ZAWA's capacity of the groundwater management and water system O&M is enhanced

③ Outputs

Output 1: Capacity to evaluate the amount of permissible yield is equipped.

Output 2: Groundwater Management Plan is implemented.

Output 3: Volume of water production, distribution, and billed are

measured.

Output 4: Capacity of operation and maintenance for boreholes and water reservoir is enhanced

④ Main activities

【Output 1】

The groundwater basins where the water source wells of the Wereso water distribution system which distibute to the Urban West Province where the target area of the Technical Cooperation Project, will be identified through watershed classification and water balance analysis throughout Unguja Island, and observation wells will be installed to measure electrical conductivity and estimate the distribution of salt water boundaries (fresh water lensing). Implement contunious monitoring of the distribution of the saltwater boundary and evaluate the amount of permissible yield .

【Output 2】

To grasp the groundwater usage in the target basin, survey actual amount including other sectors such as irrigation. The amount of permissible yield evaluated through Output 1 will be compared to the groundwater usage in the target basin and develop groundwater management plan to prevent saltwater intrution by controling pumping amount.

Develop Groundwater Management Plan to control pumping to prevent saltwater intrusion of groundwater resources. If the risk of intrusion increases after the Groundwater Management Plan is implemented, water abstraction will be inhibited for wells under ZAWA's administration and public awareness will be conducted for saving water to control abstraction amout. Assist ZAWA to revise Groundwater Management Plan to meet constantly fluctuating water usage conditions.

【Output 3】

Measure the amount of water abstraction, distributed, and billed at the pilot DMA (District Metered Areas) acculately to calculate the amount of non-revenue water. A future personnel deployment plan will be prepared to ensure that the necessary personnel to read meters to be installed upon completion of the facilities by the ODA Loan Project. The amount of water abstraction measured through this activity will be reflected in the understanding of groundwater usage and Groundwater Management Plan in Output 2.

【Output 4】

Strengthen facility operation and maintenance management capacity to ensure that facilities which are existing wells, reservoirs and facilities to be constructed through the ODA Loan Project will be operated properly. Through the activities, a future personnel deployment plan will be prepared to operate the facilities to be constructed by the ODA Loan Project. Activities also include the preparation of standard operating procedures (SOP) for the operation, inspection, and repair of wells and water distribution facilities, and the implementation of on-the-job training using these SOP.

⑤ Beneficiaries (target group)

・Direct beneficiaries: Zanzibar Water Authority (ZAWA) about 500 staffs (including about 280 staff in Unguja Island)

・Final beneficiaries: Residents of the project area (estimated 600,000 people)

(2) Estimated Project Cost

14,379 million (Loan Amount: 10,864 million)

(3) Schedule

【ODA Loan Project】: February 2022 (signed L/A) to December 2028 (83 months in total). Project completion is defined as when the facility operation is commenced (December 2027).

【Technical Cooperation Project】:May 2023 to April 2028 (60 months in total).

(4) Project Implementation Structure

1) Borrower: The Government of the United Republic of Tanzania

2) Guarantor: none

3) Executing Agency: Zanzibar Water Authority (ZAWA)

4) Operation and Maintenance System: Zanzibar Water Authority (ZAWA)

(5) Coordination and Division of Roles with Other Projects and Aid Organizations

1) Japan's Assistance Activities

Japan's cooperation in the water sector includes "the Grant Aid Project for Zanzibar Urban Water Supply Development", "Technical Cooperation Project for Enhancement of Water Supply Management of Zanzibar Water Supply Authority (Phase 1 and 2)", " Water Advisor for Zanzibar". The ODA Loan Project will improve the water distribution facilities, rehabilitate existing wells,

and install and replace the water distribution pipes to improve the revenue ratio and reduce the leakage ratio. By implementing the Technical Cooperation Project, the operation and maintenance management capacity of the facilities will be strengthened, and the stable and efficient operation of the facilities constructed by the ODA Loan Project will promote safe and stable water supply services, thereby contributing to the improvement of the living environment of the residents in the target area. The implementing agency for both the ODA Loan Project and the Technical Cooperation Project is ZAWA, which is also the counterpart of the previous technical cooperation projects.

2) Aid Activities by Other Aid Organizations, etc.

In the Urban West Province targeted by this project, the AfDB project to repair water supply facilities has already been completed in 2020, and the construction and upgrading of water supply facilities (RIWSSZ) by the Indian government (EXIM-BI) is currently ongoing and its completion scheduled in March 2023. In the Technical Cooperation Project, the activities of Output 3 will be implemented at the site of the RIWSSZ. Regarding water resources management, KfW has plans to conduct a study on the status of water resources management and the feasibility of investment and development in water resources management through estimation of water withdrawal and water demand for Unguja and Pemba islands starting this December (2022), but there is no overlap in the target areas and sectors. However, it is desirable to monitor the progress of each project and share information as appropriate after start the Technical Cooperation Project.

(6) Environmental Considerations

① Category: 【ODA Loan Project】:B【Technical Coopretion Project】:C

② Reason for categorization:

【ODA Loan Project】The project is not located in a sensitive area, nor has sensitive characteristics, nor fall into sensitive sector under the JICA guidelines for environmental and social considerations (April 2010), and its potential adverse impact on the environment are not likely to be significant.

【Technical Coopeartion Project】The project is likely to have minimal adverse impacts on the environment under the JICA Guidelines for Environmental and Social Considerations (April 2010).

③ Environmental permit:

【ODA Loan Project】The Environmental Impact Assessment (EIA) report

on the Project was approved by the Zanzibar Environment Management Authority in April 2017.

④ Anti-pollution measures:

【ODA Loan Project】Noise, vibration, and air pollution are expected during the construction work, but they will be reduced through the use of low-noise, low-vibration machines, maintenance of the machines, and water spraying during the construction. There may be an impact from domestic waste in the operational phase. Disposal will be carried out according to the country's relevant laws and regulations.

⑤ Natural environment:

【ODA Loan Project】The Project is not situated in or near sensitive areas such as national parks or nature preserves, and it is assumed that there is no significant adverse impact on the natural environment.

⑥ Social environment:

【ODA Loan Project】The Project will take place on public land, including land along existing roads. Therefore, no involuntary resettlements or land acquisition will be required.

⑦ Other/monitoring: The noise, vibration, and air quality during the construction work and the environmental and social impact during the operational phase will be monitored primarily by ZAWA based on an environmental monitoring plan.

(7) Cross-cutting Issues

The Project will reduce the nagative effects of climate change on water supply by improving the efficiency of the water supply system, and through the activities in Output1, identify the saltwater boundary and monitor its water level to assess signs of saltwater intrusion due to sea level rise and issue alerts accordingly. There are no issues regarding measures to fight poverty, poverty considerations, or measures for infectious diseases, including HIV/AIDS.

(8) Gender Category

【ODA Loan Project】GI (Gender mainstreaming needs survey/analysis project)

<Activities/Reason for categorization>

In the preparatory survey for cooperation, a survey was conducted on the need for gender mainstreaming, but it did not lead to specific efforts that would contribute to gender equality and women's empowerment.

【Technical Coopretion Project】GI(S) (Gender Informed (Significant))

<Activities/Reason for categorization>

Based on the information collected and analyzed through the preparatory survey, in the activities of Output 1 and 2, the activity plan indicates that gender balance will be taken into consideration when selecting the members of the working groups to be formed after commencement of the Project.

(9) Other Important Issues

None

4. Target Outcomes

(1) Quantitative Effects

1) Outcomes (Operation and Effect Indicators)

Indicators	Baseline (Recorded in 2017)	Target (2030) [2 years after project completion]
Revenue water ratio (*1)	No data	80%
Water meter installation ratio (*2)	No data	100%
Disinfection implementation ratio (*3)	No data	100%
Connection ratio	64.0%	87.0%

*1 The ratio of billed water to the water distributed to district metered areas. There is no existing baseline data because the district metered areas will be set in this Project. The non-revenue water ratio for the target area for this Project is estimated to be about 60% and the current revenue water ratio is estimated to be 40%.

*2 The ratio of water meters installed to the number of taps. There is no existing baseline data because ZAWA did not survey taps in the target area for this Project. Based on ZAWA's customer management system, the water meter installation ratio for all of the Urban West Region (number of meters / number registered) is 12%.

*3 There is no existing baseline data because this is the disinfection implementation ratio for distribution reservoirs that will be developed in this Project (the Welezo reservoir and the Migombani reservoir).

(2) Qualitative Effects (Technical Cooperation Project)

The following indicators were set for Improvement of the living environment for residents in the region through safe and stable water service (improved

access to clean water)

Objectivily Verifiable Indicators	Means of Verification
1. Advice and recommendation to the potential developers is provided by ZAWA based on the evaluation result of saltwater intrusion risk level	Records of groundwater development Record of discussion with developers concerned
2. Operation and maintenance of water facilities constructed by the ODA Loan Project is conducted based on the developed SOP on a continuous manner.	Inspection and repair history

(3) Internal Rate of Return (ODA Loan Project)

Based on the following prerequisites, the economic internal rate of return (EIRR) of the Project is 12.6% and the financial internal rate of return (FIRR) is -10.3%. The FIRR is negative because of ZAWA's low water charge revenue compared to the Project cost.

[EIRR]

Costs: Project cost and operation and maintenance costs (including cost of facility renewal) (all exclude tax)

Benefits: Reduced cost of current water supply and additional water use

Project life: 30 years

[FIRR]

Costs: Project cost and operation and maintenance costs (including cost of facility renewal)

Benefits: Additional fee revenue

Project life: 30 years

5. Prerequisites and External Conditions

(1) Prerequisites

ODA Loan Project	Receiving appropriate assistance from the Ministry of Finance and Planning of Zanzibar until ZAWA's financial condition has improved
Technical Cooperation Project	1. Budget and human resource are provided continuously to maintain the service delivery 2. Designated ZAWA’s mandate as water supply and water resource management is maintained (not being privatized) 3. JICA’s ODA Loan Project is not cancelled

(2) External Conditions

【ODA Loan Project】None

【Technical Coopertion Project】

1) External conditions for linking Activities to Outputs

- Budget and human resource including meter readers and operators for the Project activities are secured (Budget includes daily allowances for the Project counterparts)
- Mul-functioning bulk meters and customer meters are repaired or replaced promptly by ZAWA
- Required information and data are provided at a prompt manner upon request
- DMA chosen from ZUWSP is hydraulically/ independently divided
- RIWSSZ project is completed without significant delay

2) External conditions to achieve project purpose based on Outputs

- Budget and human resource including meter readers and operators for the Project activities are secured
- Mul-functioning bulk meters and customer meters are repaired or replaced promptly by ZAWA
- Spare parts, supplies and goods are procured/ are sufficiently stocked by ZAWA as necessary

3) External conditions for further development of impacts

- Designated ZAWA's mandate as water supply and water resource management is maintained.

6. Lessons Learned from Past Projects and Application to the Project

【ODA Loan Project】

In the ex-post evaluation of the yen-loan assistance for the Islamic Republic of Pakistan under the Karachi Water Supply Improvement Project (2008), there were fiscal sustainability issues due to water tariffs not being revised and a low water tariff collection rate. From the time the project was formed, in addition to carefully checking the allocation of government subsidies and future prospects such as the prospects for raising water tariffs, it was important to consider getting the government of Pakistan to commit to improving the organizations and systems that are connected to the improvement of services as necessary, in order to ensure long-term sustainability.

In the ex-post evaluation of the Grant Aid Project for Zanzibar Urban Water Supply Development (Phase 1 and 2) (2013) that targeted the same water supply area as this Project, it was reported that the impact of the project was limited due to leakage from parts of the aging water distribution network that were outside the project's target area, preventing the achievement of 24-hour water supply. It was therefore suggested that it would be preferable to plan a project that would thoroughly address the entire water supply network.

In the Project, it was agreed during the fact-finding mission that the Ministry of

Finance and Planning of Zanzibar would assist in operation and maintenance costs for the facilities as a measure to be taken until improvement is seen in ZAWA's financial condition. JICA has confirmed with ZAWA the schedule for its financial improvement, including transitioning to a metered-rate water tariff system, conducting a survey of taps, implementing a mobile payment system, and formulating and implementing plans to employ and train ZAWA personnel. In addition, based on the experiences of the Grant Aid project, the plan for the Project takes the entire water supply network into consideration, from the water source (boreholes) to the supply pipes via the reservoirs and distribution pipes, so that the renewal of the entire water distribution network, which is an issue in the above project, is reflected in the project plan.

【Technical Coopertion Project】

The terminal evaluation of the "Project for Enhancement of Water Supply Management of Zanzibar Water Authority Phase 2" (2011-15) has derived the lesson that appropriate communication with the counterparts should be sought. In addition, based on the experience of changing the PDM twice during the project period, the PDM should be developed based on an elaborate analysis of the core problem at the time of project design and the project activities envisioned the outputs that directly contribute to solving that problem. Based on these lessons, we planned activities to include orientation and study sessions at the beginning of the activity and on-the-job training during the activity period, so that experts and counterparts would have opportunities for mutual communication. In developing the project plan, organized the challenges ZAWA faces, conducted a problem analysis of the factors hindering sustainable and safe water supply, and identified the core issues. Moreover, the draft PDM was prepared, taking into account the information obtained through site visits and consultations, manpower and financial situation on the ZAWA side.

In the terminal evaluation of the "Project for Capacity Enhancement of Groundwater and Seawater Intrusion Management in the Republic of Cuba" (2013-17), the report recommends focus on continuity and utilization of methodologies and human resources of counterpart from prior projects are effective, because the use of those technology and human resources developed in prior projects led to effective technology transfer and enhanced the capacity development of the counterpart agencies as an organization. The report also mentions that it is necessary to keep up to date with the changes in organizational systems, and to consider appropriate implementation systems

and involve relevant organizations for the project.

Based on these lessons, both sides agreed on the minutes that key staff with experience of prior projects should be assigned as project managers and person in charge of personnel deployment plan development. Furthermore, in the Zanzibar water sector as a whole, the National Water Policy is scheduled to be revised in the future, and depending on the content of the revision, there is a possibility of major changes in the water administration, including MoWEM and ZAWA. A representative of MoWEM will be assigned as one of the members of the Joint Coordinating Committee (JCC) to monitor policy revisions and trends in higher level institutions.

7. Evaluation Results

The Project conforms to the development issues and policies of Tanzania as well as the cooperation policies of Japan and JICA and contributes to the improvement of waterworks services through the development and renewal of water distribution facilities and the water distribution network in the target area. The Project is also considered to contribute to SDGs 6 (ensure availability and sustainable management of water and sanitation for all), so the need to support the implementation of the Project is high.

8. Plan for Future Evaluation

(1) Indicators to be used

Same as 4. (1)-(3)

(2) Timing of the Next Evaluation

Terminal evaluation: 6 months before project completion(Technical Cooperation Project)

Ex-post evaluation: 2 years after project completion (The ODA Loan Project and the Technical Cooperation Project are integration and subjected for evaluatation)

-End-