Terminal Evaluation Report Summary

I. Outline of the Project		
Country: Ethiopia		Project title: The Project for Strengthening Addis Ababa Water and Sewerage Authority's Management Capacity of Non-Revenue Water Reduction
Issue/Sector: Water Resources		Cooperation scheme: Technical Cooperation
Division in charge: Water Resources Group Global Environment Department		Total cost：636Million Yen
Period of Cooperation	(R/D):4 years from the first expert's arrival (August 2021 to August 2025)	Partner Country's Implementing Organization ：Addis Ababa Water and Sewerage Authority
		Implementing Organization in Japan: Kitakyushu City Water and Sewer Bureau

1. Background of the Project

1-1 Background

The Ethiopian government formulated the Ten Years Development Plan 1 (2021-2030) in 2021. The government is implementing water resource development and water supply projects to achieve water supply of 25L/person/day in rural areas and 100 L/person/day in urban areas. The achievement rates in 2021 for rural and urban areas were approximately 55% and 59% respectively. Further the developments and improvements of water supply were required to achieve these goals.

Particularly in urban areas, water supply infrastructure has not been kept up to the pace of rapid population growth. The population of Addis Ababa is estimated 5.2 million in 2022 with increasing at an annual rate of approximately 4.4%. It is estimated to reach approximately 7.3 million in 2030.

The demand for water is rapidly increasing as the population increases. The Addis Ababa Water and Sewerage Authority (AAWSA), responsible for the water supply services in Addis Ababa, has established a "Business Plan 2011-2020" in 2011. In its plan, the water supply amount for 2020 was set at 763,000m^3/day in order to respond to the rapidly increasing water demand. To meet this demand, the city began developing new water sources and constructing water treatment plants and set a goal of reducing the citywide Non-Revenue Water (NRW) rate to 20% to make the maximum use of existing water sources. While the water demand in 2022 is estimated to be approaching 900,000 m^3/day exceeding its predictions due to rapid population growth, large-scale water source development projects were still at the planning stage, and the water distribution volume in 2022 was approximately 511,000 m^3/day that AAWSA was not able to fully respond to the demand. Additionally, the NRW ratio remains high at approximately 40%, estimated that 70% of NRW is due to physical losses.

Water Resources Management Policy, the highest national policy in the Ethiopian water sector, stipulates the full cost recovery for water services should be achieved through water charges. Although AAWSA's management goal by 2020 was to gradually achieve full cost recovery and generate 25% of the financial resources needed for the construction and maintenance of water facilities from the profits, it has been relied on the subsidies from Addis Ababa City: for approximately 80% of its capital expenditures over the past 11 years is supported by the subsidies. The water tariff collection rate at the time of the detailed planning study was approximately 92%. However, the water tariffs were kept at a low level of approximately 6 yen/m^3 to 85 yen/m^3 (progressive tariff). For AAWSA, it is necessary to increase water tariffs in order to achieve full cost recovery. Due to the low level of water services, such as intermittent water supply and insufficient water pressure, planned water tariff increases have not been materialized, and AAWSA's budget continues to rely on city's financial supports.

Against this backdrop, "The Project for Strengthening Addis Ababa Water and Sewerage Authority's Management Capacity of Non-Revenue Water Reduction" (the Project) has been implemented. The Project aims at strengthening AAWSA's ability to implement and manage NRW countermeasures in order to effectively utilize existing water resources: responding to high water demands and contribute to improving water services.

The Project plans to implement NRW reduction activities that are cost-effective and based on the NRW

reduction plan formulated in the Project. By doing this, the efficiency of management of AAWSA's water supply business is expected to improve. As the revenue base is strengthened by increasing water users' willingness to pay through improved water supply services, thereby sound water supply business management can be achieved. Furthermore, the Project is consistent with AAWSA's business goal to reduce the NRW ratio to 20% and is also consistent with Ethiopia's national policy, which stipulates that water utilities to be operated under the principle of full cost recovery.

The Project begun its activities in 2021 for the duration of 4 years and Japanese experts have been dispatched.

1-2. Project Overview

(1) Overall Goal: AAWSA's water supply business is efficiently conducted by the cost-benefits management of NRW reduction.

(2) Project Purpose: AAWSA's operation and management capacity of NRW reduction is strengthened.

(3) Project Interim Purpose: Knowledge and techniques accumulated in the pilot branch office are ready to be transferred to another branch office.

(4) Outputs:

1.NRW monitoring system is established at selected pilot branch office.

2.Capacity to implement and manage NRW reduction measures is strengthened in the pilot branch office.

3.Capacity for cost-benefits analysis of NRW reduction measures by the pilot branch office is strengthened.

4.Technical skills and business management capacity on NRW control is improved at AAWSA Head Office and branch offices.

5. Knowledge and techniques accumulated in the pilot branch office are transferred to another branch office.

(5) Inputs (As of Feb. 2025)

Japanese side：

- Expert: 12 experts have been dispatched.
- Training in Japan:22 counterparts were trained in Japan
- Equipment

Ethiopian side：

- Counterpart:100 counterparts participated in the Project activities
- Project Cost: Budget for household surveys and replacement of meters and pipes

2. Evaluation Team

Evaluation Team	Ethiopia: Meseret Assefa	Head of Office of General Manager and Legal Advisor Addis Ababa Water and Sewage Authority
	Japan: Yoshiaki Yokota	Water Resources Group, Global Environment Department, JICA
	Eri Noda	Water Resource Team 2, Water Resources Group, Global Environment Department, JICA
	Hiroko Sugimoto	Japan Development Service Co., Ltd.
Period of Evaluation	26/02～18/03/2025	Type of Evaluation: Terminal Evaluation

3. Results of Evaluation

3-1 Project Achievements

1) Likelihood of Achieving the Project Purpose

At the time of evaluation, the Project purpose has not been achieved. The performance indicators are expected to be discussed and approved with the counterpart by the end of the Project. The Project OVI (Objectively Verifiable Indicators) is expected to be achieved by the end of the Project.

2) Level of Achievement of Project Outputs

Output 1: The NRW monitoring system in the pilot branch office had not been established, and it is unlikely that the system will be established by the end of the Project. Therefore, Output 1 is less likely to be achieved by the end of the Project.

Output 2: Achievement targets of Output OVIs are not clear. Based on the achievements of activities, the evaluation team decided that two of the three OVIs have been achieved, and one OVI is not achieved and can't be determined if it will be achieved by the end of the Project.

Output 3: Achievement targets of Output OVIs are not clear. The team assessed the results of activities related with each OVI. Two OVIs are considered as achieved.

Output 4: Achievement targets of Output OVIs are not clear. The evaluation team assessed that the activities related with OVIs and decided that both (two) OVIs have been achieved.

Output5: Output 5 has not been achieved. The activities for Output 2 will be replicated in three twinning blocks (K-5, K-7, and K-11) in Output 5. In line with the current situation of the Project, the target of twinning has been changed from twinning branch to twinning blocks K-5, K-7, and K-11.

3-2 Results of Evaluation

(1) Relevance

Relevance is very high. Ethiopia's Ten Years Development Plan for 2021-2030 sets the target for reduction of water loss as 20% by 2030. The reduction of water losses is crucial to meet water demand of Addis Ababa as the water supply does not meet the water demand. AWWAS needs to reduce water losses as the available water is limited. The Project contributes to strengthening the capacity of AAWSA staff for NRW reduction, so it is relevant with national and AAWSA's strategy and responding to the needs of AAWSA. Although Kirkos Branch was selected as the pilot branch for the Project, it has not yet been established. Therefore, activities were carried out in the area designated for the future Kirkos Branch, within the jurisdictions of the four existing branches: Mignogna, Nifas Silk, Mekanisa, and Akaki. While allocating a limited number of Japanese experts and their limited dispatch periods across these four branches may have resulted in relatively limited support, it contributed to a broader transfer of technical skills and knowledge to a larger number of counterparts.

(2) Coherence

Coherence is very high. Support for strengthening management capacity for the sustainable water and sanitation services is one of the country assistance policy of Japan to Ethiopia. The Project is coherent with the cluster strategy of the JICA's global agenda No. 19, "Supporting the Growth of Water Utilities" helping the water utilities for their spiral of growth, by reducing NRW which leads to the increased revenue for healthy and sustainable finance. The Project also contributes the achievement of SDG 6.1 of increased access of population with safely managed water.

(3) Effectiveness

Effectiveness is moderately low. The Project purpose is likely to be achieved by the end of the Project as the KPIs (Key Performance Indicators) are to be discussed. However, in Output1, the establishment of monitoring system has not been achieved. This is affecting Output 5 activities as the baseline NRW of twinning blocks have not been established. External factors, the spread of COVID-19, the state of emergency in Ethiopia that led to the emergency repatriation of Japanese experts and prevented on-site activities, as well as changes in activity plans caused by the Corridor urban development project have affected timely implementation of activities. Changing the perception of commercial losses reduction of AAWSA counterparts (CPs), trainings in Japan and introduction of mobile application (Epicollect5) contributed to the Project. Lack of accurate pipe network data and intermitted water supply were the hampering factors for physical loss activities. Lack of means of transport prevents CPs from joining the activities and meetings.

(4) Efficiency

Efficiency is moderately high. External factors such as COVID-19 and insecurity in Ethiopia caused the

delay of experts' dispatches and equipment. High inflation increased the cost of project. The number of CPs participated in the Project has increased as the Project targeted four branches instead of one. Having distant location of experts' office from AAWSA required travel for meetings and consultation as well as the level of communication. Evaluation of inputs from Japan and Ethiopia by the CP and experts were generally positive.

(5) Impact

Impact is very high. The likelihood of achieving overall goal could not be confirmed with no OVI's target values were defined. Unexpected positive impact is that AAWSA is expanding project activities and approaches to all the branches. Use of mobile application introduced in the Project is also expanded to AAWSA's other activities.

(6) Sustainability

Sustainability is high. The policy direction of AAWSA and Ethiopia will be continued as the NRW reduction goal is set for 2030. The availability of budget may have limits, but if project activities are included in the branches' budgets, certain levels of budgets may be allocated. Cost-benefit analysis of NRW reduction may help prioritizing the activities. CPs who gained knowledge and skills from the Project continue activities of the Project. When the Project activities are integrated in the annual action plan, it will help continuation of the Project. AAWSA is proactively expanding some of the Project activities and continues trainings others. Availability of equipment or materials such as meters and pipes may affect the sustainability of technology or skills.

3-3 Factors

(1) Contributing Factor by the Project Design

N/A

(2) Factor relating with the Implementation Process

By presenting data from the results of customer surveys, the seriousness and issues of commercial losses were exposed which helped for AAWSA CPs to realize the importance of addressing commercial losses reduction.

3-4 Inhibiting Factors

(1) Factors relating with Project Design

At the time of planning, the Project selected one pilot branch. From the result of the baseline survey, the experts proposed the introduction of block distribution system as the accurately monitoring of numbers of flow meters would be a challenge. It took more than one year to start establishing block distribution system, even though some external factors affected, is the major delay of the Project.

(2) Factor relating with implementation process

The main factors of the delay in establishing the NRW monitoring system in Output 1 are the inaccuracies of the information of pipe networks in the target area as well as the external factors such as the Corridor project. Intermitted water supply caused the limited days and times when on-site work such as hydraulic separation and leakage investigation can be carried out.

3-5 Other Factors

(1) Adjustment/Contribution

N/A

(2) Added Value/Creativity

The expert from the Kitakyushu City Water and Sewer Bureau proposed the block distribution system to manage NRW reduction activity in the pilot branch. The block distribution system is used to manage NRW activities of a relatively large area than the DMA（District Metered Area） based NRW reduction activities which may be suitable for the situation of AAWSA. This approach was proposed because the experts from the Kitakyushu City Water and Sewer Bureau is participating in the Project and their knowledge on and experienced of block distribution system can be utilized.

Before the Project, AAWSA's NRW reduction projects by development partners were mainly implemented by the external consultants. In this technical cooperation project, AAWSA staff of relevant departments of NRW management are implementing the Project activities themselves with the support provided by the experts. Since the staff are implementing the Project, their capacity of NRW reduction can be strengthened.

3-6 Conclusion

Out of the five Outputs, the NRW monitoring system has not been established (Output1), and it is less likely this Output will be achieved by the end of the Project. Although intermediate target OVIs have been achieved and the Project purpose OVI is likely to be achieved, not all the Outputs will be achieved. Moreover, while the intermediate targets have been achieved the logic which follows achievement of Outputs leads to the achievement of project purpose cannot be established. Among the sixth evaluation criteria, "effectiveness" was rated as "moderately low" while the remaining criteria are rated either "very high," "high" or "moderately high." In addition, considering the delays caused by external factors such as the COVID-19 pandemic, the emergency repatriation of Japanese experts, and the Corridor urban development project, a 12-month extension is necessary to enable CPs to take the lead in implementing the PDCA cycle for NRW reduction activities in order to achieve the Project purpose.

3-7 Recommendations

(1) Recommendations for the remaining period of the Project

1. Complete the block distribution system for NRW monitoring

Establishing the block distribution system in Output 1 is the priority of the Project. For the speeding up to complete the block distribution system, the strong leadership and ownership by AAWSA is expected. The evaluation team recommends that AAWSA managers and staff responsible for the block distribution system to form a taskforce to complete the block establishment with the support provided by the experts. So that the baseline NRW of each block can be established to measure the effectiveness of NRW reduction activities which will be implemented in the Project.

2. Regular meeting to share the progress

Currently JCC is the only forum where all of major CPs and experts meet to share the progress, but it is only held in every 6 months and there is no other forum where CPs and experts meet collectively and monitor the progress and achievements and discuss issues of the Project implementation. The team recommends that the Project to hold a regular meeting (monthly or bi-monthly) where relevant CPs and experts meet and share the progress and discuss issues related with the Project implementation.

3. Visualization of the Project results

To keep motivating staff, it is important to visualize and share the achievements or results of NRW reduction activities with them. For instance, knowing how much billing volume will be increased by replacing 200 aged meters may encourage the staff to continue meter exchanges. Therefore, the evaluation team recommends that the Project to visualize the results/achievements of work completed with everyone, particularly technicians and engineers.

4. Integration of NRW reduction plan and branches' Annual action plans

The evaluation team recommends that the Project's NRW reduction strategic plan to be integrated or at least harmonized with AAWSA's Annual action plans so that the budget for the activities can be secured.

5. Solution for mobility problem of CPs.

The evaluation team recommends that AAWSA acknowledges that the lack of transportation at the filed level is the issue and provides solutions for the mobility related issues.

6. Extension of project period

Due to external factors such as the COVID-19 pandemic and Ethiopia's state of emergency, the activities of Japanese experts in Ethiopia were disrupted. In addition, the Corridor urban development project forced delays in block establishment and changes to the pipeline renewal plan, resulting in only one block being completed out of the planned eleven. These delays have significantly reduced opportunities to learn various NRW reduction techniques during on-site training and to acquire know-how on NRW management through block formation.

The evaluation team recommends that the Project period to be extended for 12 months from the end of the Project. It is crucial that the baseline NRW ratio/volume data in twinning blocks (K-5, K-7 and K-11) to be calculated so that the effect of NRW reduction activities in twinning blocks can be measured. For target branches to formulate the NRW reduction plans, obtain budgets and implement, review the achievements, the

Project requires additional 12 months.

7. Changes of PDM

The evaluation team recommends the revisions of PDM. The main reasons of revision are to clarify the achievements or targets of each OVI and changes of target of area from twinning branch to twinning blocks.

(2) Recommendations for AAWSA

1. Providing necessary equipment for utilizing acquired skills

The evaluation team recommends that AAWSA to provide locally available necessary materials and equipment so that trained CPs can use their skills to improve the quality of work. Due to the lack of equipment, CPs cannot use the learned skills in their work or teach skills to others. There are skills and technologies do not require new equipment such as proper digging of trenches, technicians and engineers who attended the trainings are expected to use available skills in their daily works.

2. Continuation of establishing block distribution system

The evaluation team recommends AAWSA to continue establishing block distribution system. The block distribution system offers some advantage over DMA（District Metered Area）. It can also help managing water distribution as the water with a fewer inlets and outlets.

3. Annual action plan to include NRW reduction activities of the Project

The evaluation team recommends that the target branches (and pilot Kirkos branch) to include NRW reduction activities of the Project in their Annual action plan. When the activities are proven to be effective, branches can include those activities and secure the budget and human resources.

4. Standardized meter installation and its monitoring

Many of meter set up problems can be avoided if the customer meters were installed by following the meter installation standard. To do this, technicians responsible for the installations must know the standard. Additional trainings on the installation and availability of standard will help. Further, it is crucial to monitor the finished installation to ensure that the works are done according to the standard.

5. Continuation of trainings of technicians

In AAWSA, opportunities for technicians to receive trainings are generally limited. AAWSA management needs to acknowledge that technicians are the closest to the customers and their quality of work directly affects the NRW. Therefore, the evaluation team recommends AAWSA to continue providing trainings to technicians.

6. Information sharing and peer to peer learning

The team recommends that AAWSA to encourage the information sharing among staff and managers and encourage peer to peer learnings.

7. Place trained managers and staff in new Kirkos branch

The evaluation team recommends that when the Kirkos branch is established, the consideration is given to assign managers and staff who participate in the Project as priority so that the new branch have capacity to continue the Project activities.

8. Documentation of project activities

The evaluation team recommends that AAWSA to consider documenting project activities and materials including videos for their future use.

(3) Recommendation for JICA

The evaluation team recommends that PDM (especially the indicators) is reviewed and revised if necessary. The situation surrounding the Project may change during the implementation due to the external or internal conditions, in such case, PDM may not be fit in the situation that were initially assessed. Further, importance of using SMART principal (Specific, Measurable, Achievable, Relevant, and Time-based goal setting) for OVIs to measure the progress by the Project manager and those who monitor the progress. It is recommended to set the target values for the indicators of the overall goal before the completion of the Project.

3-8 Lessons Learned

1. Effectiveness of trainings in Japan

Trainings in Japan contributed to improve the understandings about the Project among participants who experienced the operations of Kitakyushu City Water and Sewer Bureau and saw how the block distribution system is used to manage the NRW. These trainings motivated CPs for continuing the Project activities. This kind of experiences could not have been obtained without trainings in Japan. Trainings in Japan with clear intention can help increasing the motivations of CPs and gaining support of managements.

2. Importance of sharing workspace between the experts and CPs.

The physical distance of workspace between the experts and CPs affect for the communication and coordination. Sharing the workspace or even located in the same building with CPs have great advantage. It is important that the offices between experts and CPs to be closer if the workspace is not shared for better communication and coordination.

3. NRW reduction activities under intermitted water supply

The intermitted water supply makes hard to conduct some of the NRW activities. Leak detection activities can only be done when the water is available in the area. The enumerators of HHS (Household Survey) encountered customer complaints or uncooperative attitude to collect data facing the frustration of not receiving water. Water supply condition should be taking into serious considerations when planning NRW activities.

4. Implementations of activities in multiple branches

The advantage of targeting four branches is that the number of CPs benefitted from the Project has been increased compared with the original plan of targeting one branch. The lessons from the first branch could be used in another (next) branch so that the activities can be improved. When targeting multiple branches, technology and knowledge transfer from one branch to another branch was easier. CPs can gain experience and learning to each other branches. When targeting only one branch, the expert may require to wait for CPs to become available. With 4 branches, the experts did not have to wait for CPs as there were more number of CPs in the Project.

The organizing the activities in five locations require moving in different locations. As the number of CPs increases, so are the workload of experts. Experts may not be able to concentrate on one branch and responses and/or follow up of activities of each branch may be compromised. When the Project targets multiple branches, it is important to consider the distance and determine appropriate (workable) number of branches.

5. Secondment of CP to the Project office

When the Project faces the challenges, the experts try to solve problem. The similar challenge may arise when CPs are implementing the Project activities after the completion of project. Considering the sustainability of the Project, when CP is sharing the workspace with experts, he/she can learn how the experts solved the challenges or even CP can contribute to the solution. In the Project, one CP is seconded to the Project and working in the Project office from January 2025. Having the CP in the same office can enhance the communication between the experts and other CPs. This CP can learn from the experts as they work together. When the experts' office is away from CP, having CP in the Project office can bring alternative solution.

6. Improved motivation through workload reduction and task simplification

The smartphone application introduced for customer surveys has expanded to the extent that it is now being adopted for other operations within AAWSA. The main reason for its acceptance is that it streamlined and simplified the counterparts' work. By using the app, record-keeping tasks were shortened, fieldwork became easier, and time savings were achieved—factors that contributed to its acceptance. Furthermore, data can now be compiled simply by transmitting recorded information, eliminating the need to transfer paper-based records into a computer, thereby reducing workload. Such simplification and reduction of tasks serve as a source of motivation for counterparts. If the introduction of Digital transformation (DX) can further promote this, it should be incorporated into future project activities.