

Republic of Kenya

FY2019 Ex-Post Evaluation of Japanese Grant Aid Project

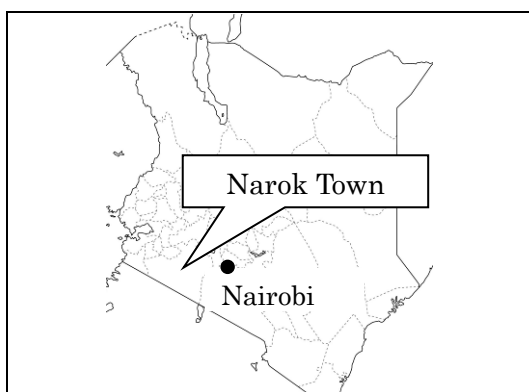
“The Project for Augmentation of Water Supply System in Narok”

External Evaluator: Ayako Nomoto, International Development Center of Japan Inc.

0. Summary

This project aimed to provide safe and sustainable potable water in 14 districts in the central Narok Town by constructing and rehabilitating water supply facilities, thereby contributing to an improvement in the living environment of residents. The relevance of the project is high because the objective of the project is consistent with the development plan and development needs of Kenya both at the time of planning and the time of the ex-post evaluation, and it is also consistent with Japan's ODA policy to Kenya at the time of planning. The project produced outputs that were mostly in line with the plan. The efficiency is fair because the project cost was within the plan, while the project period exceeded the plan. The project has produced the effects such as increases in the served population and in the water supply amount; however, they did not reach the targets. The main reasons for this are delays in laying of house connection pipes and limited operating hours of the facilities due to unstable power supply and time required for desilting. Meanwhile, positive impacts such as more convenient access to water, reduction of water-borne diseases, and reduction of workload for fetching water have been observed. Therefore, the effectiveness and impacts are fair. The sustainability of the project effects is high, as no major problems have been observed in the institutional/organizational, technical, financial aspects and current status of the operation and maintenance system. In light of the above, this project is evaluated to be satisfactory.

1. Project Description



Project Location



Newly constructed North Water Treatment Plant

1.1 Background

According to Kenya's white paper, *KENYA YEARBOOK 2010*, the amount of water resources available per capita was 650 m³ annually. It was less than 1,000 m³, which was set as the water scarcity line by the UNDP. Furthermore, with population growth, it was predicted that per capita water resources would decline to 235 m³ in 2025. Under these circumstances, there was a need for measures, including reduction of the non-revenue water (hereinafter referred to as "NRW") ratio to promote the development of available water resources and the effective use of them. According to the *Kenya Vision 2030 (2008-2030)*, Kenya's national development planning document, 80% of infectious diseases in Kenya had been caused by unclean water, making safe water supply an urgent issue to prevent further spread of infectious diseases.

Narok Town, which is the target site of this project, is a transit point for tourists because of its location at the centre of traffic in the direction of Nairobi, Nakuru, Masai Mara, Kisii, and Kisumu, and has a thriving service industry including restaurants, shops, and hotels. It is also the halfway point from Nairobi to the Masai Mara National Reserve, where tourism-related jobs are the primary industry. Against this backdrop, Narok Town is expected to develop industry and tourism, and is positioned as one of the 15 priority towns for water supply facilities in the *Vision 2030*. At the same time, the demand for water increased rapidly due to the increase in the number of tourists to watch wildlife, the expansion of Maasai Mara University, and the rush to build residential houses in conjunction with the construction of tourist roads. Thus, Narok Town suffered from the limited capacity of the small-scale water treatment plant built in 1940s and 1950s. With the increase in water demand, the shortage of water treatment facility capacity was expected to increase further, and there was an urgent need to develop water treatment facilities.

1.2 Project Outline

The objective of this project is to provide safe and sustainable potable water in 14 districts in central Narok Town by constructing and rehabilitating water facilities, thereby contributing to the improvement of the living environment¹.

Grant Limit / Actual Grant Amount	1,470 million yen (Detailed Design: 88 million yen, Implementation: 1,382 million yen) / 1,410 million yen (Detailed Design: 88 million yen, Implementation: 1,322 million yen)
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¹ At the time of planning, the objective of the project was "contributing to the implementation of the *Vision 2030*, Kenya's national development plan which aims to improve rural water supply rate" as the impact of the project. However, this objective was considered to be duplicative of the effectiveness of the project. Therefore, the impact was newly set as "contributing to the improvement of the living environment" (indicators of reduction of the risk of waterborne diseases and reduction of workload of fetching water were set out which were originally set as the qualitative effects.).

Exchange of Notes Date /Grant Agreement Date	Detailed Design: February 2013, Implementation : July 2013/ Detailed Design: February 2013, Implementation : July 2013
Executing Agency(ies)	Ministry of Environment, Water and Natural Resources (Currently, Ministry of Water & Sanitation and Irrigation), Rift Valley Water Services Board (Currently, Central Rift Valley Water Works Development Agency; hereinafter referred to as CRVWDA)
Project Completion	April 2016
Target Area	Narok Town
Main Contractor(s)	Konoike Construction Co., Ltd.
Main Consultant(s)	NJS Consultants, Co., Ltd.
Preparatory Survey	January 2012-December 2012
Related Projects	<p><Technical Cooperation></p> <p>“The Project for Management of Non-Revenue Water in Kenya” (2010-2014)</p> <p>“The Project for Strengthening Capacity in Non-Revenue Water Reduction” (2016-2021)</p> <p><Others></p> <p>Towns Sustainable Water Supply and Sanitation Program (African Development Bank)</p>

2. Outline of the Evaluation Study

2.1 External Evaluator

Ayako Nomoto, International Development Center of Japan Inc.

2.2 Duration of Evaluation Study

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

Duration of the Study: July 2019 – August 2020

Duration of the Field Study: October 1, 2019 – October 15, 2019, February 20, 2020 – February 29, 2020

3. Results of the Evaluation (Overall Rating: B²)

3.1 Relevance (Rating: ③³)

3.1.1 Consistency with the Development Plan of Kenya

The objective of the project has been consistent with the development plan both at the time of planning and at the time of the ex-post evaluation.

At the time of planning, Kenya's national development plan, the *Kenya Vision 2030 (2008-2030)*, identified water and sanitation as one of its development challenges, with the goal of increasing the water supply rate in rural areas from 40 percent to 59 percent. Besides, the *National Water Policy* was announced in 1999, and to implement this policy, administrative reforms in the water sector were pushed forward based on the *Water Act*, which came into force in 2002. Furthermore, in the *National Water Resources Management Strategy (2007-2009)*, the primary objective was equitable access to water resources and sustainable and efficient water use, intending to eradicate poverty through the supply of drinking water and water for production.

At the time of the ex-post evaluation, the *Kenya Vision 2030* has remained valid, and the *Third Medium-Term Plan (2018-2022)* of *Vision 2030* continues to call for an increase in the population of water supply in regional urban centres. The *Water Act* of 2016, which came into force on April 21, 2017, calls for the realization of safe water supply in sufficient quantities. Also, the *National Water Master Plan 2030* (formulated in March 2014) projects that the urban population will increase from 13 million in 2010 to 46 million in 2030, with the aim of providing water to 100 percent of the population.

3.1.2 Consistency with the Development Needs of Kenya

There is a high degree of consistency between the objectives of the project and the needs for water supply at both the time of planning and ex-post evaluation.

At the time of the project planning, Narok Town, the target site of the project, was positioned as one of the 15 priority towns for water supply services in the *Vision 2030* because of its expected industrial and tourism development. On the other hand, according to the *Kenya County Fact Sheets*, a government document, Narok Town had a low access rate to safe water (33%). The existing small-scale water treatment plant could not provide sufficient water, and water supply hours were limited and indefinite, and water supply was limited to some areas of the

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

³ ③: High, ②: Fair, ①: Low

town. Therefore, the water was provided by water trucks in many areas. This situation of insufficient supply capacity to meet water demand was expected to expand further in the future as water demand increased.

At the time of the ex-post evaluation, the water supply rate in Narok County, a local administration that includes Narok Town, the site of the project, was only 45%⁴, so the need for safe water has remained high. Also, the population of Narok Town is projected to increase significantly to 54,701, according to the latest projection⁵, compared to Narok's population of 42,505 at the time of planning (2012). Besides, at the time of the project planning, the area of water supply in Narok Town was 11.27 km², which was provided by the operating and maintenance agency named Narok Water and Sewage Services Company Limited (hereinafter referred to as "NARWASSCO"). However, at the time of the ex-post evaluation, the area has expanded to about 25 km², so the need for water supply has remained high.

3.1.3 Consistency with Japan's ODA Policy

The project was consistent with the ODA policy of Japan. Water supply and water resource management were included in the priority area of "environmental conservation" in the *Country Assistance Policy to the Republic of Kenya (2012)* at the time of this project planning. The 5th Tokyo International Conference on African Development (TICAD V) (2013) also included the improvement of access to safe water and sanitation.

In light of the above, this project has been highly relevant to the country's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance is high.

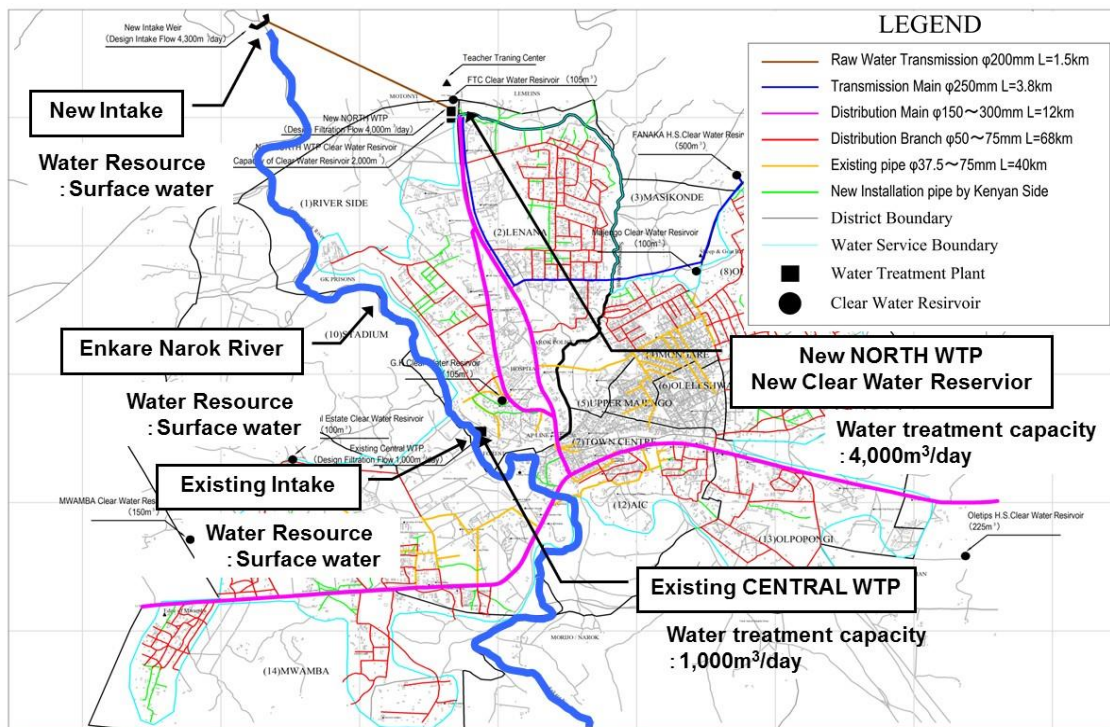
3.2 Efficiency (Rating:②)

3.2.1 Project Outputs

The main outputs of this project are as follows: (1) Construction of new intake facilities, laying of a raw water transmission pipe, construction of a new water treatment plant (the North Water Treatment Plant; hereinafter referred to as "NWTP"), partial rehabilitation of an existing water treatment plant (the Central Water Treatment Plant; hereinafter referred to as "CWTP"), laying of a clear water transmission pipe, renovation of reservoirs, construction of distribution pipes, and other facility improvements; (2) Procurement of equipment such as chemical injection equipment, water quality analysis equipment, house connection pipes, and water meters; and (3) Capacity building program (soft component) on operation and maintenance of water supply facilities, capacity of overall water utility management, and supervising capacity for pipe installation.

⁴ Source: *Performance Report of Kenya's Water Services Sector 2017/18*, Water Services Regulatory Board

⁵ Source: *Narok County Integrated Development Plan 2018-2020*



Source: Documentation provided by JICA

Figure1: Outline of the facilities under the project

Table 1 shows the plans and actual results of the main outputs (Japanese side). The outputs were produced mostly as planned with some changes. The changes from the plan included: (1) the addition of water supply pipes at the intake facilities (to supply clear water to the intake facilities), the addition of a drainage pit, and the addition of a sand pump for the grid chamber, (2) the extension and diameter changes based on the review of the distribution branch pipeline plan, and (3) the addition of monitoring equipment for maintenance. Besides, as the Ministry of Lands, Housing and Urban Development widened the box culvert where the main water distribution pipe was to be laid, it was necessary to construct a water pipe bridge, which was not in the original plan.

The soft component of “improvement of operation and maintenance of water supply facilities,” “upgrading of supervising capacity pipe installation,” and “strengthening of capacity of overall water utility management” were generally implemented as planned.

Table 1 Planned and actual outputs (Japanese side)

Facility	Planned Scope	Actual
Construction of water intake facilities	Weir, Grit chamber and Pump pit, Pump room (1.5m ³ /×102 m×45 kW×4 Pumps (2 of them are spare)), Control panel, Flow meter	Addition of water supply pipes, a drainage pit and a sand pump for the grid chamber
Laying of raw water transmission pipe	φ200mm of 1.5km (DI pipe)	As planned
Rehabilitation of existing water treatment plant (CWTP)	Planned capacity: 1,000m ³ /day (Replacement of filter sand, Chemical house, existing reservoir)	As planned
Construction of new water treatment plant (NWTP)	Planned capacity: 4,000m ³ /day (Receiving well, Flocculation tank, Sedimentation tank, Rapid filter, Rapid mixing tank, Elevated backwash water tank, Clear water reservoir, Sludge drying bed, Drainage pond, Chemical house and chemical room, Operation building, Electrical house, Yard pipe, In-plan landscaping, Guard house, Mechanical facilities, Generator, Electrical facilities, Power receiving facility, Chlorine injector)	As planned
Laying of clear water transmission pipe	φ250 mm, 3.8 km, DI pipe	As planned
Laying of distribution pipe	Distribution main pipeline: φ150mm-300mm, 12km, DI pipe Distribution branch pipeline: φ50mm-75mm, 68km, uPVC/GI pipe	The distance was changed (from 68km to 58km) based on a review of the distribution branch pipeline plan at the time of the detailed design, and the diameter was reviewed. Addition of a water pipe bridge.
Renovation of reservoirs	Improvement of water proofing of existing 7 water reservoirs	As planned
Equipment	Planned Scope	Actual
Water supply pipe materials	<ul style="list-style-type: none"> - Water supply pipe material of 16km (φ13mm) - Water meters of 1,600pcs - Repair valve, 2 units - Rodding instrument for ferrule with saddle, 2 units - Examine equipment of water meter, 1 unit 	As planned
Water quality measurement equipment	pH meter, Turbid meter, Residual chlorine analyser, Electric balance scale, Testing bench, Autoclave, Incubator, Spectrophotometer, Jar tester, Refrigerator, Ultrapure water production system, Hot plate stirrer, Water bath, Automatic oven, Device to be cool for chemicals, Filtration equipment for clarifying, Portable type Ultrasonic flow meter, Colony counter, Reagent for Spectrophotofluoro meter, Instrument for water quality analysis (beaker, pipette, syringe etc.)	As planned
Operation and	5 computers and 4 printers,	Addition of a monitoring

Maintenance equipment	4 Uninterruptible Power Supply (UPS)	device (LCD display)
Capacity building (soft component)	Planned number of participants	Actual
Improvement of operation and maintenance of water supply facilities	15	10
Improvement of the capacity to supervise the construction of water distribution pipe installation	10	10
Strengthening of capacity of overall water utility management	10	10

Source: Documentation provided by JICA and NARWASSCO, Interviews with NARWASSCO



Pumps at the newly constructed intake facilities



Newly constructed NWTP
(front: rapid filter, back: sludge drying bed)

Table 2 shows the status of the Kenyan construction work at the time of the ex-post evaluation, that was not completed when the project was completed. Although there are some delays, the work is generally progressing as planned.

Table 2 Outputs by the Kenyan side

Item	Plan	At the time of ex-post evaluation
Laying of distribution pipe, ϕ 50mm, 20km (Procurement and laying)	3 years after the completion of construction work by the Japanese side	Completed in November 2018
Laying of house connection pipe, ϕ 13mm, 16km (Utilizing the materials procured by the project)	1 year after the completion of construction work by the Japanese side	- Under implementation (Expected to be completed in FY2020-June 2021) - Remaining work: 1.3km
Laying of house connection pipe, ϕ 13mm, 16km (Procurement and laying)	4km per year for 2 to 5 years after the completion of construction work by the Japanese side	Under implementation (Expected to be completed in FY2020)
Installation of water meter of 1,600 pieces (Utilizing the materials procured by the project)	1 year after the completion of construction work by the Japanese side	Completed (as of May 2017)
Procurement and installation of water meter	Installing 500 pieces per year for 2 to 5 years after the completion of construction work by the Japanese side	Under implementation (Expected to be completed in FY2020)
Installation of a gate and fence (New intake facilities)	At the time of the completion of construction work by the Japanese side	Completed in November 2018
Installation of a gate and fence (NWTP)	At the time of the completion of construction work by the Japanese side	Completed in November 2018

Source: Documentation provided by JICA, Responses to questionnaire from and interviews with NARWASSCO

Note: NARWASSCO's fiscal year is from July to June.

3.2.2 Project Inputs

3.2.2.1 Project Cost

Table 3 shows the planned and actual project cost. The exact amount of Kenyan side was not available due in part to the fact that outputs by the Kenyan side were not yet complete at the time of the ex-post evaluation as noted in "3.2.1 Project Outputs." Based on a comparison of planned and actual project cost for the Japanese side only, the project cost was as planned.

Table 3 Project cost

	Plan	Actual
Japanese side	1,410 million yen (Detailed Design: 88 million yen, Implementation: 1,322million yen)	1,410 million yen (Detailed Design: 88 million yen, Implementation:1,322million yen)
Kenyan side	60 million yen	N/A

Source: Documentation provided by JICA

3.2.2.2 Project Period

The actual project figure for the Kenyan side was not obtained as the outputs by the Kenya side were still under implementation at the time of the ex-post evaluation, as explained in Table 2. Therefore, only the plan and the actual project results for the Japanese side are compared. While the planned project period was 35 months from the signing of the Grant Agreement, the actual period was 39 months from February 2013 (signing of the Grant Agreement) to April 2016 (completion), which is 111% of the planned period. The project period exceeded the plan mainly due to the following reasons. Firstly, the deadline of the contractor was extended by one month because the scheduled tender was set back by one month due to the Kenyan government, and the contract date was extended accordingly. Secondly, as described in "3.2.1 Project Outputs," the construction of the water pipe bridge, which was not included in the original plan, was required, and the contract had to be extended due to the design changes and the installation of the water pipe bridge.

Thus, although the project cost was as planned, the project period exceeded the plan. Therefore, efficiency of the project is fair.

3.3 Effectiveness and Impacts⁶ (Rating:②)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

The project aimed to provide a stable supply of safe drinking water to the residents of the target area (14 districts in the centre of Narok Town). The increase of the served population, and the water supply amount were set as the operational and effect indicators. In this ex-post evaluation, the number of house connections was added as an alternative indicator since it was not possible to obtain accurate figures for the served population. Also, NRW rate was added as a supplemental indicator.

⁶ Sub-rating for Effectiveness is to be put with consideration of Impacts.

Table 4 Quantitative effects (Operation and Effect Indicators)

	Baseline	Target	Actual				
	2012	2020	2015/16	2016/17	2017/18	2018/19	2019/20
		4 Years after Completion	Completion Year	1 Year after Completion	2 Years after Completion	3 Years after Completion	4 Years after Completion
Indicator 1: Served population	18,000	49,980	N/A	N/A	N/A	N/A	N/A
Indicator 2: Water supply amount (m ³ /day)	2,000	5,000	1,194	2,562	2,304	3,028	2,625
(Existing CWTP) (m ³ /day)	2,000	1,000	N/A	160	67	296	244
(New NWTP) (m ³ /day)	—	4,000	N/A	2,402	2,237	2,732	2,381
(Alternative indicator) Indicator 3: Number of house connection (household)	2,437	N/A	3,004	4,016	4,420	4,746	5,427
(Supplemental Indicator) Indicator 4: NRW (%)	57.6	25	N/A	N/A	34.7	20.6	18.4

Source: Documentation provided by JICA and NARWASSCO

Note: (1) The target value for the served population (indicator 1) is the estimated population of the project site reflecting the population growth in the target area. (2) Concerning actual figures, NARWASSCO's fiscal year runs from July to June. (3) The breakdown of the number of house connections (indicator 3) as of 2018/19 is 91% for general households, 6.8% for commercial facilities, and others (e.g., public facilities). In addition to this, it is expected that there will be about 1,100 public faucet users. (4) Actual figures for 2019/20 are as of December 2019 for water supply amount (Indicator 2) and NRW (Indicator 4), and September 2019 for the number of house connections (Indicator 3). (5) The amount of water supply (indicator 3) is the amount produced at the water treatment plants. (6) The baseline value for NRW (indicator 4) is for 2013.

(1) Served population and number of house connections

Concerning the served population, the population of Narok Town, which was receiving water supply at the time of planning, was 18,000. As noted in "3.1.2 Consistency with Development Needs," the estimated population of Narok Town as of 2018 was 54,701, though NARWASSCO does not have an exact figure regarding the actual served population.

Looking at the number of house connections to NARWASSCO's water system in Narok Town as an alternative indicator, the number of house connections in 2019/20 was 5,427 compared to 2,437 in 2012 before the project was implemented. 2019/2020 figure is an increase of 223%

from before the project was implemented, and the number of house connections has increased substantially. Although accurate data on the served population was not available, as noted above, entire population of Narok Town is expected to be covered soon after the completion of the on-going house connection project. At the time of ex-post evaluation, as a part of a sewerage project (supported by the African Development Bank; hereinafter referred to as “AfDB,” implemented by CRVWWDA, and operated and maintained by NARWASSCO), 2,500 house connection was underway and expected to be completed by 2021.

(2) Water supply amount

The actual water supply amount was 2,625 m³/day in 2019/20, which is about 53% of the target (2020) water supply of 5,000 m³/day. Of these, the water supply at NWTP, which was newly constructed under the project, was 2,381 m³/day, 60% of the planned water supply (4,000 m³/day), and the water supply at the existing CWTP (the project replaced sand filtration and renovated some facilities such as a chemical house) was 244 m³/day, 24% of the planned water supply (1,000 m³/day).

The main reason why the water supply has not reached the target is the limited daily operating hours of the water treatment plants: approximately 16 hours at the new NWTP, and 10 hours at the existing CWTP. Of these, there are two to three hours a day when the water intake facilities and treatment plants cannot operate due to power outages. Further, the production at the existing water intake facilities and treatment plant is decreasing due to aging pumps, and there is a period when production is not possible⁷ because the electricity supply has been stopped due to the late payment of electricity bills (borne by the County Government).

As for the power outages, NARWASSCO is working on getting the Kenya Power and Lighting Company (hereinafter referred to as "KPLC") to make a dedicated power distribution to NARWASSCO. The Ministry of Water & Sanitation and Irrigation has also asked the Ministry of Energy to provide a stable power supply, including the construction of a substation. About the suspension of the facilities for desilting as described above, NARWASSCO believes that in the future, it will be necessary to change the water intake position at the existing intake facilities and to introduce an efficient desilting system at the new intake facilities.

While the demand for water from unserved areas is high due to the expansion of Narok Town and the significant increase in population, the water supply amount has not been as planned. As noted above, at the time of the ex-post evaluation, 2,500 households in the unconnected areas were expected be connected to the water supply facilities in the future. To meet the water demand from this development, CRVWWDA, the project's executing agency, and NARWASSCO have decided to increase production by (1) rehabilitating the existing intake facilities and (2) rehabilitating and refurbishing the spring.

⁷ For example, water was not produced for two months in 2018/2019.

(3) Non-revenue water ratio

NRW ratio has improved significantly from 57.6% before the project was implemented (2012) to 18.4% in 2019/20. In addition to the high-quality distribution pipes procured in this project, the materials procured by NARWASSCO based on the technical guidance of soft component were also of high quality, and the physical water leakage was almost eliminated. On the other hand, issues such as (1) inaccurate water meter readings, (2) delays in water billing or unclaimed bills, and (3) water theft were identified. As countermeasures, NARWASSCO is considering the introduction of an automatic meter reading and billing system, introducing a fine system, and strengthening the NRW response team. Among them, NARWASSCO plans to purchase software for an automated meter reading and billing system and to enhance its capacity to handle NRW with the support of CRVWDA.

3.3.1.2 Qualitative Effects (Other Effects)

The qualitative effects of the project were assumed to be “stable water supply by way of 24-hour water supply” and “improvement of water quality through the construction of a new water treatment plant, renovation of the existing water treatment plant, and improvement of operation and maintenance capacity,”

The 24-hour water supply has not been realized due to the unreliable power supply and the suspension of the facilities due to desilting operations as described in "3.3.1.1 Quantitative Effects." Also, the water supply is limited because of the increased demand for water following the population growth. In some areas, especially in newer residential areas, the water supply is only two days a week. Even in the city centre, water supplies are sometimes cut off at night, and there are occasional water restrictions in the dry season. However, many of the users interviewed⁸ did not have any significant disruptions to their water use because they had storage tanks. According to them, before the project, the water supply was once a week, and sometimes the water was not available for a month when using a public faucet. After the project, people have been satisfied with the regular water supply and the improved accessibility of water.

According to NARWASSCO, the operation and maintenance agency, the water quality has met the standards of the WHO drinking water quality guideline and Kenyan national water quality standards. Interviews with users also revealed significant improvements in colour, taste, and smell, and they were satisfied with the water quality. Many users drink directly from the tap.

Besides, users were highly satisfied with the water volume and water pressure. In particular, before the project, not only households but also commercial facilities and the university were

⁸ In the ex-post evaluation, interviews were conducted with six large users (three hotels in different water supply districts, a university, a primary school, and a shopping mall), three public faucets in lower-income areas (operators and users), and ten households in five different water supply districts.

unable to obtain sufficient water supply; however, the situation has significantly improved since the project was implemented.

The effects of the soft component to “improve the capacity to operate and maintain facilities,” “improve the capacity of overall water utility management,” and “improve the capacity to supervise the construction of water distribution pipe installation” were expected. Many of the participants in the soft component of the technical department have continued to work there, and the technology transferred by the soft component has been used for operation and maintenance activities of water intake facilities and water treatment plants as well as construction supervision of the installation of water distribution pipes. On the other hand, the number of people at the management level has changed since the implementation of the project, so the continued effectiveness of the soft component could not be confirmed.

3.3.2 Impacts

3.3.2.1 Intended Impacts

It was expected that the project would reduce the risk of water-borne diseases by supplying safe and clean drinking water and that it would provide house connection to each household, thereby reducing the heavy burden of fetching water on women and children⁹.

For water-borne diseases, no precise health data was available to show improvement. Still, according to interviews with the users, many of them believed that diarrhoea and typhoid decreased. They were more common before the project due to poor water quality and the use of unclean water such as rivers. Besides, hygiene awareness and hygienic environment have significantly improved, including handwashing and keeping toilets and homes clean.

Before the implementation of the project, there was no access to the water supply system in areas where house connection pipes were not installed, and water was not supplied regularly, so the water was supplied by water trucks. The workload required for fetching water, such as searching for a water truck all day long, was a burden. However, after the project was implemented, users said that they no longer needed to search for water because they could receive water stably from each house connection and from the public faucets, which reduced their burden. In particular, the burden of women, who had been the primary bearers of water-fetching labour, has been dramatically reduced, and they are now able to take better care of their families and children. Furthermore, some users said they were able to spend that time on their cash-generating businesses.

The other positive impact is the reduction in water purchase costs. Before the project, there was an additional cost of purchasing water from expensive water trucks because the water was not supplied regularly. However, after the project, this cost has been saved, which has had a

⁹ At the time of planning, they were categorized as qualitative effects, but this ex-post evaluation reclassifies them as impacts as they are more indirect effects.

significant impact on both large users of commercial facilities (hotels and shopping malls) and households. In terms of specific water use cost changes, Table 5 below shows the user perceptions.

Table 5 User perceptions on the cost of water use

User	Before the project	After the project
Shopping mall (Number of customers per day: 3,000-3,500)	Ksh240,000/month (Amount of water consumed: 20,000ℓ/month)	Ksh178,000/month (Amount of water consumed: 50,000ℓ/month)
Primary school (Number of students and teachers: 500)	Ksh100,000/month	Ksh70,000/month
Hotel (Number of guests per day: 100-200)	Ksh70,000-80,000/month	Ksh30,000/month
Households	Ksh5,000/month	Ksh1,000-1,500/month

3.3.2.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

According to the agencies involved, there has been no negative impact on the natural environment. Sludge and wastewater from the water treatment plant have been sun-dried in the water treatment plant and then transported to the premises of the facility for proper treatment. According to NARWASSCO, the water quality of wastewater has been checked once a month, which has been within the standard value of the National Environment and Management Authority.

(2) Resettlement and Land Acquisition

As the facilities under the project have been constructed on public land under the jurisdiction of Narok Town, no land acquisition or involuntary resettlement has occurred.

Thus, this project has achieved its objectives to some extent. Therefore, effectiveness and impacts of the project are fair.



3.4 Sustainability (Rating: ③)

3.4.1 Institutional / Organizational Aspect of Operation and Maintenance

NARWASSCO operates and maintains the facilities developed under this project.

NARWASSCO was established in 2008 after receiving approval for water operations from the Rift Valley Water Services Board (currently CRVWWDA) at the time of the project planning, to operate water supply service in Narok Town.

At the time of the project planning and implementation, the executing agency, CRVWWDA, was one of the eight regional bureaus supervising the waterworks projects across the country, and has owned the facilities that were constructed under the project. The actual water supply service was to be provided by NARWASSCO under a service agreement. Besides, CRVWWDA has owned NARWASSCO's assets and receivables. With an amendment to the *Water Act 2016* following the devolution, water services were also transferred to the counties. At the time of the ex-post evaluation, NARWASSCO is owned by the Narok County Government. The assets, including the project facilities owned by CRVWWDA, will be transferred to NARWASSCO in the future. A committee consisting of national and county levels was appointed by public notice in July 2019 to review the transfer process. CRVWWDA will continue to be the executing agency for the development of water related infrastructure in Narok Town. At the time of the ex-post evaluation, no formal agreement for water service was in place between the County Government and NARWASSCO. Therefore, the division of responsibilities between the County Government and NARWASSCO may be somewhat unclear.

NARWASSCO had challenges in the decision-making process, including a year without a board, the highest decision-making body. Nonetheless, with the appointment of board members, including the County Government in August 2019 and the first board meeting in the year in November, it is expected to get back on track.

Table 6 shows the number of staff at the time of the ex-post evaluation. The number of technical staff is generally sufficient for operation and maintenance of the water intake facilities and treatment plants. Currently, there are two NRW personnel and one Geographic Information System (GIS) personnel, but NARWASSCO believes that these numbers should be doubled. Also, NARWASSCO thinks it is necessary to assign an electrical and mechanical expert to deal with electricity-related issues (see "3.4.2 Technical Aspect of Operation and Maintenance" below), and the management is considering assigning this kind of expert.

Table 6 Number of staff of NARWASSCO

	2012 Number of staff	2020 Number of planned staff	2019 Number of staff (Actual)

Management staff	3	4	4
Sales staff (including accounting assistance/IT, meter reader, billing, customer relation/reception, disconnecting assistance, driver)	8	17	13
Technical staff	12	22	19
(Breakdown of technical staff)			
Intake/water treatment plant operators	7	14	10
Person in charge of water supply/distribution (Including 1 member in charge of GIS and 2 members in charge of NRW (leakage prevention)/Reconnection)	5	8	9
Accounting staff	-	-	3
Personnel staff	-	-	7
Total	23	43	46

Source: Documentation provided by JICA, documentation provided by NARWASSCO and interviews with NARWASSCO

Note: The number of staff in the 2020 plan is the appropriate number proposed by the JICA survey at the time of the project planning.

Based on the above, it can be said that the organizational structure of operation and maintenance mostly appropriate, though it is considered necessary to assign electrical and mechanical experts and increase the number of technical personnel for more stable operation and maintenance activities.

3.4.2 Technical Aspect of Operation and Maintenance

Operation and maintenance of the water intake facilities and water treatment plants are generally carried out appropriately, utilizing the manuals provided under the soft component. However, due to the lack of electrical and mechanical experts, it may not be possible to immediately identify and address the cause of problems in the electrical system. At the time of the ex-post evaluation, the technicians of the County Government were responding to the problem, if any; however, as the number of County Government technicians was also small, the response took some time.

For newly hired staff, skills are transferred within the company mainly through on-the-job training. NARWASSCO also conducts exposure visits to other water service companies when necessary. NARWASSCO plans to apply training in the next year's budget and is also considering developing a regular training system. Under the sewage plant development project being implemented with the support of AfDB, technical enhancements in operation and maintenance, including NRW measures and overall company management will be implemented for two years from June 2020. Also, CRVWWDA is willing to continue to provide necessary technical assistance as requested by NARWASSCO.

Therefore, it can be said that the technical aspect is mostly appropriate as the technical staff has the necessary technical skills for operation and maintenance, and the transfer of skill is also taking place.

3.4.3 Financial Aspect of Operation and Maintenance

Table 7 shows NARWASSCO's revenues and expenses for the past three years.

Sales/Turnover has increased due to the increase in the number of house connections and production volume. At the same time, production costs such as chemical and electricity costs and labour (administrative) costs have also increased. The County Government has provided subsidy (for electricity) to cover the necessary operating expenses for the time being. With the start of sewerage operation in the future, the operation and maintenance costs of the water supply and sewerage operations are expected to increase further, and it is necessary to increase revenues, including water tariff revision, for more sound operation.

Since the incorporation of NARWASSCO, there have been no revisions to water tariff. However, as discussed in “3.4.1 Institutional/Organizational Aspect of Operation and Maintenance,” following a board meeting in November 2019, NARWASSCO started the application process for the tariff revision to the Water Services Regulatory Board (hereinafter referred to as "WASREB"). Water tariff will be revised as early as the 2020/2021 fiscal year, and NARWASSCO aims to recover costs from sales/turnover through tariff revision.

Users, including households, commercial facilities, and government agencies, have incurred significant amounts of water bills in arrears amounting to 62 million Kenyan shillings as of September 2019. Those of national and county governmental agencies (hospitals, prisons, etc.) are long term and challenging to collect, but NARWASSCO continues to request reminders and on-time payment.

Table 7 Financial condition of NARWASSCO

(Unit: thousand Kenyan Shillings)

Item	2016/17	2017/18	2018/19
Sales/Turnover	72,048	77,766	99,910
Grants	10,012	4,490	20,109
In-kind contributions	-	-	6,264
Other income	-	-	49
Total revenue	82,060	82,256	126,332
Water production cost	39,072	36,342	49,631
Administration cost	43,968	49,520	70,614
Depreciation of property, plant and equipment	0	379	2,303

Amortisation of intangible assets	26	26	27
Total operating expenses	83,066	86,268	122,576
Operating profit/loss	-1,005	-4,012	3,756

Source: Documentation provided by NARWASSCO

Note: The last digit is adjusted after rounding to the nearest thousand shillings.

Thus, although the water tariff revision is still in process and there is a need for appropriate debt collection, the financial aspect of operation and maintenance is generally adequate, given the expected increase in sales/turnover of water from future water tariff revision.

3.4.4 Status of Operation and Maintenance

The water intake facilities, raw water transmission pipe, NWTP, clear water transmission pipes, and water distribution pipes developed in this project are in good condition. Two uninterruptible power supplies (“UPS”) were broken due to erratic power supply but were replaced. At the water intake facilities, four pumps are used in two shifts, but one of them had been broken at the time of the ex-post evaluation. However, NARWASSCO is going to procure spare parts soon, and repairs are being scheduled.

The equipment (water quality analysis equipment, water meter examination equipment, flow meter, water pipes and accessories, water meters, computers, and printers) procured under the project is also in good condition and is being utilized.

Thus, the facilities and equipment developed and procured in this project are generally in good condition.

In light of the above, no major problems have been observed in the institutional/organizational, technical, financial aspects and current status of the operation and maintenance system. Therefore, sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed to provide safe and sustainable potable water in 14 districts in the central Narok Town by constructing and rehabilitating water supply facilities, thereby contributing to an improvement in the living environment of residents. The relevance of the project is high because the objective of the project is consistent with the development plan and development needs of Kenya both at the time of planning and the time of the ex-post evaluation, and it is also consistent with Japan's ODA policy to Kenya at the time of planning. The project produced outputs that were mostly in line with the plan. The efficiency is fair because the project cost was

within the plan, while the project period exceeded the plan. The project has produced the effects such as increases in the served population and in the water supply amount; however, they did not reach the targets. The main reasons for this are delays in laying of house connection pipes and limited operating hours of the facilities due to unstable power supply and time required for desilting. Meanwhile, positive impacts such as more convenient access to water, reduction of water-borne diseases, and reduction of workload for fetching water have been observed. Therefore, the effectiveness and impacts are fair. The sustainability of the project effects is high, as no major problems have been observed in the institutional/organizational, technical, financial aspects and current status of the operation and maintenance system.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) At the time of the ex-post evaluation, the facilities constructed under the project were not fully utilized due to unstable power supply and suspension of facilities due to desilting operations, etc. Hence, water production amount has not reached the target. NARWASSCO is recommended to continue discussing and requesting the stable power supply with KPLC for stable water production.

(2) NARWASSCO is recommended to develop a systematic and regular training system for technology updates. Support will be obtained from CRVWWDA for the development of a training system. There should also be additional engineers in charge of NRW and an electrical and mechanical specialist.

(3) With the revision of water tariff, NARWASSCO will aim to operate with the cost recovery from water sales in the future. Still, for the time being, NARWASSCO needs subsidy from the County Government for the electricity bill. However, because the electricity bill was not paid on time, at the time of ex-post evaluation, the electricity supply was suspended to time to time, and CWTP was unable to produce for some time, causing problems with water supply operation. Therefore, the County Government is recommended to pay the electricity bill on time in the foreseeable future.

Also, given the arrears of water bills from the county and central government agencies, NARWASSCO and the County Government are recommended to facilitate timely payment from these agencies. Also, NARWASSCO and the County Government may consider entering into a formal water service provision agreement. The agreement will clarify the responsibilities of each party, which leads to smoother operation.

(4) Also, it is recommended that NARWASSCO put in place an effective management and collection system for water charges, given the large number of water bills that are not paid on time. The County Government and CRVWWDA are recommended to provide support to

enhance such management capacity.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

Target for technology transfer when the institutional set up for the operation and maintenance system of a water utility is in transition

Although the soft component of the project included the improvement of management capacity, the target was limited to NARWASSCO, the operating and maintenance agency. However, with NARWASSCO was then newly established and the change of ownership of NARWASSCO from CRVWWDA to the County Government due to decentralization was scheduled, the County Government could have been included in the technology transfer. NARWASSCO needs to strengthen further its water service management, including setting appropriate water tariff, collecting water charges and collecting debts, and planning long-term investments to meet future water demand and cover the increased maintenance costs. Still, NARWASSCO needs the technical and financial support of the County Government to do so. Also, although the County Government pays subsidy (electricity bill) to NARWASSCO, a decrease in water production partly due to delays in payment to the power company and delays in payment of water bills by the county government agencies have a significant impact on the operation and maintenance of NARWASSCO. Therefore, it is vital to raise awareness and transfer technology related to the management of such supervisory body to increase ownership.