

Republic of Kenya

Ex-Post Evaluation of Japanese ODA Grant Aid Project

“The Project for Augmentation of Water Supply System in Kapsabet Town”

External Evaluator: Tsuyoshi Ito, IC Net Limited

0. Summary

This project was implemented with the objective of increasing the water supply volume and ensuring the provision of safe water to residents in the project target area by improving the water supply system facilities for water intake, conveyance, purification, and distribution in Kapsabet Town, thereby contributing to the improvement of the living environment in the target area. This project has been highly relevant to Kenya’s development plan, development needs, as well as Japan’s ODA policy. Although the one of the objectives was realization of 24-hour water supply, the project resulted in 12-hour water supply because of rising electricity costs, and income from water fees was also below the target. However, the rise in electricity prices that started in 2011 seems to have substantially resulted from the influence of the Arab Spring and related factors, and it is deemed to have been difficult to predict this consideration during planning and incorporate it into the project plan. Therefore, it is deemed that the relevance of the project is high because this factor does not diminish the appropriateness of the plan and the approach of the project. The efficiency of the project is fair, because although the project costs were within the plan, the project duration was longer than the plan. The targets for meter installation and water supply households were met and water supply population was close to the target. The anticipated contributions such as to reduce labor for water transport were confirmed as impacts, but the water supply hours and water supply volume were only about halfway achieved towards the target, and the increase in income achieved only about 60% of the target. Therefore the effectiveness of the project is fair. Sustainability has been observed in the institutional and technical aspects of the project, and there are no problems in the status of operation and maintenance at the time of the ex-post evaluation. Although, in the financial aspect of sustainability, a balance of income and expenditures has not been achieved at the time of the ex-post evaluation, it has been confirmed that there is a possibility for sustainability to be secured through increase in water fee, expected supplementary funding by the Nandi County government, and other factors. Therefore, the sustainability of the project is fair.

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

1. Project Description



Project Location



Sedimentation Pond of the Water Treatment Plant

1.1 Background

Established in 1948 and expanded in 1960 and 1980, Kapsabet Town's existing water supply system uses surface water as its water source, but as it only covered 33% of the administrative district of the town when this project was planned, it was estimated that the system supplied water to about 5,000 people (15%) of the nearly 33,000 residents of Kapsabet Town. The water supply conditions were also extremely unstable because of deterioration of facilities. Thus residents were forced to rely on spring water or river water, and the outbreak of waterborne diseases and other sanitation problems were pointed out.

To improve the water supply situation and raise the number of people supplied with water to 47,500¹, the Government of Kenya (herein after the "GOK") requested a Grant Aid Project from Japan, and the Government of Japan responded by conducting a basic design study in 1993. In implementing the project, three items were given as prerequisites, namely 1) sewerage system construction at Kenya's expense, 2) organizational strengthening of the water supply company, and 3) budgetary provision by the GOK. The GOK completed improvement of the sewerage system in 2002. Regarding the other challenges, in accordance with the Water Act that went into effect in 2002, a system was put in place where the Kapsabet Nandi Water and Sanitation Company (hereinafter the "KNWSC"), which was established in December 2006, became the primary contractor in a contracting agreement with the Lake Victoria North Water Supply Board (hereinafter the "LVNWSB"), with the LVNWSB bearing responsibility for the financial management. With this implementation of setting up a system and amid the continuous development of budgetary provision, the GOK again requested a Grant Aid Project from Japan in 2004. As a result of deliberations between representatives from the both countries, an agreement was reached to narrow the scope of cooperation to upgrading and augmenting the existing facilities using the Kabutie River as a water source.

1.2 Project Outline

The objective of this project is to increase the water supply volume and ensure the provision of safe water to residents in the project target area by improving the water supply system facilities including water intake, conveyance, purification, and distribution in Kapsabet Town, thereby contributing to the improvement of the living environment in the target area.

Grant Limit / Actual Grant Amount	1,956 million yen / 1,956 million yen
Exchange of Notes Date /Grant Agreement Date	July, 2009 / July, 2009
Implementing Agency	Lave Victoria North Water Service Board (LVNWSB)
Project Completion Date	November, 2011
Main Contractor(s)	Konoike Construction Co. Ltd.
Main Consultant(s)	NJS Co. Ltd.
Basic Design	September, 2008
Detailed Design	July, 2009
Related Projects	The Project for Management of Non-Revenue Water in Kenya (Technical Cooperation Project) (September 2010–October 2014)

¹ No information on the basis for this figure was found as it was quoted from the ex-ante evaluation table, but it seems to be based on the population growth rate.

2. Outline of the Evaluation Study

2.1 External Evaluator

Tsuyoshi Ito, IC Net Limited

2.2 Duration of Evaluation Study

Duration of the Study: July, 2014 – September, 2015

Duration of the Field Study: October 5–19, 2014; February 1–10, 2015

3. Results of the Evaluation (Overall Rating: C²)

3.1 Relevance (Rating: ③³)

3.1.1 Relevance to the Development Plan of Kenya

The “Ninth National Development Plan (2002-2008)” of Kenya stated that a stable water provision was indispensable to the sustainable agricultural production and the promotion of industrialization and private enterprise, and had appropriate development and improved maintenance of its water supply systems as one of its goals. Based on this, the National Water Policy was formulated in 1999, the Water Act went into effect in 2002 as a part of the actualization of the policy, and administrative reforms in the water sector were advanced. In addition, the National Water Resources Management Strategy (2007-2009) was formulated in January 2007. With the goal of eliminating poverty through the provision of drinking water and the water necessary for production activities, the strategy aimed to achieve fair access to water, as well as sustainable and efficient water usage.

“Kenya Vision 2030” was created as a more long-term development strategy looking to the years 2008 to 2030, and the First Medium Term Plan (2008-2012) specified the improvement of infrastructure to ensure the provision of safe water as one of the six focus priority areas in the water sector. It also sought to address the problem of non-revenue water.

At the time of the ex-post evaluation, the Second Medium Term Plan (2013-2017) is effective and shows the improvement of urban water supply as one of its flagship programs and projects. The National Water Quality Management Strategy (2012-2016) also specifies a shortage of equipment and materials, as well as a shortage in human resource capabilities, as a challenge in the provision of water. These explain improvements in both infrastructure and institutional aspects are still remaining as priorities.

Kapsabet Town, the target area of this project, had not created policy documents for development plans, etc. at the time of planning of this project (2008-2009)⁴. By a constitutional amendment in 2010, most of the administrative authority was transferred to the 47 regional administrative districts (hereinafter “counties”), with the county governments being the unit of decentralized regional authority. Kapsabet, the target area of this project, is a part of Nandi County. The development plan of the Nandi County

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

³ ③: High, ②: Fair, ①: Low

⁴ From the interview to Nandi County Government.

government for 2013 to 2017 targets 30% of coverage rate for the water supply system for the whole of Nandi County, with improvement of water provision remaining a priority. It also mentions that, in response to rising electricity costs in recent years, the county is working to strengthen gravity flow systems and other water supply systems that minimize operational costs whenever possible.

In this way, improvements in both infrastructure and institutional aspects in the water supply sector remain priority issues in national development plans, sector strategies, and development plans for the target area at the time of project planning and the ex-post evaluation. Therefore, this project is deemed to have relevance to the development policies.

3.1.2 Relevance to the Development Needs of Kenya

Although the water treatment plant that supplied water to Kapsabet Town was constructed in 1948 and had expansion work done in 1960 and 1980, the coverage rate was only 33% of the administrative area of the town, and because of deterioration, the facility was only able to produce 550 m³ per day of their production capacity of 820 m³ per day. For instance, in 2006, only 340 out of 1,120 households registered⁵ at the time were supplied with water⁶. Moreover, according to the basic design study (2008), the number of people supplied with water at the time was estimated at roughly 5,000 (about 15% of Kapsabet's population of 33,000), and water supply restrictions were carried out on a daily basis. Residents not supplied with water used 21 springs and river water, resulting in a burden on water transport labor, as well as waterborne diseases.

According to Impact Report Issue 2 (2009) issued by Kenya's Water Service Regulatory Board⁷ (hereinafter the "WASREB"), in the performance ranking⁸, the KNEWSC, which is the target company of the project, ranked No. 52⁹ out of the 55 water supply companies nationwide as of 2008, and could be said to have fallen behind in many areas, such as water supply volume, water supply time, and water quality, even in comparison with Kenya's other water supply companies.

⁵ Including those under process of registration.

⁶ Basic design study.

⁷ As the national body that oversees water supply nationwide, the WASREB issues licenses to water supply companies and monitors company operations, water quality management of supplied water, and other aspects.

⁸ The performance ranking compares companies on ten criteria: sufficiency of staffing in the organization, water supply coverage, non-revenue water rate, fee collection rate, operation and maintenance cost coverage rate, water quality, residual chlorine concentration, water supply hours, water meter coverage, and latrine coverage.

⁹ In Impact Report Issue 7 (2014), the KNEWSC is ranked No. 46 (out of 61 companies nationwide), which is still low, but it was one of the three "counties showing greatest improvement," having moved up 15 places.

Table 1: Performance of KNWSC (Unit: % if there is no note)

Indicators	2008/09	2009/10	2010/11	2011/12	2012/13
Residual Chlorine (Rate of tests passed the standard)	75	75	83	67	83
Bacteriological Quality (Rate of tests passed the standard)	na	nd	nd	na	0
Non-Revenue Water	64	63	63	51	49
Water Coverage	20	5	5	33	45
Sanitation Coverage (Rate of houses with latrine)	nd	5	60	nd	87
Water Supply Hours (Hours)	6	6	6	6	18
Staff Productivity (Staff per 1,000 connections)	33	23	23	9	7
Collection Efficiency	84	68	68	68	74
Operation and Maintenance Coverage (collected fee/O&M cost)	41	38	69	103	94
Ranking (Ranking/Total number of Water companies)	72/77	61/62	62/63	58/64	46/61

Source: Created from data in “Impact Report,” (Issue 3 to 7, 2010-2014), WASREB

na: not applicable nd: no data

In this way, at the time of project planning, the Kapsabet/Nandi region had a high demand for improvement of water supply coverage, water quality, water supply time, and other demand-side aspects, as well as high demand for increase in registered households (meter installation), decrease in non-revenue water, improvement in maintenance cost coverage, and other supply-side aspects, compared with other regions. Also, despite improvements being seen after the completion of this project, the ranking was still at No. 46 at the time of the ex-post evaluation (table 1), demonstrating that the need for improvement in water supply coverage, water supply time, and other water supply factors remains high.

3.1.3 Relevance to Japan’s ODA Policy

In the Country Assistance Plan for Kenya (FY2008) at the time of the planning, five focus areas of human resource development, agricultural development, economic infrastructure improvement, health and medical care, and environmental protection were set forth, among which “water quality improvement to contribute to greater access to safe water” was given as a part of the health and medical care, and “support for upgrading water supply and sewerage systems” was mentioned as support contributing to “improving the urban sanitation environment and protecting water quality.” Therefore, the project is considered relevant to Japan’s ODA policy.

In view 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 actual outputs of the project in terms of facilities, equipment, and materials are summarized in Table 2, and the actual outputs in terms of soft components are summarized in Table 3.

Table 2: Outputs of the Project (Facilities and equipment)

Plan	Changes in Actual (Project Completion Report)
Intake Weir: Rehabilitation of intake weir (Height 1m, Length 28m)	As planned
Raw water pipe: Construction of a new pipe from the intake weir to the treatment plant (length 700m)	As planned
Water Treatment Plant: Construction of a new plant (intake flow: 3,800 m ³ /day, 2 Flocculation tanks, 2 Sedimentation tanks, 4 Rapid sand filters, 2 Clear water reservoirs, 5 Sludge drying beds, Administration building and so on)	<ul style="list-style-type: none"> ● Diversion of river stream running adjacent to the water treatment, placement of gabion and refilling of coursed points for bank protection. ● Road-bed improvement for management road of the treatment plant where black cotton soil prevails.
Equipment for the Treatment Plant: 2 sets of Chemical feeding equipment, 4 units of Water transmission pumps (2 are for standby), 3 Service pumps (1 is for standby) etc.	As planned
Electric Equipment: 1 Transformer, 1 Power receiving panel, 6 Switch boxes (for transmission pumps, service pumps, drain pumps), 1 Outdoor switch box (for service pump), 1 Electromagnetic flow meter, 2 Turbine type flow meter, 1 Pressure gauge, 1 Flow type level gauge, 1 Communication device (for management building) etc.	Cancellation of electric transformer
Transmission Pipe: From new water treatment plant to new distribution reservoir (Length: 2,930m)	As planned
Distribution Reservoir: 2 units of new distribution reservoir, 2 units office reservoir, Rehabilitation of piping for the Kapsabet High School reservoir	As planned
Distribution Pipe: Primary pipe (approximately 4km), Secondary pipe (approximately 22.2km)	Reduction of length of secondary pipe by 585m.
Service Pipe: Connection between Distribution pipe and boundary of private land, approximately 400 sites)	As planned
Other Equipment: Equipment for water meter (water meter approximately 1,700 units, etc.), Water meter testing equipment, Water quality examination equipment, Computers and relevant software for billing and accounting system (2 Servers, 6 PCs, Software (DATAflex), etc.)	Increase of printers for billing to 10 units.
Soft Component: Training for KNWSC staff members on maintenance and operation of water facilities, and on strengthening of business management.	As Planned. Details in Table 3.

Some of the outputs were slightly modified from the plan. Most of the modifications were adjustment measures at the construction and they are recognized by the KNWSC as being appropriate to ensure proper construction¹⁰ With regard to the number of printers for issuing electricity bills, they were increased because it was envisaged that they would be used not only for issuing bills but also for issuing receipts and related tasks separately in different departments (from the interview to the main consultant of the project). Thus the consideration on quantity of printers is deemed appropriate.

From the above, the modifications to the inputs are within reasonable limits.

¹⁰ From the interview to KNWSC.

Table 3: Outputs of the Soft Component of the Project

Subject	Expected Output	Target participants at the Planning	Duration	Actual Participants
Training on Business Operation	KNWSC's management level employees and staffs in charge of business/accounting gain business knowledge and operation know-how required for operational management on water supply project and hence can carry out the project operation such as financial management (budget management & cost analysis) and business management.	2 management level employees in charge of general affairs & business respectively, 5 staffs in charge of business/accounting: 7 staffs in total	22 May, 2011- 22 July 2011	4 LVNWSB staffs 6 KNWSC staffs
Training on Public Education	<ul style="list-style-type: none"> - Residents gain adequate knowledge on relation between drinking water and health. - To contribute the promotion on willingness payment of water tariff by enlightening the intension on water service connection - KNWSC's staffs gain the technology on planning/operation of enlightenment assembly 	<p>30-40 persons for each assembly: 4 assemblies in Kapsabet town and 2 in other areas.</p> <p>1 management level employee in charge of business division, 2 staffs in charge of business.</p>	22 May, 2011- 22 July 2011	4 KNWSC staffs 497 residents participated in 6 meetings
Training on O&M of Water Supply Facilities	KNWSC staffs obtain necessary knowledge and skill to operate and maintain appropriately the facilities (water intake, water conveyance, water treatment and water transmission/distribution)	1 management level employee & 10 staffs in charge of technical division (4 staffs in charge of O&M on facilities, 2 staffs in charge of electric equipment, and 3 staffs of technicians): 10 staffs in total	16 October 2011- 16 December 2011	12 KNWSC staffs
Training on Leakage prevention & Water Meter Management	KNWSC staffs obtain methods of leakage survey/repair/leakage prevention measures and management method of water meter and manage pipeline with appropriate O&M.	1 management level employee of technical division & 5 staffs in charge of O&M on piping: 6 staffs in total	1 December 2011- 6 January 2012	9 KNWSC staffs 11 from other 2 water companies 4 LVNWSB staffs
Training on Billing/Accounting System Operation	KNWSC' staffs in charge of tariff/accounting obtain know-how of tariff application/accounting system	1 management level employee in charge of business, 6 staffs in charge of tariff/accounting: 7 staffs in total	1 November 2011- 6 January 2012	12 KNWSC staffs

The actual results of the soft components are also mostly according to plan. Although initially it was envisioned that only KNWSC employees would be targeted, at the time of implementation of this project (before the decentralization) the staffs of the LVNWSB, which is the body that oversees the KNWSC, were also included as participants for “strengthening business operations” and “preventing water leakage.” This is considered to be appropriate from the perspective that it used effectively a valuable opportunity for technology transfer.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The costs of this project borne by Japan were kept within the plan (78.7% of budget) at 1,609 million yen from within the E/N limit of 2,044 million yen. Kenya's portion of the costs is as shown in Table 4 below. Actual figure for the bank charge is not available, however, with all other required cost items were payed, it is reasonable to expect necessary bank charges were paid as well. All the items born by Kenyan side were completed and the total amount confirmed is within the planned budget (25.4%).

In this ex-post evaluation, only Japan's cost burden is assessed because data on some of the the actual cost burden items on the Kenya side could not be obtained, and the project cost is lower than the plan.

Table 4: Actual cost of the Project by Kenyan Side

Items	Plan (Kenyan Shilling)	Actual (Kenyan Shilling)
Land acquisition	2,000,000 (Approximately 3.59 million yen)	5,921,221
Power line for new water treatment plant (1site) for new service reservoirs (2sites)	949,000 (Approximately 1.71 million yen)	4,400,213.20
Installation of service pipes (full set)	76,932,000 (Approximately 138.01 million yen)	Installed pipes for 1,700m, actual cost data not available
Fencing for new water treatment plant (1site), for new service reservoirs (2 sites)	2,698,000 (Approximately 4.84 million yen)	4,974,428
Installation of water meters (400 units)	1,167,000 (Approximately 2.09 million yen)	
Preparation of access road outside of construction sites (500m)	2,133,000 (Approximately 3.83 million yen)	Constructed, actual cost data not available
Vehicle (for soft component)	3,473,000 (Approximately 6.23 million yen)	2 vehicles purchased, actual cost data not available
Bank charge	581,000 (Approximately 1.04 million yen)	Actual cost data not available
Total	89,933,000 (Approximately 161.34 million yen)	22,821,434 (Total of available figures)

Note: 1 Kenyan Shilling = 1.794 yen (at the time of planning)

Source: LVNWSB

3.2.2.2 Project Period

The project period of this project was estimated at the time of the plan to be 32 months from the start of the detailed design study. In actuality, although the detailed design study started in January 2009, the effect of the conclusion of E/N being delayed by about two

months resulted in a period of 33.3 months (28th January, 2009¹¹ to 7th November, 2011), taking longer than planned (104% compared to the plan).

Based on the above, although the project cost was within the plan, the project period exceeded the plan. Therefore, the efficiency of the project is fair.

3.3 Effectiveness¹² (Rating: ②)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

The anticipated effects of this project were divided into operation indicators, namely water supply capacity of water treatment plants, water supply hours, and water meter installation; and effect indicators, namely water supply population, water supply households, and fee collection. The level of achievement of each of the operation and effect indicators is as shown in Table 5.

Table 5: Plan and Actual Achievement of the Project (Operation and Effect Indicators)

Indicators (Unit)	Baseline year (2006)	Target at project completion (2011)	Target in 4 years after completion (2015)	Actual at project completion (2011)	Actual 2 years after completion (2013)	Actual 3 years after completion (2014)	Actual 4 years after completion ¹³ (2015)
Water supply capacity ¹⁴ (m ³ /day)	620	3,600	3,600	1,146 (Actual supply amount)	1,887 (Actual supply amount)	1,682 (Actual supply amount)	N.A.
Water Supply hours (hours/day)	Time restriction	24	24	12	12	12	N.A.
Water meter installation (Unit)	46	800	2,100	1,057	1,685	2,235	N.A.
Water supply population ¹⁵ (person)	5,000 (Area population :33,000)		32,500 (Area population: 41,400)	N.A. (Area population: 45,596)	N.A. (Area population: 47,006)	N.A. (Area population: 48,760)	29,532 (Area population: 57,078)
Water supply households ¹⁶ (household)	340 (Registered: 1,120)	1,620 (Registered: 2,230)	6,500 (Registered: 6,500)	N.A. (Registered: 1,963)	N.A. (Registered: 2,190)	N.A. (Registered: 2,501)	5,618 (Registered: 2,930)
Fee collection (million Ksh)	2.0	7.0	23.1	6.5	9.9	14.4	N.A.

Source: Figures of the Baseline year and targets are from the Basic Design Study. Actual figures are from KNWSC

¹¹ The detailed plan started on 28th January, the main E/N concluded on 26th July, and the starting date of 28th January is applied for the project period as from the beginning of the detailed plan to the completion of construction.

¹² A rating is assigned based on a judgment of effectiveness with consideration also given to impact.

¹³ Additional data on water supply population as of April 2015 was provided from KNWSC in June 2015.

¹⁴ Looks at whether the constructed facilities have the capacity to produce the water volume and water pressure that were in the initial plan.

¹⁵ “Area population” in the “Water supply population” of the baseline year (2006) was estimated based on figures used by the Ministry of Planning applying the data of census in 1990. The same of the target years in 2011 and 2015 were estimated using a population increase rate of 2.4% which was used by the Ministry of Planning. Target figure of “Water supply population” in 2015 assumed that coverage rates of different areas as follows: 100% in Township area and Kapngetuny area and 50% in rural areas.

¹⁶ Basic Design Study shows number of household in 2007 was 388 (registered number was 1,160) and target of year 2011 is 1,620 households (registered number is to be 2,230). See “(5) Number of Households Supplied with Water” for the method of calculation of the actual figure in 2015.

(1) Water Supply Capacity

The target figure for water capacity were set at 3,600 m³ per day, assuming 24-hour operation, at the time of project completion (2011) and four years after project completion (2015). The actual supplied water volume at the time of project completion (2011) was 1,146 m³ per day (31.8% of the target), whereas at the time of ex-post evaluation (2014) it was 1,682 m³ per day (46.7% of the target), reaching only about half the targeted water supply capacity. The main reason for the water supply volume at the time of the ex-post evaluation (2014) not reaching the target value in terms of water supply capacity four years after completion of the project (2015) was, as detailed in the sustainability section, that difficulties in paying electricity fees made it unfeasible to run the pumps longer than 12 hours, which is half of the initial plan. In contrast, as will be mentioned in 3.3.2 (1) below, more than 70% of users are satisfied with the water pressure. Based on these factors, if 24-hour operation of the pump as initially planned is enabled, it can be deemed that the constructed water treatment plant system has capacity up to the target volume of water.¹⁷

(2) Water Supply Hours

The target water supply time at the completion of the project (2011) and four years after the completion of the project (2015) was set at 24 hours per day, but in actual fact the water supply time at the completion of the project (2011) and four years after the completion of the project (2015) was 12 hours per day. Therefore, the target value was not met.

The reason for the non-achievement of the water supply hours target was same with that of the water supply capacity, which is the restriction on pump operation because of difficulties in paying electricity fees.

(3) Water Meter Installation

The number of meters installed was 2,235 at the time of the ex-post evaluation (2014), thereby meeting the target (2,100 units) for four years after the completion of the project.

The basic design study expected that installation of water meter is particularly for middle and high income households in the township and Kapngetuny area, however, at the time of the ex-post evaluation, KNWSC did not have a particular target of water meter setting. As the result, at the time of the ex-post evaluation, one registered user supposed to have one water meter. Number of registered user at the time of the ex-post evaluation (2014) was 2,501. Given this as the base number, actual number of water meter installation of 2,235 is 89.4% of the registered users. KNWSC explained the reason of the gap between the registered users and water meter installation is because KNWSC did not have enough number of water meters and could not install all the registered users.

(4) Water Supply Population

KNWSC estimated the water supply population in April 2015 as shown in Table 6. The target area is divided into three areas, and estimate averages of number of population

¹⁷ The same opinion was obtained from both the KNWSC and the LNVWSB.

served by a water tap or one connection according to different types of water supply (individual connection, yard tap, multi dwelling unit)¹⁸. Then, the total water supply population was calculated by multiplying the number of registered users by average number of population served by a tap or connection¹⁹. According to this estimation, total number of water supply population is 29,532, which is 90.9% of the target figure of the 4 year after the completion (32,500). This can be regarded as target has been almost achieved.

On the other hand, area population in the target area has grown rapidly. Area population 4 years after the completion of the project (2015) was estimated as 41,400, however, it has become 57,078 at the time of the ex-post evaluation (2014)²⁰. This suggests that the increase in the number of people is faster than expected and expansion of water supply system has not been keeping up with the increase in the population of the target area²¹.

Table 6: Water Supply Population in the Target Area (as of April 2015)

	Namgoi Area	Town Area	Kamobo Area	Total
Registered individual Connections (a1)	924	934	568	2,426
Active connections (b1)	912	921	483	2,316
No. of population served through individual connections (c1)	5	4	6	15
No. of population served through individual connections (by active connections) (d1=b1xc1)	4,469	3,684	2,898	11,051
No. of population served through individual connections (by all connections) (e1=a1xc1)	4,528	3,736	3,408	11,672
Registered yard taps (a2)	59	70	333	462
Active taps (b2)	57	65	302	424
Average no. of people served per yard tap (c2)	29	24	35	88
No. of population served through yard taps (by active taps) (d2=b2xc2)	1,653	1,560	10,570	13,783
No. of population served through yard taps (by all taps) (e2=a2xc2)	1,711	1,680	11,655	15,046
Registered multi dwelling units (a3)	2	2	38	42
Average no. of house hold per unit	15	20	11	46
Average no. of population served per multi dwelling unit (c3)	73	80	66	219
No. of population through multi dwelling units (e3=a3xc3)	146	160	2,508	2,814
Total number of population served (by active taps and connections) (f=d1+d2+e3)	6,268	5,404	15,976	27,648
Total number of population served (by all taps and connections) (g=e1+e2+e3)	6,385	5,576	17,571	29,532
Total number of population in the target area	14,830	14,830	27,418	57,078

Source: KNWSC

¹⁸ Individual connection is setting a tap in a resident's house. Yard tap is a tap set in a back yard of the resident's premise. Multi dwelling tap is a tap shared by more than one households at such as tenement houses.

¹⁹ For example, in Namgoi area, the average number of population served by an individual connection is 5 (line c1 of table 6), that of a yard tap is 29 (line c2, ditto) and that of multi dwelling unit is 73 (line c3, ditto). Multiplying these figures by respective number of registered users (individual connection: 924 (line a1, ditto), yard tap: 59 (line a2, ditto), multi dwelling unit: 2 (line a3, ditto)), and adding up all gives the total water supply population of 6,385 (line g of table 6).

²⁰ Each figure is a comparison between the target/forecast values for 2015 and the 2014 actual values.

²¹ When the plan was made, water supply coverage targets were set by areas, with a coverage level of 100% in the target year (2015) for the Township area and Kapngetuny, and 50% coverage for the others areas. In contrast, the actual figure (2013/2014) for the Township area was 72% and for Kapngetuny was 96%, whereas other districts amounted to 26%.

(5) Water Supply Households

KNWSC did not record actual number of water supply households. Based on the figures given by KWNWSC in April 2015 (Table 6), total number of water supply household can be estimated as many as 5,618 (registered users is 2,930)²², which is 86.4% of the target (6,500) of the 4 years after the project completion (2015). The target is not fully met, however, considering the fact that water supply population is close to the target, the expected effect of the project of “expansion of water supply service” has been realized in effect.

(6) Fee Collection

Although an increase in fee revenue was observed from 2 million Kenyan shillings (2006) to 14.4 million Kenyan shillings at the time of the ex-post evaluation (2014), the target of 23.1 million Kenyan shillings for four years after the completion of the project (2015) has not been reached (Table 5).

The implementation of this project marked the start of a metered system for fee collection. Before the implementation of the project, the fee structure was a flat fee (250 Kenyan shillings per month) regardless of the amount of water used, however, the installation of water meters by this project changed the system to one of metered payments for at least 70% of registered users²³. After the completion of the project, although the number of registered users had not reached the target of 6,500, it increased dramatically from 1,120 in 2006 to 2,501 in 2014 (123% increase) and maintained about the same ratio of fee collection as before the implementation of the project (around 70%), meaning that the FY2011/2012 fee revenue was roughly double that of the preceding fiscal year (FY2010/2011 total: 3,027,716 Kenyan shillings; FY2011/2012 total: 6,050,291 Kenyan shillings) (Attached Table 1). However, even if the collection rate were to have reached 100%, the the billed amount for FY2013/2014 is about 17.8 million Kenyan shillings and would not meet the target of 23 million.

On the other hand, the fee collection rate for FY2013/2014 was 76% (Attached Table 1), which means that fee for around one-fourth of the water sold was not able to be collected. According to KWNWSC, most of the payments in arrears are for the facilities of the police and other central-government-related public agencies. The water supply to these customers cannot be shut off in consideration of the effect it would have on public services, and therefore it is difficult to urge on the payment.

²² In the Basic Design Study, as shown in the target figures in the year of 2015 in the table 5, water user registration was regarded as one household. However, number of household using one water connection or one tap can be different according to type of water supply and more than one household use one registered tap in some cases, therefore, number of households using water of KWNWSC is more than the number of registered users. In case of individual connection, “Registered individual connection” (line a1 of Table 6) and number of water supply households should be the same. For the yard tap, regarding the “No of population served through individual connection” of the individual connection (line c1, ditto) as the average number of family members in one household, then the answer of the division of the figure of “No. population served through yard taps” (line e2, ditto) by the average number of family members in one household can be regarded as the number of households (Namgoi area: $1,711/5=342$, Town area: $1,680/4=420$, Kambo area: $11,655/6=1,942$, Total= $2,704$). For the multi dwelling units, “Average number of household per unit” (one line below a3, ditto) times “Registered multi dwelling units” (a3, ditto) gives the number of households (Namgoi area: $2 \times 15=30$, Town area: $2 \times 20=40$, Kambo area: $38 \times 11=418$, Total= 488). As the result, estimated number of the water supply household is 5,618 ($2,426$ (total of a1)+ $2,704$ + 488).

²³ Results of the beneficiaries study. Also from interview to KWNWSC.

One factor influencing fee revenue is the change in the rate of non-revenue water²⁴. After the implementation of this project, the rate of non-revenue water has been improved substantially (Table 7), and along with increases in water treatment plant capacity and the number of households supplied with water, the conditions for increasing fee revenue are coming into line.

In this way, while the introduction of metered rates, improvement of the rate of non-revenue water, and other advancements is creating the right conditions for revenue increases, the revenue increase has not reached the target set during the project planning.

Table 7: Change in Non-Revenue Water in Kapsabet area of KNWSC

Fiscal Year	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Revenue water (m ³)	73,849	79,845	80,016	180,662	312,322	370,978
Non-revenue water (m ³)	141,206	130,118	144,613	231,922	367,023	234,820
Rate of Non-revenue water (%)	65.7	62.0	64.4	56.2	54.0	38.8

Source: KNWSC

3.3.2 Qualitative Effects

Other qualitative effects anticipated for this project that were examined during this ex-post evaluation include the level of satisfaction of water users, the status of utilization of manuals introduced through soft component activities, other effects of the soft components, and the structural condition of the fee billing and accounting system.

(1) User Satisfaction

A study was conducted on user satisfaction levels as a reference for effect indicators. According to the beneficiary survey²⁵ the responses on “overall level of satisfaction” of the users were that more than 80% of them were “very satisfied” or “satisfied,” showing an overall high level of satisfaction (Table 8)

Table 8: Overall Satisfaction to the Water Supply after the Completion of the Project

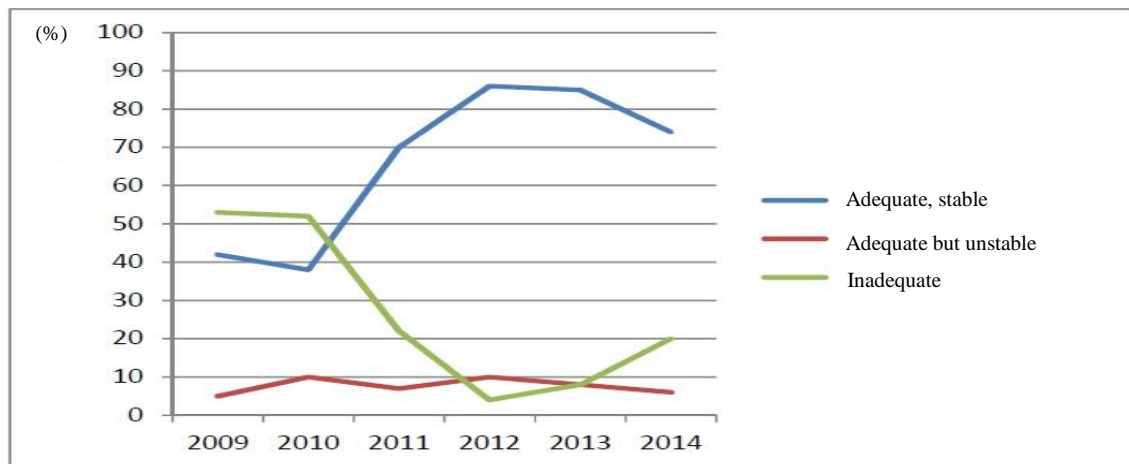
Response	Rate (%)
Very much satisfied	16.5
Satisfied	65.2
There are some problems	14.8
Unsatisfied	3.5
Very much unsatisfied	0.0

Source: Beneficiary Survey of the Ex-post evaluation

²⁴ Refers to the ratio of water for which revenue was not obtained, regardless of whether it was distributed from the water treatment plant. It is due to water leakage and water theft.

²⁵ Face-to-face poll based on a questionnaire of 127 users who had registered in the area where this project engaged in supplying water, conducted over a nine-day period from October 8 to 16, 2014. Sample numbers were apportioned to the number of registered users in each of nine water supply districts of the target area (Showground, Prison, Town, Chebarbar, Kamartagui, Kapngetuny, Kamobo, Kabutiei, and Major), then users were randomly sampled from the user list for each district in the area. 54% of the respondents were ordinal residences, 6% were hotels or restaurants, 2% were retail stores, and other users such as schools, churches, service businesses, and livestock businesses were included. Each respondent was asked questions regarding satisfactory level on water pressure and water volume at the time of ex-post evaluation and also in the past in the same questionnaire.

The level of satisfaction of the water users on each element of water provision was confirmed through a beneficiary survey that assessed satisfaction with water quality (taste, color, and odor), water pressure, water supply hours, and water volume, including the changes before and after the implementation of the project. As a result, regarding water quality, almost 100% of respondents were “very satisfied” or “satisfied” with each of taste, color, and odor (97%, 99%, and 98%, respectively). As for water pressure, about 80% responded selected “adequate” (Figure 2).

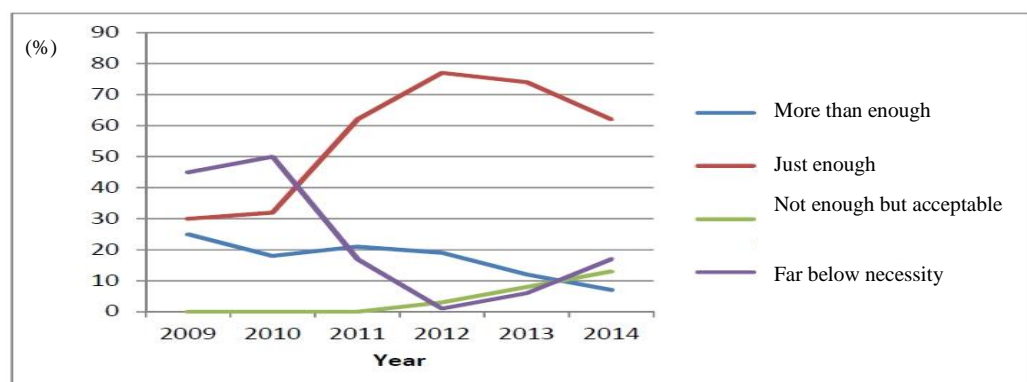


Source: Beneficiary Survey of the Ex-post evaluation

Figure 2: Change in Satisfactory Level on Water Pressure

With regard to water supply hours, responses showed dissatisfaction with the length of hours (it is short), along with dissatisfaction with not knowing when the water will stop.

On water volume, about 70% responded that it was “More than enough.” However, the past trend of “More than enough” responses since 2013 shows a decline, with “not enough” and “far below necessity” responses on the rise (Figure 3).



Source: Beneficiary Survey of the Ex-post evaluation

Figure 3: Change in Satisfactory Level on Water Volume

(2) Status of Use of Manuals Introduced through the Soft Component

At the water treatment plant, water quality inspections are performed twice a day, and the records are stored. The LVNWSB also carries out water quality inspections once per quarter, and through these results water quality is maintained appropriately. In addition, manuals introduced through the soft component were being used at the time of the ex-post evaluation, thus they are having the anticipated effect.

(3) Other Effects of the Soft Component

In this project, training sessions were given in the five areas of “strengthening business operations,” “educating residents,” “operation and maintenance of water supply facilities,” “water leakage prevention and water meter management,” and “fee billing and accounting system operations.” In each area, the following results and effects were confirmed upon the completion of the project and at the time of the ex-post evaluation, demonstrating that the anticipated effects were generally achieved.

(i) Strengthening Business Operations

This training was conducted with the aim of having the staff members in charge of management and business/accounting at the KNWSC acquire the necessary business and management knowledge for the operational management of water supply businesses, and to enable them to perform fiscal management, task management, and other business operations.

In the comprehension test after the training, the trainees’ average scores were more than 70 points in all the subjects including financial document preparation, budget management, cost analysis, measures for reducing non-revenue water, and public relations / extension / education, and it was judged that they had acquired the knowledge. At the time of the ex-post evaluation as well, the trainees maintained the knowledge they had acquired. The accounting and fiscal management works have been standardized and stably exercised.

(ii) Educating Residents

This training was conducted with the aims of having residents obtain adequate knowledge on drinking water and its relation to health, raising awareness for the intention to connect water supply, improving consciousness about paying water fees, and also having KNWSC staff members acquire skills in public relations and the planning and operation of educational assemblies.

During the training period, a questionnaire to the residents who participated in educational activities by the project showed that more than 90% of them understood the importance of sanitation and the role of water supply and sewerage systems, and more than half expressed desire for connecting water supply. Therefore it was judged upon the completion of the project that the anticipated effects had been realized. Two staff members who took part in these training sessions included an acting director and a meter inspection manager, and the knowledge is preserved in the company because they stayed at the KNWSC even at the time of the ex-post evaluation. However, upon commencement of the ex-post evaluation, no decision was made on the staff member that would be in

charge of resident education activities and such education activities were not carried out after the completion of the project. Then, during the execution of the ex-post evaluation, a person in charge of the resident education was appointed. The soft component effect in the resident education is low.

(iii) Operating and Maintenance of Water Supply Facilities

This training was carried out with the aim of teaching the KNWSC's technical staff members the appropriate methods of operating and maintaining of water intake facilities, water treatment facilities, water conveyance and distribution piping, and other water supply systems.

In the On-the-Job-Training conducted during the training period, it was confirmed that operations were being properly carried out, and that each facility's operations and maintenance tasks were converted into routine tasks. From this it was regarded that the objective had been reached at the time of the completion of the project. At the time of the ex-post evaluation as well, it was confirmed that tasks had continued to be carried out in a standardized manner and that manuals were being used, showing that the effect was maintained.

(iv) Water Leakage Prevention and Water Meter Management

This training was carried out with the aim of having the KNWSC's technical staff members understand water leakage investigation, repair, and prevention measures, as well as water meter management methods, to ensure appropriate maintenance of the distribution system.

In the On-the-Job-Training during the training period, it was confirmed that staff members understood water leakage detection methods and how to use water meter inspection devices, as well as that water meters were being installed with the correct tools. Based on these findings, it was deemed that the objective had been reached at the time of the completion of the project. At the time of the ex-post evaluation as well, the operations of meter installation, meter inspection, and new connection were being carried out according to the methods the trainees had learned. As for water leak detection, although the technique is being maintained, the shortage of staffs has resulted in a situation that necessary activities have not necessarily been carried out. Consequently, the effects in this area are partially not realized.

(v) Fee Billing and Accounting System Operations

This training was conducted with the aim of teaching the KNWSC's fee handling and accounting staff members the expertise to operate the fee billing and accounting system.

Upon completion of the project, it was confirmed that the billing and accounting system operations, the water fee billing and collection management and accounting processing using the system, and the customer ledger management had all been converted into standardized tasks. Thus it is deemed that the objective of the training was achieved. At the time of the ex-post evaluation as well, tasks continued to be carried out in a standardized manner, showing that the effect was maintained.

Most of the staff members who participated in the soft component training mentioned above remain on staffs currently, and except for the resident education area, the skills acquired were being used through to the time of the ex-post evaluation. Therefore, the effects have been generally realized according to the plan. As for resident education activities, after the completion of the project, although they were not carried out because staff members were not deployed because of budgetary shortages at the KNWSC, a customer interface staff member was appointed as a person in charge during the ex-post evaluation period

The billing and accounting system was mostly satisfactory, but mutual coordination between the billing and the accounting is inefficient because of lack of LAN in place (From the interview to the person in charge of accounting management).

Another noteworthy lesson regarding the soft component is proactive utilization of On-the-Job-Training. The soft component training plan of this project had the “conversion of tasks to standardized tasks for the instructed items” set as one of the envisioned effects of the training in each subject, wherein the training combined classroom instruction with On-the-Job-Training to apply guidelines and manuals to actual work tasks as a technique for bringing the acquired knowledge and skills into the organization. Because this kind of method requires a degree of flexibility in the training period, it increases the training administration costs, but it has the advantage of more fully realizing the effects from the training and retaining those effects for longer.

3.4 Impact

3.4.1 Intended Impacts

The intended impacts of this project include the stabilization of company’s business (improving the balance of income and expenditures), the status of utilization of the knowledge and skills in “strengthening business operations/management,” “educating residents,” and “measures for preventing water leakage” that were learned through the soft component, reducing the incidence of waterborne diseases in water users, and reducing the burden on water fetching labor.

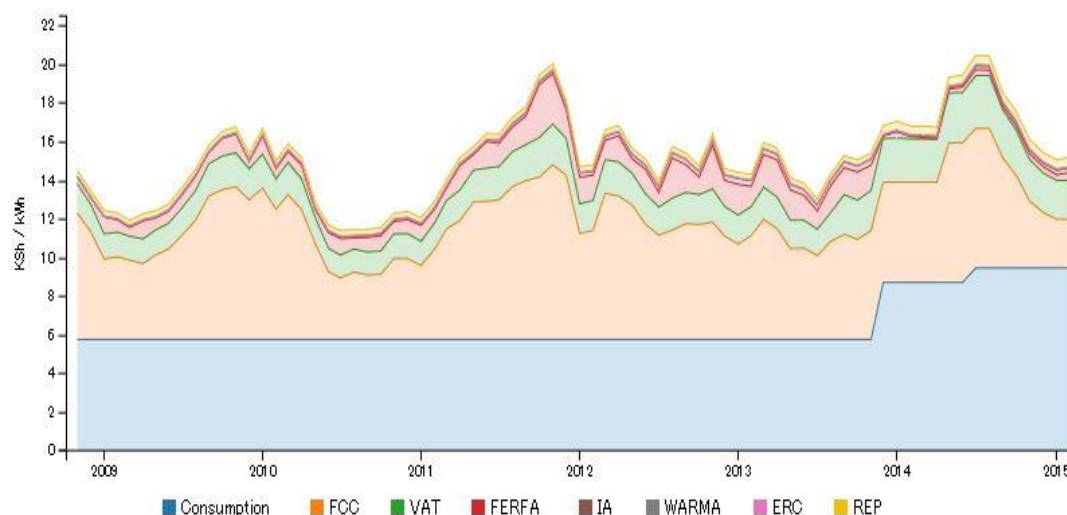
(1) Stabilization of Business (Improving the Balance of Income and Expenditures)

More than 70% of users have been transitioned to a metered fee payment system owing to this project²⁶, and there have been improvements in non-revenue water and a clear effect has been seen toward an increase in fee revenue, but the balance of income and expenditures has not reached to stable situation.

This can be said to be largely a result of the increased electricity fee burden and uncollected bills. In the Basic Design Study, the estimate for electricity usage fees in 2015 was 10.47 million Kenyan shillings per year for 24-hour water supply, but actually for 12-hour water supply status the cost has swelled to 8 to 9 million Kenyan shillings per year. Although the cost lowered slightly in FY2013/2014, electricity usage fees still took up roughly half of total expenditures, which are equivalent to roughly 60% of income excluding uncollected bills, and roughly half the total amount of all bills (Attached Table 2, Attached Table 3).

²⁶ Beneficiary survey of the Ex-post evaluation

Only a 5% inflation rate for electricity charges was taken into account during the planning, resulting in an estimated roughly 10 million Kenyan shillings being envisaged for 24-hour operation costs in 2015, but the actual result was that at the time of the ex-post evaluation the 12-hour pump operation costs amounted to 9 million Kenyan shillings, deviating dramatically from the forecast. Electricity unit price has trended as shown in Figure 4 since the latter half of 2008.



Source: Regulus Limited, Web site: “Electricity cost in Kenya” <https://stima.regulusweb.com/>

(Consumption: consumption unit price, FCC: Fuel Cost Charge, VAT: Value Added Tax, FERFA: Foreign Exchange Rate Fluctuation Adjustment, IA: Inflation Adjustment, WARMA: Water Resource Management Authority Levy, ERC: Energy Regulatory Commission Levy, REP: Rural Electrification Programme Levy)

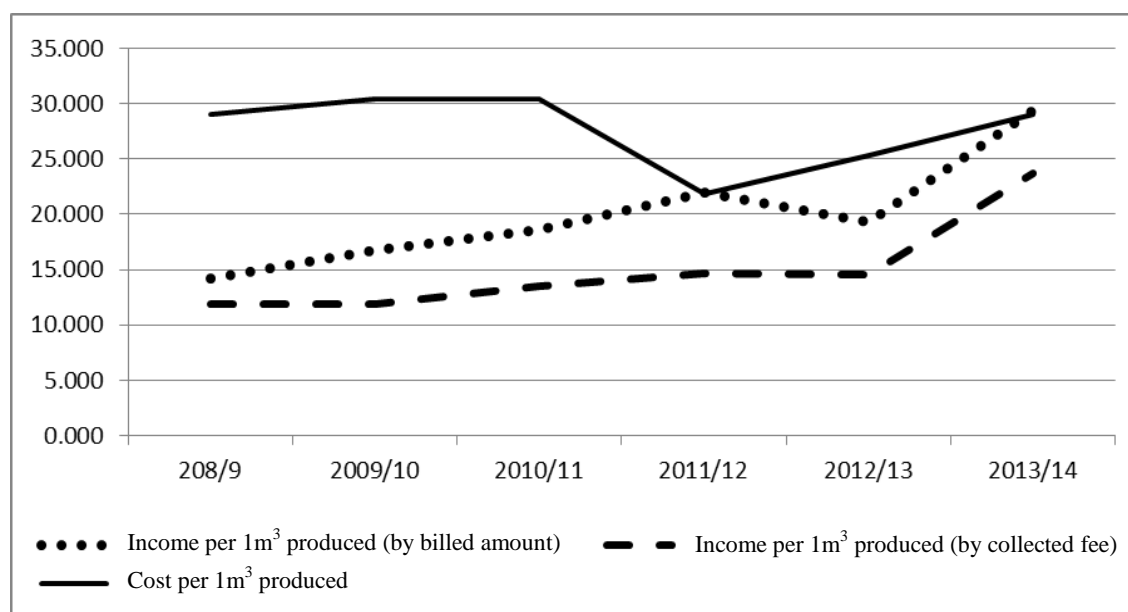
Figure 4: Electricity Unit Price for Small Scale Enterprise in Kenya

During the period from 2008 to 2013, the consumption unit price has not changed. Since the latter half of 2008, the falling oil prices owing to the influence of the bankruptcy of Lehman Brothers resulted in the fuel cost charge falling and put electricity fees on a downward trend, after which they fluctuated gently up and down. Since 2011, fuel cost charge rose again in response to the rising oil prices because of the influence of the Arab Spring, pushing up electricity price substantially, after which they remained at a relatively high level. In the latter half of 2013, electricity price showed a further uptrend, partly because of a price increase in the consumption unit price. As explained above, the influence of the large economic shock on a global scale caused rising electricity prices substantially, and it is deemed to have been difficult to have predicted the rise in electricity costs since 2011, at the time of the planning.

The trend in overall income and expenditures in Attached Table 3 shows that FY2011/2012 and FY2013/2014 had cash balances (the balance of actual cash income and expenditures) in the red, but the balance of bills and expenditures (the balance of income that should have been received and expenditure) was in the black.

Figure 5 is a graph showing the trend in cost and income per cubic meter of the total volume of water produced at the treatment plant. Because all the water produced at the

water treatment plant has a cost, turning a profit on water production requires not just the sold water but looking at the produced water as a whole. The graph shows that in FY2013/2014 income and costs were in line with each other on a “billed amounts basis,” and that if the fee collection ratio were 100% then enough income to cover the water production costs could be ensured. Although strictly speaking a more detailed analysis is needed, it can be said that as a business the water supply system is approaching profitability. However, it still cannot be said that costs and income are approximately in balance (it is not structured for profit) and that the system has reached a condition of contributing to stable operations.



Source: KNWSC

Figure 5: Cost and Income per 1m³ of Produced Water (Unit: Kenya shillings)

Another major financial issue is the delay in revision of water fee tariff to increase the water fee. This had not yet been achieved at the time of the ex-post evaluation. According to the LVNWSB, the board intends to approve an application to raise water fee if KNWSC carries such an application out. The condition was set, and in 2014 application was submitted once. However, because it was an application only for a rise in water fee in the Kapsabet water supply area²⁷, LVNWSB instructed that the application should be for all of the KNWSC which includes water tariff for the Nandi water supply area. Documents are now being prepared for submission in a re-application, meaning that it is almost certain that a revision in prices will be effected²⁸.

Another issue is that of the transfer of responsibility for financial aid to the KNWSC because of the decentralization of authority to counties based on the constitutional amendment of 2010. Prior to the decentralization, the Ministry of Environment, Water and Natural Resources supplemented the loss portion of the KNWSC’s balance sheet, such as by providing 100% subsidies through the LVNWSB in procuring chemicals and

²⁷ Because the KNWSC is a merger between a company in charge of Nandi water supply area and a company in charge of Kapsabet water supply area, even during the ex-post evaluation the water supply systems for both the areas are independent each other.

²⁸ From the interview to LVNWSB.

reagents for the treatment plant²⁹. The decentralization based on the 2010 constitutional amendment first actually went into effective form in FY2013/2014, after which budgetary allocations were begun for the county governments, and at the time of the ex-post evaluation the transfer work was still in progress. In the initial period of this decentralization, the recognition on the responsibility of the Nandi County government for the KNWSC was what had a large impact on this project. Specifically, the Nandi County government initially considered the KNWSC a private corporation and that, therefore, the Nandi government should not bear the responsibility for providing financial aid to the KNWSC directly³⁰. The delay in the revision to the law establishing the KNWSC (changes in owners, changes in membership in the board of directors, etc.) was another obstacle in adjusting the relationship between the Nandi County government and the KNWSC³¹. In this period of transfer of authority under the framework of the decentralizations, the supplementation of the negative portion of the KNWSC's balance sheet ceased from 2011 onwards.

In relation to this matter, even during the ex-post evaluation period as well, negotiations were being advanced among the three parties: the Nandi County government, LVNWSB, and KNWSC. As of February 2015, the parties had reached near-agreement, with the Nandi County government bearing 100% of the costs of purchasing chemicals and reagents, and also subsidizing electricity costs³².

In view of the above, although increased income was achieved, an improvement in the state of income and expenditures cannot be said to have been reached, nor has the business stabilized, because of such factors as rising electricity fees, delays in the introduction of new fee tariff, and the lack of subsidization of the negative side of the balance sheet from the Nandi County government as of yet.

(2) Effects of the Use of Skills and Knowledge on “Strengthening Business Operation and Management,” “Educating Residents,” and “Measures to Prevent Leakage,” acquired through the Soft Component

The guidelines and manuals provided through the soft component are being used even at the time of the ex-post evaluation for chemical management and water quality inspection at the water treatment plant, and to standardize work tasks for account management software and bill forms. The effects are sufficiently realized and are supporting the technical side of facility operations.

The calculation tables for mix ratios of chemicals at the water treatment plant, the software and bill forms for fee billing, and other measures introduced via soft components are being used even during the ex-post evaluation and are taking root as a way of standardizing work tasks.

²⁹ From the interview to LVNWSB.

³⁰ From the interview to the Nandi County government and LVNWSB.

³¹ From the interview to the Nandi County government and LVNWSB.

³² From the interview to the Nandi County government, LVNWSB, and KNWSC. A copy of the relevant minutes of the hearing was obtained. However, the electricity cost subsidy ratio was still being negotiated as of this ex-post evaluation.

(3) Reduction of Waterborne Diseases in Water Users

As an impact on water users, an effect on the reduction of waterborne diseases was not found (Table 9). Fluctuation in the number of patients shown in the table 9 cannot explain main effect of the changes, and the beneficiary study also found on the state of waterborne diseases that 83% responded that there had been “no change” before versus after project implementation. The reasons seem to include the fact that there was no small number of users who would already boil their water before using it prior to the water supply covering their area (beneficiary study) and that there has been no change in the infection sources not involving water supply (toilets, hand-washing, etc.; heard from Kapsabet Hospital).

Table 9: Number of Waterborne Diseases

	2010	2011	2012	2013	2014
Diarrhea	691	206	294	181	707
Dysentery	795	318	266	682	237
Vomiting	1	0	0	6	26
Total	1487	524	560	869	970

Source: Nandi County Hospital

3.4.2 Other Impacts

With regard to the expense of procuring water, compared to the purchasing water from a water dealer as was done prior to the implementation of the project, several comments were received to the effect that the procurement costs of water was reduced (beneficiary study). From some beneficiaries, the view received from all members was that before the project implementation they were paying between 30 and 200 Kenyan shillings, whereas the costs at the time of the ex-post evaluation were overwhelmingly less expensive considering the water quality and volume. In addition, many responded that they started a household garden after the completion of the project and that they were able to give more adequate drinking water to their livestock, because they can obtain water from a physically nearby location for a low price.

Moreover, 78% of respondents in the beneficiary study said that the labor they put into water transport had decreased.

There were no other impacts on the natural environment, land acquisition, resettlement, etc.

As explained above, in terms of effectiveness, although water supply hours and income have not met their targets, the water supply capacity achieved the target, water supply population was close to the target, and water meter installations, utilization of various manuals improved through the soft component achieved the targets, and user satisfaction levels are high. Regarding impacts, although business management stability (improvement in income versus expenditures) has not been achieved, the economic effects on users, a reduction in labor, and other benefits have been found, adding up to a degree of effect owing to the implementation of this project. Therefore, this project has to some extent achieved its objectives. Therefore effectiveness and impact of the project are fair.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

The deployment of the staff members of the KNWSC is as shown in Table 10. Although operation and maintenance, as well as the fiscal management structure, for the water treatment plant are mostly adequate, there is a shortage of staffs for water meter checking and drainage pipe management. According to a hearing with the accounting manager at the KNWSC, the lack of staffs deployed to water meter checking means that the monthly bill creation work takes time, often resulting in delayed sending of bills, and overall the fee collection system is not fully effective. During the ex-post evaluation as well, the questionnaire on satisfaction included multiple comments on the delay in sending bills. However, as shown in the section on effectiveness, the fee collection ratio has remained at around 75% despite the increase in the number of registrations, meaning that inadequacies in the billing and fee collection system are not a major issue.

Table 10: Staff allocation in KNWSC (Unit: person)

Title / Sections	Number of existing personnel at present	Number of allocated personnel for the position / section	Remarks
Board of Directors	8	7	
Internal Audit Manager	0	1	
Managing Director	1	1	On acting capacity
Technical Manager	1	1	On acting capacity
Meter Reader	1	5	
Non-Revenue Water	0	0	
Line Patrollers	4	9	4 casual engaged
Artisan Plumbers	3	9	1 casual engaged
Water Supply Operator (Treatment Plant)	1	2	
Electro-Mechanical Technician	1	1	
Pump Attendant	0	1	
Laboratory Technician (Treatment Plant)	1	1	Engaged a casual
Chemical Attendant	1	1	
Sewerage Operator	<i>Not yet handed over to KNWSC</i>	0	
Laboratory Technician (Sewerage)		0	
Sewerage Attendant		0	
Commercial & Administration Manager	1	1	
Office Assistant	1	1	Engaged a casual
Customer Care Officer	1	1	
Accountant	1	1	Engaged a casual
Expenditure Clerk	1	1	
Cashier	1	1	
Billing Clerk	1	2	Engaged a casual
IT Operator	0	1	
Supplies Clerk	0	1	
Driver	2	2	

Source: KNWSC

Furthermore, the KNWSC hires many non-regular employees (short-term contracts), which is the result of inadequate income to hire regular employees. To address this, the KNWSC is revising its remuneration standards for regular and non-regular employees to

maintain the motivation of non-regular employees for their work. According to the KNWSC, there is no impact evident on their implementation structure due to having many non-regular employees.

Education activities for water supply users were not being conducted during the period leading up to the ex-post evaluation, because of a lack of clarity at the KNWSC as to what department and where the manager who is responsible for education activities resides, as well as because of budget limitations. Therefore, without users fully understanding the water fee system (which is a combination of a flat rate and a metered rate), there is a possibility that this could lead to complaints about fee payment³³. Note that it has been decided that, during the implementation of the ex-post evaluation, the staff member in charge of customer interface will also perform education activities, and will commence these activities with regard to education on sanitation as well³⁴.

In addition, as mentioned in the effectiveness section, the internal LAN structure is outdated, resulting in inefficient transmission of work-related data among departments. In particular, because information transmission among the three departments of fee collection, accounting management, and financial information management is done by hand, there are delays in data transmission, mistakes in data, and other problems occurring.³⁵ Although this has not resulted in any major problems so far, this project has provided servers and other equipment for LAN construction, so the necessary equipment is all available and a prompt effort to build a LAN structure is necessary.

In view of these factors, despite the partial staff shortage, delays in creation of bills, lack of education activities, inefficient data transmission, and other challenges, water supply and fee collection are being carried out appropriately. Therefore, the sustainability in terms of the institutional aspects of operation and maintenance is considered as fair.

3.5.2 Technical Aspects of Operation and Maintenance

With regard to the technical aspects of operation and maintenance of the water treatment plant, the distributing reservoir, and the distribution piping, in each department tasks are being performed in a standards-based manner using the techniques learned via soft components, and there have been no major issues at the time of the ex-post evaluation.

As shown in Table 7, the non-revenue water ratio has been gradually declining since FY2011/2012. In training for a technical cooperation project known as the Project for Management of Non-Revenue Water, which was planned for coordination since when this project was planned, although only the acting manager of the KNWSC participated, afterward the following activities were carried out. Having falling steadily after holding at levels exceeding 60% until 38.8%, then, it is fair to say that the effect on the non-revenue water ratio owes to these activities.

³³ Confirmed from Customer Care Officer that there were claims from customers on over charges despite the calculations of the charge were correct. The beneficiary survey also found some respondents who did not understand how to read the invoice and/or receipt.

³⁴ Heard from the KNWSC.

³⁵ Heard from the accounting personnel at the KNWSC.

- Training to other employees by trainees
- Water leakage inspection and repair
- Replacement of deteriorated acrylic pipes
- Implementation of education activities for users
- Periodic checks for illegal connections
- Swift response to leaks, pipe ruptures, etc.

The malfunction in the water level auto-regulating system for the distributing reservoir that was pointed out in the defect inspection remained at the time of the ex-post evaluation, so it is currently not being used. However, the water level management can be performed manually as well, so this presents no obstacle to operation or maintenance.

Based on the above, the sustainability in terms of the technical aspects of operation and maintenance can be considered as high.

3.5.3 Financial Aspects of Operation and Maintenance

The KNEWSC's income, expenditures, and the status of its balance of income and expenditures are shown in Attached Table 1, Attached Table 2, and Attached Table 3. In terms of cash flow there is a chronic loss, but on a billed basis FY2011/2011 and FY2013/2014 are cash-flow positive. However, this is with restrictions in place on the operating time of the pumps. To verify the fiscal stability in the future, consideration will need to encompass elements such as future increases to the water supply prices.

At the time of the ex-post evaluation, the KNEWSC had submitted a price revision proposal (Attached Table 4) to the LVNWSB. If fees were to be collected based on this new fee structure, the estimated total billing amount would be about 28.9 million Kenya shillings, which is a 62% increase compared with the amount of 17.8 million Kenyan shillings in FY2013/2014. A concern about the new fee structure is an increase in unpaid fees especially among low income earners, but for users who use the lowest amount, which is less than 6 m³ of water, the flat usage fee will change from the current 250 Kenyan shillings to 380 Kenyan shillings (Attached Table 4)³⁶. As mentioned in the impact section, considering that the payment amount before the project implementation (2009) was 30 to 200 Kenyan shillings per day, an increase of 130 shillings in the monthly rate is seen as within allowable limits. As a result, an increase as estimated is anticipated.

In this new fee structure, supposing the fee collection ratio can be held around 75% as it was during the ex-post evaluation, the yearly cash income would reach about 21.7 million. Because the total expenditures are about 17.5 million Kenyan shillings based on the expenditure figures for FY2013/2014 (Attached Table 2), assuming income of 21.7 million Kenyan shillings, there would be about 4 million Kenyan shillings of net income.

³⁶ In the current fee structure, a water usage fee of 200 Kenyan shillings (33.33 Kenyan shillings x 6 m³) and a meter usage fee of 50 Kenyan shillings combine to total 250 Kenyan shillings. In the submitted proposal, a water usage fee of 330 Kenyan shillings (55.0 Kenyan shillings x 6 m³) and a meter usage fee of 50 Kenyan shillings combine to total 380 Kenyan shillings.

The electricity usage costs for FY2013/2014 were about 8.2 million Kenyan shillings, which corresponds to the conclusion that a rise in electricity usage costs of up to around 50% (to roughly 12.3 million Kenyan shillings) could be covered by that net income. Based on this, the pump operation time could be lengthened and the water supply time could be increased, leading to even more additional income. Achieving the income increase also needs a condition that the rate of non-revenue water is maintained at the level of 2014 (slightly less than 40%)³⁷, and continuous effort of prevention and response to water leakage is necessary.

Another concern in establishing financial independence is how to address the unpaid bills that are centered on public facilities. As mentioned in the Quantitative Effects subsection of the effectiveness section, most of the public facilities that are in arrears are public bodies that are affiliated with the central government. Therefore, it seems as if this will require direct negotiation on dissolution of late payments with the central government agencies under the authority of the Nandi County government. In addition, because the increase in fees may add to the risk of non-payment, this needs to be adequately addressed.

Moreover, as mentioned in the Stabilization of Business (Improving the Balance of Income and Expenditures) of the impact section, the ownership rights over the KNWSC were transferred to the Nandi County government in connection with the decentralization to regions, making financial aid to the KNWSC also the responsibility of the Nandi County government. At the time of the ex-post evaluation, deliberations on financial aid to the KNWSC by the Nandi County government had entered the final stage; as of February 2015, although it appears that a near-agreement has been reached wherein the Nandi County government will bear 100% of the purchase costs for chemicals and reagents and also subsidize electricity usage costs³⁸, actual support has not yet been realized. Furthermore, both the Nandi County government and the KNWSC think that the KNWSC should become financially independent in the future. Thus there are concerns as to how long the subsidies from the Nandi County government will continue and what the KNWSC's road map to financial independence will look like.

Note also that the KNWSC has created a five-year strategic plan starting in 2012³⁹ wherein it puts forth the establishment of its financial independence as one of its five priority challenges, with the following two pillars of activity plans as the concrete means of achieving that. However, the KNWSC has not clarified the feasibility of these activities.

- Increasing customers
 - Review of connections that are not being used
 - Streamlining of fee billing
 - Elimination of corruption

³⁷ Increase of rate of non-revenue water results in the situation that more water production (including waste water) is necessary to earn same amount of profit, which means cost of water production is higher.

³⁸ Heard from the Nandi County government, the LVNWSB, and the KNWSC. A copy of the relevant minutes of the hearing was obtained. However, the electricity cost subsidy ratio was still being negotiated as of this ex-post evaluation.

³⁹ Strategic Plan 2012-2017 (draft, February 2012)

- Promotion of Transfer of Pump Fees

- Transfer of office and treatment plant lighting to solar generation
- Conducting a feasibility study on a water supply system that uses gravity with Kilot Dam as the water source
- If the feasibility of the water supply system above is confirmed, then secure a funding source to commercialize it

Based on these factors, although there is a possibility of achieving financial sustainability in the future through the introduction of a new fee structure and improving the status of electricity cost payment and thereby extending pump operation time as a result, as well as through recovery of unpaid bills from public agencies affiliated with the central government, at the time of the ex-post evaluation the new fee structure still had not been put in place and concerns such as the non-payment of bills focused on public facilities remained. Therefore as of the ex-post evaluation, the sustainability in terms of the financial aspects of operation and maintenance is fair.

3.5.4 Status of Operation and Maintenance

Overall the facilities are being appropriately operated, so there are no major issues. Although there are some malfunctioning devices that have not been repaired, such as the water level auto-regulating system for the distribution reservoir, these have not presented a problem for operations.

From a hearing with the KNWSC, it was learned that the transformer installed by Kenya Power is currently working without issue, and that no subsequent problems occurred regarding the adjustment of voltage pointed out during the defect inspection.

Based on these factors, the status of operations and maintenance can be considered as good.

In view of the foregoing, there is sustainability in terms of the technical aspects, and at the time of the ex-post evaluation there are no issues of note on the status of operation and maintenance. Although the operation and maintenance of the facilities poses no obstacles, there are challenges from an institutional aspect, such as lack of personnel deployment and the non-performance of education activities. Regarding sustainability in terms of financial aspects, although a balance of income and expenditures has not been achieved as of the ex-post evaluation, it was confirmed that there is a possibility that sustainability could be established in the future through price increases, supplemental assistance from the Nandi County government, and other measures.

Therefore, some minor problems have been observed in terms of uncertainty in financial stability of KNWSC, the sustainability of the project effect is fair.

4. Conclusion, Recommendations and Lessons Learned

4.1 Conclusion

This project was implemented with the objective of increasing the water supply volume and ensuring the provision of safe water to residents in the project target area by improving the

water supply system facilities for water intake, conveyance, purification, and distribution in Kapsabet Town, thereby contributing to the improvement of the living environment in the target area. This project has been highly relevant to Kenya's development plan, development needs, as well as Japan's ODA policy. Although the one of the objectives was realization of 24-hour water supply, the project resulted in 12-hour water supply because of rising electricity costs, and income from water fees was also below the target. However, the rise in electricity prices that started in 2011 seems to have substantially resulted from the influence of the Arab Spring and related factors, and it is deemed to have been difficult to predict this consideration during planning and incorporate it into the project plan. Therefore, it is deemed that the relevance of the project is high because this factor does not diminish the appropriateness of the plan and the approach of the project. The efficiency of the project is fair, because although the project costs were within the plan, the project duration was longer than the plan. The targets for meter installation and water supply households were met and water supply population was close to the target. The anticipated contributions such as to reduce labor for water transport were confirmed as impacts, but the water supply hours and water supply volume were only about halfway achieved towards the target, and the increase in income achieved only about 60% of the target. Therefore, the effectiveness of the project is fair. Sustainability has been observed in the institutional and technical aspects of the project, and there are no problems in the status of operation and maintenance at the time of the ex-post evaluation. Although, in the financial aspect of sustainability, a balance of income and expenditures has not been achieved at the time of the ex-post evaluation, it has been confirmed that there is a possibility for sustainability to be secured through increase in water fee, expected supplementary funding by the Nandi County government, and other factors. Therefore the sustainability of the project is fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

(1) Prompt Commencement of Financial Aid by the Nandi County Government

To increase the KNWSC's pump operation time and increase the overall volume of water supplied, the Nandi County government and the KNWSC should come to an agreement on the Nandi County government bearing the costs of electricity, as has been promoted up to now, as expeditiously as possible. In conjunction with this, the KNWSC's strategic plan should be finalized promptly and starting in FY2015/2016 it should move to execution starting from whatever can be done, commencing concrete and realistic activities toward future achievement of financial independence.

(2) Effecting the New Water Tariff

To improve financial capacity of KNWSC to pay the electricity bill and to realize financial self-reliance, appropriate revision of water tariff is indispensable. Both KNWSC and LVNWSB have already worked on to realize the revision of the water tariff, however, it was not confirmed during the ex-post evaluation study. LVNWSB should take necessary action to approve the application submitted by KNWSC to realize the revision of the tariff as soon as possible.

(3) KNWSC's Construction of a LAN

To enable the sharing of accounting data between the billing section and the financial section via a LAN and streamline accounting and financial tasks and improve accuracy, the KNWSC should construct a LAN within their organization promptly using the PC servers provided in this project. This can be expected to resolve the data transmission errors, delays, and other problems associated with the current handwritten format for data exchange.

(4) Commencement of Education Activities for Users

Education activities should be carried out for users prior to the introduction of the new fee structure, led by the KNWSC's new education activities manager. This will obtain users' understanding of the need for a fee increase and the potential for improvement in water supply after the increase. Guidance should also be given on how to read the bills and other matters alongside the education, so that the users themselves can understand the reasons for the billed amounts.

(5) Continual Work for Reduction of Non-Revenue Water

To achieve financial stability in the future, KNWSC should continue its effort to maintain the non-revenue water, which was reduced to 38.8% in 2014. KNWSC should continue the on-going activities to improve the rate of non-revenue water to prevent it from getting worse again.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

(1) Ensure the Realization of Sustainable Project by Considering Water Supply Systems that Minimize Production Costs

In this project, it seems that it would have been difficult during planning to consider alternative proposals with lower production cost in operation, because that the elevation of the water source in the requested content was low, there was no other water source that could have used the gravity method for the target area, the water pumping method using an electric pump was still common at the time, and other reasons. However, taking into account water users' ability to pay charges, consideration for low income earners, and financial burden on the water provision business entity, the expansion possibilities for future provision, and other factors comprehensively, it is preferable to minimize water production costs. To achieve this, even if the initial investment is somewhat large, adequate consideration should be given at the project design stage, by both the requesting country and Japan, to the possibility of water supply systems powered by gravity, and other systems that have lower production costs during operation, if at all possible.

(2) Proactive Use of On-the-Job-Training and Introduction of Practical Tools through Soft Component Aiming at Internalization of learned knowledge and skills

The soft components in this project included not only classroom instruction and hands-on training, but it also incorporated those forms of learning into actual practice in actual

work situations. Moreover, by introducing into the training the forms and work process procedures that are actually used, it can be expected to be transferred as is into actual work. This kind of incorporation of OJT into soft components is a highly effective innovation. To boost the technical sustainability of grant facilities after the project, at the project planning stage adequate consideration should be given on the Japan side to these kinds of technology transfer programs that use OJT to the fullest extent when incorporating soft components.

Attached Table 1 Details of Income of KNEWSC (Unit: Kenya shillings, if not specified)

	Billed amount	Collected amount				Rate of collection (%)	Water produced (m ³)	Sold water (m ³)	Volume of non-revenue water (m ³)	Rate of non-revenue water (%)
		Consumption	Deposit	Others	Total					
FY 2008/9 Total	3,048,913	2,550,665	5,000	12,000	2,567,665	84	215,055	73,849	141,206	66
FY 2008/9 Monthly average	254,076	212,555	417	1,000	213,972	84	17,921	6,154	11,767	66
FY 2009/10 Total	3,528,698	2,468,522	17,000	16,000	2,501,522	70	209,963	79,845	130,118	62
FY 2009/10 Monthly average	294,058	205,710	1,417	1,333	208,460	70	17,497	6,654	10,843	62
FY 2010/11 Total	4,176,300	3,016,716	4,000	7,000	3,027,716	72	224,629	80,016	144,613	64
FY 2010/11 Monthly average	348,025	251,393	333	583	252,310	72	18,719	6,668	12,051	64
FY 2011/12 Total	9,040,712	5,601,291	258,000	191,000	6,050,291	62	412,584	180,662	231,922	56
FY 2011/12 Monthly average	753,393	466,774	21,500	15,917	504,191	62	34,382	15,055	19,327	56
FY 2012/13 Total	13,102,030	8,891,876	518,000	444,600	9,854,476	68	679,345	312,322	367,023	54
FY 2012/13 Monthly average	1,091,836	740,990	43,167	37,050	821,206	68	56,612	26,027	30,585	54
FY 2013/14 Total	17,825,260	13,468,260	301,000	614,500	14,383,760	76	605,798	370,978	234,820	39
FY 2013/14 Monthly average	1,485,438	1,122,355	25,083	51,208	1,198,647	76	50,483	30,915	19,568	39

Source: KNEWSC

Attached Table 2: Details of Expenditure of KNWSC and their changes (Unit: Kenya shillings)

	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14
Salary	2,177,484	2,177,484	2,177,484	2,231,969	2,955,400	3,301,872
Electricity	3,070,961	3,314,098	3,219,669	5,023,272	9,221,274	8,218,274
Operation and Maintenance	113,300	161,800	351,700	456,250	617,321	1,043,464
Travelling	47,700	23,300	166,300	93,700	210,600	571,750
Security	0	0	0	0	1,531,200	1,531,200
Chemicals	615,750	575,625	626,274	882,785	1,271,940	1,177,570
Stationary	33,000	28,800	68,100	80,500	134,500	167,900
Fueling	118,600	70,800	94,200	138,100	685,950	715,896
Others	75,800	33,644	124,470	113,630	601,392	799,123
Total	6,252,595	6,385,551	6,828,197	9,020,206	17,229,577	17,556,249
Rate of Electricity to the Total expenditure (%)	49.1	51.9	47.2	55.7	53.5	46.8

Source: KNWSC

Attached Table 3: Financial Balance of KNWSC and burden of Electricity expenditure (Unit: Kenya shillings)

	208/9	2009/10	2010/11	2011/12	2012/13	2013/14
Cash balance	-3,684,930	-3,884,029	-3,800,481	-2,969,915	-7,375,101	-3,172,489
Balance of billed fee and expenditure	-3,203,682	-2,856,853	-2,651,897	20,506	-4,127,547	269,011
Rate of electricity expense to the cash income (%)	119.6	132.5	106.3	83.0	93.6	57.1
Rate of electricity expense to the billed fee (%)	100.7	93.9	77.1	55.6	70.4	46.1

Source: KNWSC

Attached Table 4: New Water Tariff Proposal (Unit: Kenya shilling)

	2011/12 (Current)		2015/16 (Proposed)	
	Volumetric charge (per 1 m ³)	Monthly meter rent	Volumetric charge (per 1 m ³)	Monthly meter rent
Domestic/residential				
0-6m ³	33.33	50	55.00	50
6-20m ³	50.00	50	65.00	50
21-50m ³	65.00	50	80.00	50
51-100m ³	80.00	50	90.00	50
101-300m ³	100.00	50	120.00	250
> 300m ³	130.00	250	140.00	250
Commercial/industrial				
0-6m ³	33.33	50	65.00	50
6-20m ³	50.00	50	75.00	50
21-50m ³	65.00	50	90.00	50
51-100m ³	80.00	50	100.00	50
101-300m ³	100.00	250	130.00	250
> 300m ³	130.00	250	150.00	250
College/universities				
<600m ³	40.00	0	50.00	250
600<1200m ³	50.00	0	60.00	250
>1200m ³	90.00	0	90.00	800
Government Institutions				
0-6m ³	33.33	50	55.00	50
6-20m ³	50.00	50	65.00	50
21-50m ³	65.00	50	80.00	50
51-100m ³	80.00	50	90.00	50
101-300m ³			120.00	250
> 300m ³			140.00	0
Schools				
<600m ³	40.00	250	50.00	250
600<1200m ³	50.00	250	60.00	250
>1200m ³	90.00	250	90.00	250
Water kiosk	35.00	50	35.00	50

Source: KNWSC