

United Republic of Tanzania

Ex-Post Evaluation of Japanese ODA Grant Aid Project

“The Project for Zanzibar Urban Water Supply Development (Phase I and II)”

External Evaluator: Keisuke Nishikawa

Japan Economic Research Institute Inc.

0. Summary

In this project, water-sources were developed and old pump / distribution stations, as well as pipelines, were improved to provide Zanzibar’s residents in urban and western districts with safe and reliable water. Relevance of this project was high as the project was consistent with the development plan and needs of Zanzibar and was also with one of the priority areas of Japan’s ODA policy. With regard to the effectiveness of the project, while a 24-hour water supply was not realised and the overall improvement in water quality was limited, there were increases in the size of the population with a water supply as well as the amount of the water supply. The quality of water at the source and the minimum water supply pressure were also generally achieved. On the other hand, contributions of the project in economic and social development and stabilisation were limited mainly due to problems in distribution networks. As a whole, the effectiveness and impact of the project was fair. The efficiency of the project was fair as both the project cost and period exceeded the plan after a tender failure occurred for Phase II due to a surge in material costs, followed by the Implementation Review Study to revise the project cost. With respect to operation and maintenance, while there were no particular issues identified in the institutional aspects, there were some problems in technical and financial aspects as well as the current status of operation and maintenance. Therefore, the sustainability of the project was judged to be fair.

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

1. Project Description



Project Location



Welezo Reservoir developed in the project

1.1 Background

Water supply development in the urban and western districts of Zanzibar, comprising the Union Republic of Tanzania, started in the 1920s with the construction of water supply facilities using ground water and springs as water sources. By 1990, the total length of water pipes had reached 100km, water pumping stations and seven water reservoirs had been developed. Due to the lack of funds, however, rehabilitation and expansion of water supply facilities was not implemented and the supply capacities of the old facilities were not meeting the water demand at all. In the urban and western districts, the target areas of this project, the amount of water supplied to residents from existing water supply facilities was not sufficient and the residents were forced to experience restrictions of water supply to certain hours and suspensions of water supply. Moreover, the morbidity rates of waterborne diseases such as cholera were high among the people in the target areas due to inflows of sewerage leading to deterioration of water quality as the distribution pipes became older and the water pressure in the pipes declined. Therefore, an improvement in living environment was an urgent challenge.

Under these circumstances, the Government of Tanzania had an aim to supply safe drinking water stably, including Zanzibar's urban and western districts, to improve basic human needs, a priority area in the country's economic recovery programme.

1.2 Project Outline

The objective of this project was to provide residents in Zanzibar's urban and western districts with safe and reliable water by developing water-sources and improving old pump / distribution stations as well as pipelines.

Grant Limit / Actual Grant Amount	(Phase I) 1,230 million yen / 1,229 million yen (Phase II (original)) 847 million yen / 47 million yen (Phase II (revised)) 1,419 million yen / 1,362 million yen
Exchange of Notes Date / Grant Agreement Date	(Phase I) June, 2006 (Phase II (original)) June, 2007 (Phase II (revised)) February, 2009 / February, 2009
Implementing Agency	Government of Zanzibar: Ministry of Lands, Housing, Water & Energy / Zanzibar Water Authority (ZAWA)
Project Completion Date	(Phase I) March, 2008 (Phase II) August, 2010
Main Contractor	Konoike Construction Co., Ltd. (Phase I and II)
Main Consultant	NJS Consultants Co., Ltd. (Phase I and II)
Basic Design	March, 2005

	(Implementation Review Study: May 2006 and November 2008)
Detailed Design ¹	(Phase I) September, 2006 (Phase II) March, 2009
Related Projects	[Technical Cooperation] The Technical Cooperation Project for Enhancement of Water Supply Management of Zanzibar Water Authority (Phase I: 2008-2010, Phase II: 2011-2015) [Grant Aid] Grant Aid for Grassroots Human Security: Zanzibar Rural Water Supply Project I – IX (FY2003) [Other Donors] Finland, ‘Urban Water Supply Project’ African Development Bank, ‘Rural Water Supply Project’ KfW Bankengruppe, ‘Supporting Sanitation in Zanzibar’ etc.

2. Outline of the Evaluation Study

2.1 External Evaluator

Keisuke Nishikawa, Japan Economic Research Institute Inc.

2.2 Duration of Evaluation Study

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

Duration of the Study: August, 2013 – September, 2014

Duration of the Field Study: January 7 – 23, 2014 and April 18 – 26, 2014

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

3.1 Relevance (Rating: ③³)

3.1.1 Relevance to the Development Plan of Tanzania

Consistency with the national policy

In Zanzibar, a policy objective to ‘ensure adequate, affordable and economically accessible and sustained water supplies to all people and sectors using environmentally sound water resource management technologies’ was clearly stated regarding the water

¹ Indicating the date when a comparison table of basic design and detailed design was prepared and submitted, following a detailed design study conducted after the Exchange of Notes was signed.

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

³ ③: High, ②: Fair, ①: Low

sector in the ‘Zanzibar Vision 2020’ formulated in 2000. Based on this ‘Zanzibar Vision 2020’, the ‘Zanzibar Poverty Reduction Plan’ (hereinafter referred to as ZPRP) was launched in 2002 to alleviate poverty. One of the key strategies emphasised in the plan was to supply safe water to residents.

‘Zanzibar Vision 2020’ continued to be a valid comprehensive development plan at the time of ex-post evaluation, and the overall positioning of this project has not been changed in the policy context. As a strategy to realise this vision, the Zanzibar Strategy for Growth and Reduction of Poverty (hereinafter referred to as ZSGRP) was formulated following the ZPRP. One of the top priorities in the ZSGRP is to ensure the supply of a sufficient amount of quality water in Zanzibar, which implies that the water supply has high policy significance.

Consistency with the sector policy

The Water Policy, formulated in 2004, stated an objective that all people would be able to use clean and safe water and socio-economic activities would also be promoted. This policy was still effective at the time of ex-post evaluation without any changes in its objective.

As an organisation to implement these national and sector policies, Zanzibar Water Authority (hereinafter referred to as ZAWA), an implementing agency of this project, was established in 2006 and formulated the Strategic Business Plan (hereinafter referred to as SBP) in 2008. A revised SBP was later formulated targeting the 2013-2018 period. The current SBP has a vision to transform ZAWA into the best water service provider in East Africa and has a concrete action plan for the improvement in water supply services by improving the services in general, commercialising service provisions and improving financial performance.

Thus, there has been a high priority at the policy level on stable water supply in terms of quality and quantity throughout the period from planning to ex-post evaluation, and this project can be said to be consistent with these policies.

3.1.2 Relevance to the Development Needs of Tanzania

A survey during the planning stage revealed that existing water supply facilities had deteriorated and that water supply (water sourcing) capacities had been insufficient to meet the growing demand. Some other associated problems such as low water supply pressures and the worsening of the quality of supplied water were also apparent. In the survey, improvements in living environment were identified as an urgent matter to be tackled as the water quality was worsening due to deterioration of distribution pipes and inflows of

sewerage, causing high morbidity rates of waterborne diseases among the residents in the target areas.

While the access to water supply improved after this project as stated below, water demand has yet to be fulfilled even at the time of ex-post evaluation. According to ZAWA, it is estimated that approximately 20% of the urban population has no access to the water supply. Regarding the stability of the water supply, there were still some cases where unstable electricity supply, deteriorated facilities, and insufficient maintenance led to disrupted water supply, and some areas were experiencing insufficient water pressure. Furthermore, ZAWA themselves have recognised the possibility of water contamination due to the inflow of underground water penetrating through damaged pipes, and it is required that quality water be supplied at all times.

The population in Zanzibar's urban and western districts in 2002 was 390 thousand, and it jumped to 594 thousand in the 2012 Census, higher than the projection, showing the annual growth rate of 4.2%. It indicates that the needs for the water supply have grown further as the population had increased.

In light of the above, this project is consistent with the needs for a stable supply of quality water to an increasing population both at the time of planning and ex-post evaluation.

3.1.3 Relevance to Japan's ODA Policy

In the Country Assistance Program for Tanzania, formulated in June 2000, one of the five priority areas was to 'improve the living environment in urban areas through the development of basic infrastructure' and the need to develop water lines was clearly stated in the program. According to the FY2006 ODA Country Data Book, assistance was to be provided based on this country assistance program in 2006, when this project was being planned.

Therefore, this is regarded as a project that developed infrastructure facilities to stabilise the water supply in the urban areas of the People's Republic of Zanzibar and that crystalized the priority 'to develop basic infrastructure in urban areas'. Based on this judgement, this project can be said to have been highly consistent with Japan's ODA policy at that time.

This project is consistent with the development plan and strategy of Zanzibar both at the time of project planning and ex-post evaluation. The development needs of sufficient and stable supply of quality water have also been high, both at the planning and ex-post evaluation stages. This project, targeting an improvement of living environment by developing infrastructure in urban areas, was also found to be consistent with Japan's ODA

policy at the time of project planning.

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

3.2 Effectiveness⁴ (Rating:②)

The project effects expected during the planning stage can be broadly classified to (1) increases in the population with water supply and the amount of water supply, (2) achievement of stable water supply and (3) improvement in water quality. The following sections describe the achievement of these effects.

3.2.1 Increase in the population with water supply and the amount of water supply

Table 1 and 2 compare planned and actual figures of the population with water supply and the amount of water supply.

Table 1: Changes in the Population with Water Supply (Project Area)

(Unit: Person)

Service area	2002	2009 年	2010	2011		2012	2013
	Plan	Actual (estimate)	Actual (estimate)	Target	Actual (estimate)	Actual (estimate)	Actual (estimate)
Saateni	No details	167,190	186,361	No details	194,747	197,744	206,049
Welezo		169,816	189,288		197,806	200,850	209,285
Dole		34,023	37,925		39,631	40,241	41,931
Kinuni		68,451	76,300		79,733	80,960	84,360
Total	350,000	439,480	489,874	457,000	511,918	519,794	541,625

Source: Data provided by ZAWA

Table 2: Changes in the Amount of Water Supply (Project Area)

(Unit: m³/day)

Service area	2002	2009 年	2010	2011		2012	2013
	Plan	Actual (estimate)	Actual (estimate)	Target	Actual (estimate)	Actual (estimate)	Actual (estimate)
Saateni	No details	9,066	8,666	No details	8,983	9,352	10,720
Welezo		28,680	28,680		20,856	27,264	30,576
Dole		936	4,632		4,632	4,632	4,632
Kinuni		7,920	10,872		10,872	11,832	11,112
Total	40,100	46,602	52,850	54,100	45,343	53,080	57,040

Source: Data provided by ZAWA

⁴ Sub-rating for Effectiveness is to be put with consideration of Impact.

Although the above data was provided by ZAWA, they did not correctly capture reality.

The 'Population with Water Supply' in the above table indicates the 'population with connections to distribution networks with a minimal amount of water supply'. Since the implementing agency estimates that approximately 80% of the entire population in the project area is receiving water, the water supplied population shown in Table 1 is 80% of the total population. Therefore, the figures are not necessarily accurate. However, based on these figures, the actual number of people with water supply in 2011 exceeded the target population, being 112% of the plan.

The amount of water supply shown in the Table 2 is the estimation of pumped water calculated from each well's electricity consumption and pumping capacity, in addition to the amount of spring water. Judging from the level of achievement in 2011 based on these estimated figures, the amount of daily water supply was 84% of the target.

This project was implemented in two phases; Phase I covered the Saateni and Welezo service areas and Phase II covered the Dole and Kinuni service areas (completed in March 2008 and August 2010, respectively). Due to the project phasing, the amount of water supply in the Saateni and Welezo service areas had already increased by 2010. It can be observed that the amount in the Dole and Kinuni service areas recorded a large increase in 2010.

After the project completion, the population with water supply and the amount of water supply both increased in 2012 and 2013 from previous years, which shows that expanded water supply capacities enabled by this project have been underpinning these increases.

The demand for water in the project area (urban and western districts) was 37,603m³/day in 2011 according to a feasibility study conducted by ZAWA in 2012, showing that the amount of water supply was theoretically larger than the amount of water demand. However, the amount of water supply shown above is the same as the amount of water intake from springs and wells. Therefore, with the consideration of non-revenue water including water leakages⁵ from distribution pipes, it is highly possible that the water demand is greater than the water supply for users.

3.2.2 Stable Water Supply

At the time of planning, the achievement of the following items was expected regarding stable water supply.

- Improvements in the distribution system would enable minimum water supply pressure in over 90% of the project area while it is currently unachieved in

⁵ Although no comprehensive survey has been conducted, it is considered, according to the implementing agency, that 30% to 40% of the water from reservoirs is leaking.

approximately 50% of the area.

- A 24-hour water supply would be realised.
- A leakage rate of approximately 30% in the project area at the time of planning would be reduced to about 21% of the amount of water intake after the project implementation.

According to the implementing agency, the ratios of sub-districts with sufficient water supply pressure were 78% in the Saateni, 75% in the Welezo, 85% in the Dole, and 90% in the Kinuni service areas at the time of ex-post evaluation. It was observed that the sufficient water supply pressure increased in all service areas from approximately 50% recorded during the planning stage. Although it was only in the Kinuni service area that the target ratio of 90% was achieved, other service areas also recorded 83% - 94% of the target rate. Therefore, it can be said that the target has largely been achieved.

On the other hand, a beneficiary survey⁶ has revealed that 68% of the respondents replied that the water pressure had been the same and that 24% of them replied that the pressure had become worse (weaker), while only 9% of them were feeling the improvement.⁷ At the same time, 56% of the respondents replied that the water pressure was acceptable. These results show that while some residents are not satisfied with the weak water pressure, other residents have accepted the unchanged pressures.

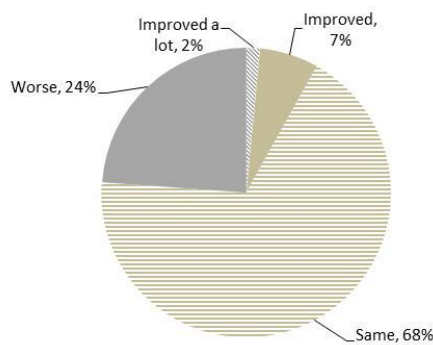


Figure 1: Improvement in Water Pressure

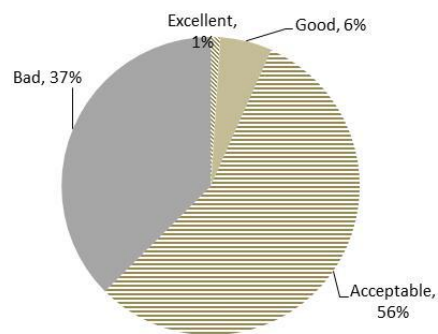


Figure 2: Satisfaction with Water Pressure

With regard to the 24-hour water supply, the data provided by ZAWA indicate that in Saateni, where spring water is the main source, the overall amount of water supply has remained restrained mainly due to declines in the amount of spring water. In this service

⁶ An interview survey with 200 residents receiving water from ZAWA in the Saateni, Welezo, Dole and Kinuni service areas was conducted. The main questions concerned stable water supply, improvements in water quality and water pressure, change in living environment, environmental and social impacts, maintenance conditions, etc.

⁷ The total exceeds 100% due to rounding after the decimal point.

area, the amount of water supply increased only by 18% from 2009 to 2013 while the population with water supply showed a 23% increase during the same period. In other service areas, although the water supply capacities are calculated to be sufficient to achieve a 24-hour water supply to their residents, the 24-hour water supply has not been realised on the part of water users. According to ZAWA, this is due to significant water leakages occurring in the distribution stage after the discharge from reservoirs. During the field survey, several points with leakage to the land surface were spotted.

In Zanzibar, laying records can be found for major pipes after the construction of water supply facilities started in the 1920s, but an entire distribution network is not known as there are no records of other distribution pipes. Therefore, accurate leakage rates cannot be calculated though they are considered to be between 30% and 40%. Also, coupled with the fact that the amounts of water supply and water usage are both estimated figures, no accurate non-revenue water rates have been captured.

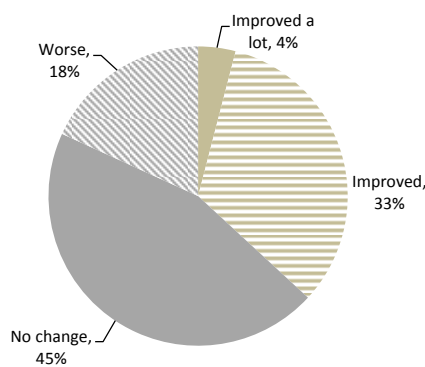


Figure 3: Changes in Water Supply Stability

Under these circumstances, a technical cooperation project ‘The Technical Cooperation Project for Enhancement of Water Supply Management of Zanzibar Water Authority (Phase II)’ being implemented at the time of ex-post evaluation, was collecting the data by setting a pilot area to accurately capture these actual situations.

The beneficiary survey results show that the stability of the water supply has ‘Improved’ for 37% of the respondents, ‘Not changed’ for 45%, and ‘Become worse’ for 18%, indicating that the respondents without feeling any changes account for the largest proportion. The breakdown of the remaining 55% who felt changes demonstrates a much larger proportion of respondents (37%) feeling improvements compared with the respondents (18%) feeling worsened situations. However, there is great variability between the settlements of the beneficiary survey. It is presumed that improvements are seen in the locations with relatively good distribution pipes from reservoirs, while no changes or worsening conditions are observed in the locations without good distribution pipes.

3.2.3 Improvements in Water Quality

In the water analysis of some springs and wells during the project planning, bacteria coliform and other common bacteria were detected, and the quality of water was expected to improve after the implementation of the project.

While ZAWA has its only laboratory at the Saateni Station for water quality inspections, no regular inspections were being conducted. As the laboratory was not equipped with sufficient inspection kits and the test reagent was out of stock, bacteria coliform tests were outsourced to a hospital several times a year. No systematic water quality inspection was established. The results of ad-hoc tests are recorded in the designated form, but no database has been created from the forms. It cannot be said that sufficient water analysis was conducted and it seemed necessary to improve test equipment and advance the development of human resources.

During the ex-post evaluation, ZAWA analysed the quality of water of the 11 wells developed under this project. According to the result of the analysis, there were no wells with infiltration of saline matters and all the wells also cleared Tanzania's criteria for other check items. On the other hand, samples of some non-regular test results from non-project wells were obtained, which showed that water from some wells had rather high electrical conductivity and needed to be treated before use⁸ while many other springs and wells had no problems for use. These results imply that the water quality of the wells developed under this project is generally better than other water sources.

In the beneficiary survey, 96% of the respondents replied that the quality of water supplied by ZAWA had not changed before and after the project. However, 93% of them also commented at the same time that the quality was acceptable. It is inferred that the improvement effect of water quality cannot be felt by water users as the water quality is, even though it is good enough at source, affected by old distribution pipes and infiltration of sewerage at the distribution stage. However, as tap water is normally boiled and used, the water quality has not become a big issue and the users have not particularly expressed their dissatisfactions.

3.3 Impact

3.3.1 Intended Impacts

At the time of project planning, improvements in sanitary conditions, and socioeconomic promotion and stabilisation were expected as project impacts, as indicated below.

- Water-borne diseases such as diarrhoea and cholera will be reduced and the residents' better health will be achieved.
- A supply of safe water will contribute to the development of the tourism sector and will be conducive to the promotion and stability of economic activities in Zanzibar

⁸ Water with impurities has a higher rate of electrical conductivity. Some of the results exceeded Tanzania's standards.

The following tables show changes in water-borne disease data in Zanzibar's urban and western districts during and after the project.

Table 3: Number of Cholera Cases

		2008	2009	2010	2011	2012
Unguja Island	Urban	0	23	0	0	0
	West	0	40	0	0	0
	Other	0	14	243	0	0
	Total	0	77	243	0	0
Pemba Island		48	528	5	0	0
Zanzibar Total		48	605	248	0	0

Source: Health Bulletin 2012 (Ministry of Health, Zanzibar)

Table 4: Dysentery Incidence

		2008	2009	2010	2011	2012
(Unit: %)						
Unguja Island	Urban	0.4	0.4	1.0	0.6	0.2
	West	0.5	0.2	0.2	0.3	0.3
	Total	0.5	0.3	0.5	0.4	0.2
Pemba Island		0.4	0.4	0.4	0.4	0.3
Zanzibar Total		0.5	0.3	0.5	0.4	0.2

Source: Health Bulletin 2012 (Ministry of Health, Zanzibar)

The project area covered urban and western districts in the above tables. No particular relationships between the project implementation and water-borne disease data can be observed, both in terms of annual changes in the same district and comparison with other districts. In the project area, there are approximately 50 other wells of ZAWA in addition to the 11 wells constructed in this project, and water is also supplied from individually-owned wells. Therefore, it was difficult to analyse how this project contributed to the reduction of water-borne diseases. There have not been any cholera cases since 2011, but according to Zanzibar Ministry of Health, this is attributed to the impact of oral cholera vaccination intervention.

With regard to an assumption of tourism sector promotion, contributions of this project are considered to be limited as a 24-hour water supply has not been realised. During the field survey, it has become clear that water is not always supplied even to hotels and restaurants that are playing a central role in the tourism industry. No changes in the amount of water supply were perceived by hotels and restaurants before or after the project. As insufficient water supply conditions have not changed, each facility has its own wells and/or transmission pipes, or fetches water from water kiosks by using their own trucks. The cost of water is lower for the amount obtained from the water supply network,

compared to providing all the water needed through their own routes. Considering that each facility is receiving the same amount of water as before despite the increases in water demand in other parts of the project area due to population increase, this project can be said to be of some help to tourism sector promotion in terms of partial cost reduction. In other words, once a 24-hour water supply becomes a reality, the cost reduction effects for the tourism industry will be a lot larger.

There were no noticeable examples observed regarding the promotion of Zanzibar's overall economy and the stabilisation of residents' economic foundation.

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment

During the project planning, the environmental impact assessment was not considered to be necessary for this project. The construction work was to be planned not to cause any negative environmental impacts.

According to ZAWA, no issues in relation to the natural environment were identified during and after the construction. In the beneficiary survey, no respondents observed any negative impacts.

During the field visit of the ex-post evaluation survey, no negative impact to the natural environment was observed.

3.3.2.2 Land Acquisition and Resettlement

During the project planning, it was deemed necessary that the implementing agency would fully confirm the construction locations as some of the sites for well development were surrounded by privately-owned land while the majority was government land. This consideration was needed as the accurate drill sites could not be determined in relation to water veins. According to ZAWA, actual well development sites were all within the government land and there were neither resident resettlement cases nor land acquisition cases seen as a result of project implementation. In the beneficiary survey, there were no respondents that reported any resettlement or land acquisition cases. No cases of resettlement or land acquisition were seen during the visits to all project sites in the field survey, and it can be confirmed that there are no issues.

While it is partly difficult to make clear judgements as various indicators are estimated figures, it was observed that the population with water supply increased to a level higher than the target and the amount of water supply from wells and reservoirs also increased to some extent by implementing this project. Although a 24-hour water supply has not been realised due to the leakages caused particularly by deteriorations of the distribution network which

was outside the project scope, water supply capacities were enhanced by developing wells and reservoirs. As for the supply of safe water, it cannot be judged that the supply system improved as a whole as the water quality inspection was not sufficiently organised. But the high quality of water from the wells developed under this project was confirmed. The water users were not feeling improvements in the quality of water due to the deterioration of distribution pipes and infiltration of sewerage in the distribution stage, but they were not showing significant dissatisfaction as the water was normally used after boiling sterilisation.

In respect to the impact of this project, it was difficult to find causality between the project and its contributions to the reduction of water-borne diseases. No typical examples were identified concerning the contribution of the project to socioeconomic promotion and stabilisation. On the other hand, there was neither negative impact on the natural environment nor resident resettlement / land acquisition cases. No particular issues were found in these respects.

In light of the above, a certain degree of project effects particularly in terms of improvements in water supply capacities and supply availability of quality water has been observed. Therefore the effectiveness and impact of the project is fair.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

In this project, facilities such as well pump stations, distribution facilities and some transmission / distribution pipelines were planned and developed, as shown in the table below.

Table 5: Output of the Project (Facilities)

Facility		Item	Number	
			Phase I	Phase II
Well pump station		Well	6	5
		Well pump	6	5
		Electrical equipment	6 sets	5 sets
		Well pump house	6	5
Distribution Facilities	Saateni	Transmission pump	4	-
		Electrical equipment	1 set	-
		Disinfection facility	1 set	-
	Welezo	Reservoir	2	-
		Disinfection facility	1 set	-
	Dole	Reservoir	-	1
		Disinfection facility	-	1 set
	Kinuni	Reservoir	-	1
Disinfection facility		-	1 set	
Transmission pipeline			Approx. 13km	Approx. 11km
Distribution pipeline			Approx. 9.6km	Approx. 10.3km

Source: Implementation Review Report and data provided by JICA

The facilities were developed mostly as planned both in Phase I and Phase II without major changes. Table 6 summarises changes from the original plan, which are minor and have not caused any influences on the achievement of project effects.

Table 6: Changes from the Original Plan

Phase	Changes
Phase I	Shape of chlorination house, Chlorinating equipment, Location of chlorination house, Transformer capacities, Area of recovery pavement, Piping route, Location of well pump installation, Route of transmission pipes
Phase II	Shape of chlorination house, Transformer capacities, Location of well pump installation, Pumping volume at wells

Source: Information provided by JICA

In addition to the development of these facilities, this project had a technical assistance component implemented by four consultants (a total of five man-months), consisting of (1) technical instructions on facilities operations, (2) instructions on institutional strengthening (management class training) and (3) activities to raise awareness on hygienic conditions among the citizens of Zanzibar. As a result of technical instructions on facilities operations, it was confirmed in the ex-post evaluation survey that proper operations and management of each facility and record taking by pump operators were undertaken. Concerning the institutional strengthening and awareness raising, this project covered only introductory training sessions on accounting and finance, personnel management and awareness raising methods. However, it is considered that these activities played a certain role as introductory courses to be carried on to JICA's technical cooperation project that was subsequently implemented at a larger scale.

The Tanzania (Zanzibar) side was scheduled to undertake land acquisition (for four reservoirs, 11 new wells, and transmission / distribution pipelines), fencing works (for four reservoirs and 11 new wells), power line installation (for four reservoirs and 11 new wells) and a disposal of replaced existing pumps (four sets). All the facilities were checked during the ex-post evaluation survey and it was confirmed that fencing works was conducted only at the Saateni Station and one of the new wells (Number: N13). Many of those new well sites already had poles for the fencing works and the fencing materials were already placed within the premises of the well pump stations. But the fencing works itself had not been carried out. According to the implementing agency, it took a longer time to confirm the land sections for those well pump stations. However, from the viewpoint of ensuring safety of water supply, it is considered to be necessary to expedite the installation works, including the reservoirs.



Photo 1: Saateni Station Transmission Pump House



Photo 2: Well (Number N9-2) – Fence not yet installed

3.4.2 Project Inputs

3.4.2.1 Project Cost

This project was implemented in two phases: with Phase I in which the Saateni and Welezo service areas were development and Phase II in which the Dole and Kinuni service stations were developed and soft component was implemented.

The planned and actual project costs were as follows.

Table 7: Comparison of Original and Actual Project Costs

(Unit: million yen)

		Original	Actual
Phase I		1,230	1,229
Phase II	Original E/N	847	47
	Revised E/N	1,419	1,362
Total	Original E/N	<u>2,077</u>	1,276
	Revised E/N	2,649	<u>2,638</u>

Source: Data provided by JICA

While this project was planned and Phase I was being implemented (before the tender process of Phase II was implemented), material costs surged beyond expectations and Phase II had a tender failure, which led to difficulties in continuing the project implementation. Therefore, the Implementation Review Study for ‘The Project for Zanzibar Urban Water Supply Development (Phase II)’ was conducted and the project costs were re-examined.

The actual cost for Phase I was 1,229 million yen against the planned amount of 1,230 million yen (1,133 million yen for construction and 96 million yen for designing and supervision). The cost for Phase II in the original E/N was 847 million yen, and 47 million yen was actually spent for the implementation of the soft component and for a detailed design study and tender administration when two tender failures occurred. The

cost in the revised E/N after the implementation review study was conducted was 1,419 million yen, and the actual project cost was 1,362 million yen (1,289 million yen for construction and 73 million yen for designing and supervision).

As the judgement in the ex-post evaluation study is based on the comparison of the E/N amount in the original plan and the actual cost at the completion of the entire project, the actual project cost of 2,638 million yen can be judged to have exceeded the original amount of 2,077 million yen (127% of the plan).

The project cost to be borne by the Tanzanian side was planned to be 45 million Tanzanian Shillings (approximately 4.52 million yen). The actual amount of 900 million Tanzanian Shillings was indicated by ZAWA as the cost of inputs, but no judgement could be made as there were no breakdowns specified and it was difficult to make a comparison with the original plan.

3.4.2.2 Project Period

The duration of this project was planned to be approximately 35 months, including the period for detailed design and tender process.

The actual project period was respectively as follows.

- Phase I: June 2006 – March 2008 (21.5 months)
- Phase II: June 2007 – August 2010 (37.5 months)

The original E/N for Phase II was signed in June 2007, but the second implementation review study was conducted following two tender failures. 4.7 months were required for this study and the E/N was revised and signed in February 2009, 20 months after the original E/N. Construction works after that progressed smoothly and the efforts were made to have the construction period shortened. However, the entire project was completed in August 2010.

As the evaluation judgement is based on the comparison of the project period in the original plan and the actual period at the end of the project, the project was completed in 50 months (June 2006 – August 2010), exceeding the planned period of 35 months by 43%.

Both the project cost and the project period exceeded the plan. Therefore, the efficiency of the project is fair.

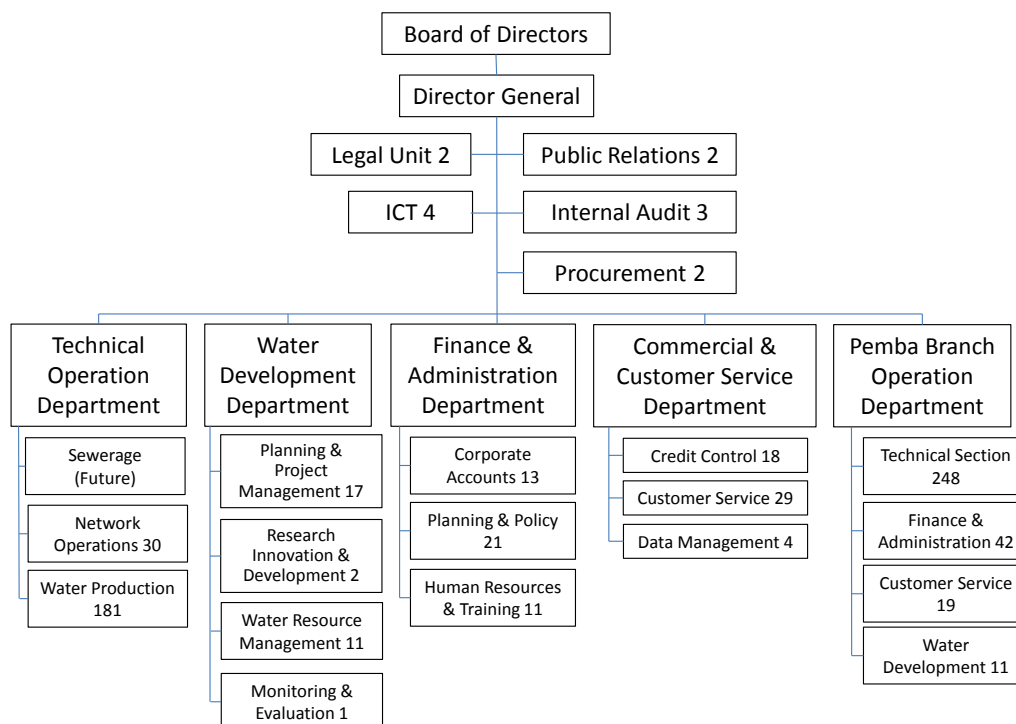
3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

The implementing agency of this project at the time of project planning was the Department of Water Development (hereinafter referred to as DWD) of the Ministry of Water, Construction, Energy and Lands, but the corporatisation process was already underway. After that, ZAWA was established based on the Zanzibar Water Authority Act, formulated in 2006. ZAWA at the time of ex-post evaluation was a public corporation providing water supply services in Unguja Island, where the area of this project was located, and in Pemba Island⁹, north of Unguja Island.

The number of ZAWA staff members at the time of ex-post evaluation was 677, of which 356 were assigned in Unguja Island (321 in Pemba Island). ZAWA has five departments: Technical Operation, Water Development, Finance & Administration, Commercial & Customer Service and Pemba Branch Operation. Operation and maintenance work (hereinafter referred to as O&M) in Unguja Island is undertaken by the Network Operations Section (30 members) of the Technical Operation Department for distribution networks, by the Water Production Section (181 members) of the same department for reservoirs and wells, and by the Planning & Project Management Section (17 members) of the Water Development Department for building maintenance. Services such as revenue collection are the responsibilities of the Credit Control Section (18 members) of the Commercial & Customer Service Department. The need to increase the number of staff in the Credit Control Section was pointed out during the project planning (12 at that time), and six staff members had been added by the time of ex-post evaluation. The number of staff in the Customer Service Section was also increased from 12 to 29, showing the strengthening of the authority's structure.

⁹ The People's Republic of Zanzibar consists of Unguja Island, Pemba Island and other surrounding small islands.



Source: Information provided by ZAWA

Note: Figures shown after section names indicate the number of staff

Figure 4: Organisational Structure of ZAWA

During the first half of 2014, when the ex-post evaluation study was being conducted, recruitment of new staff following the retirement of approximately 30 existing staff was carried out by ZAWA. As ZAWA was established by transferring DWD, the majority of the staff members were ex-DWD officers without specific qualifications, according to ZAWA. In the first half of 2014, ZAWA adopted an open recruitment process for the first time since its establishment to hire those who have expertise and/or experiences in the related fields. They actually hired a total of 52 new staff (40 in Unguja Island and 12 in Pemba Island) with academic qualifications in banking and human resource management, or with certificates in piping, statistics, information technology, etc. The efforts to raise average skill levels of the staff through the employment of qualified persons by adopting an open recruitment process can be highly evaluated.

3.5.2 Technical Aspects of Operation and Maintenance

At the time of planning, maintenance techniques of each O&M staff of DWD was thought to be at a certain level.

When the ex-post evaluation survey was conducted, ZAWA had several engineers with engineering knowledge and/or long-time experiences, enabling daily O&M of facilities. However, such engineers were limited, and repairing techniques of breakdowns, laying of

transmission and distribution pipes, planning of O&M plans, data recording and management were not sufficient as a whole. It was felt necessary to develop the capacities further so that O&M activities would be independently implemented in these fields. ZAWA also has recognition that the capacities of respective engineers in maintaining the facilities needed to be enhanced. Also, as there are no standards on the installation of water meters or distribution pipes, etc., leaving them to the construction style of their preference. It will be important to formulate and adhere to a laying standard, in order to maintain a consistent quality in construction.

ZAWA refers to an operation manual prepared in this project and manuals on customer administration system and revenue collection training prepared in JICA's technical cooperation project as necessary. It also has an 'Operation and Maintenance Manual 2012-2013' prepared with assistance from African Development Bank. However, these manuals were not necessarily utilised on a daily basis by all staff members as ZAWA has not conducted its own regular training courses, apart from participating in the courses offered inside or outside the country in JICA's technical cooperation project.

3.5.3 Financial Aspects of Operation and Maintenance

In Zanzibar, no water charges were collected from households in the past, but as the organisational structure was transferred from DWD to ZAWA, it is now required to start collecting the charges from general households gradually from 2008 and become financially independent without receiving subsidies from the government in the future.

ZAWA's financial conditions in recent years are as shown in the table below.

Table 8: ZAWA's Statement of Comprehensive Income

(Unit: million Tanzanian Shilling)

		FY 2009/10	FY 2010/11	FY 2011/12	FY 2012/13
Income	Billed Revenue	2,613.3	3,567.4	3,651.5	4,282.8
	Government Subsidies	2,544.0	2,070.1	2,746.5	2,004.0
	Electricity Subsidies	2,585.0	3,215.3	3,311.3	3,897.3
	Other Income	432.3	889.6	1,084.5	1,098.5
	Total	8,174.5	9,742.5	10,793.8	11,282.6
Costs	Electricity Costs	2,585.0	3,215.3	3,334.5	3,897.3
	Payroll & Related Expenses	1,406.3	1,508.9	2,190.5	2,196.8
	Other Expenses	1,476.9	1,652.7	1,926.1	2,435.3
	Depreciation of Fixed Assets	5,120.1	5,252.4	5,157.9	2,024.1
	Depreciation of Intangible Assets	15.2	16.5	18.1	6.9
	Bad Debt	0.0	111.6	3,894.4	1,916.0
	Allocation for Doubtful Debt	0.0	2,452.2	-868.2	295.6
	Total	10,603.4	14,209.6	15,653.3	12,772.0
Total Comprehensive Income		-2,428.9	-4,467.2	-4,859.5	-1,489.4

Source: Data provided by ZAWA

As is evident from the table above, while the water revenues are gradually increasing, the salaries and other expenses are also on the rise, resulting in a continuous inflow of large amount of subsidies from the Government of Zanzibar. The electricity charges for water supply services have also been fully subsidised and the level of subsidies has always exceeded water revenues. According to the Ministry of Lands, Housing, Water and Energy¹⁰, the governing ministry of ZAWA, these subsidies are to be gradually phased down and ZAWA is required to be more financially independent. In the SBP of ZAWA, it is aimed to cover the costs with water revenues by FY2017/18 by reducing operational losses and government subsidies will be reduced by 60% by that financial year¹¹.

Under these circumstances, ZAWA needs to strengthen water revenue collection. The current technical cooperation project has set a target to raise the collection rate to over 30% as one of the project's outputs, and has developed a customer database and improved billing operations¹². In August 2013, ZAWA started an activity called 'katakata' every week to urge non-paying customers to make payment or eventually to stop the water supply¹³. Through this activity, the water revenues increased substantially, recording 883 million Tanzanian Shillings in five months to December 2013¹⁴. This is a 50% increase from the same period of the previous year and it is expected that the annual water revenue will be approximately 50% larger than the previous year if the increases continue at the same pace. However, as there are many voices of dissatisfaction from the users regarding unstable water supply, it is imperative to improve the services at the same time to achieve stable water supply in order to further increase water revenues.

The water tariff, the other factor affecting the turnover, has been decided by the Ministry of Lands, Housing, Water and Energy and ZAWA has had no authorities to determine the tariff level. The authority will be delegated to the Zanzibar Utilities Regulatory Authority established in 2013. In Zanzibar's water supply system, water meters have not been installed except in some areas, as no water charges were collected from households until 2006. ZAWA is in the process of changing the billing structure by moving from a flat rate system to a metered system together with the installation of meters. For the households

¹⁰ It was originally the Ministry of Water, Construction, Energy and Lands at the time of project planning. As a result of government reorganisation, it is the Ministry of Lands, Housing, Water and Energy at the time of ex-post evaluation.

¹¹ However, ZAWA is positioned as a public corporation requiring a large amount of subsidies for some time. It is not clear if the SBP's target will be achieved.

¹² The collection rate was higher than 30% when the mid-term review study of the technical cooperation project was conducted in September 2013, in which this output has been analysed to have largely been achieved.

¹³ If a customer delays in payment for more than 90 days, ZAWA firstly visits the customer's house to request a payment to raise his/her awareness to pay for the bill. In the case of no payment despite the direct request, water supply will be eventually suspended.

¹⁴ The actual value paid as a result of the activities done by the Commercial and Customer Service Department, which is different from the billed revenue in Table 8 (values based on the issuance of water bills)

with a flat rate system, the rate was revised upward from 2,000 Tanzanian Shillings per month to 4,000 Tanzanian Shillings per month.

The O&M expenditure for the project area accounts for approximately 40% of ZAWA's entire O&M expenditure, as shown in Table 9. A proportion of the population in the project area is approximately 45% and the O&M expenditure in this area has not increased substantially after the project implementation.

Table 9: O&M Expenditure in the Project Area and ZAWA as a Whole

(Unit: million Tanzanian Shilling)

	FY 2009/10	FY 2010/11	FY 2011/12	FY 2012/13
Project Area	3,056	3,155	4,117	4,085
Entire ZAWA	7,933	8,520	9,263	10,936
Proportion of Project Area's O&M to the overall O&M of ZAWA	39%	37%	44%	37%

Source: Data provided by ZAWA

3.5.4 Current Status of Operation and Maintenance

In the ex-post evaluation survey, current statuses and issues of the facilities developed under this project were checked, including the procurement of spare parts and the status of the maintenance plan, and it was analysed with a site survey whether the facilities have been sufficiently maintained.

All the facilities developed under this project were visited during the site survey to see the maintenance conditions of the facilities. It was found that they were largely in good conditions although the meters of some wells were broken and one of the wells was temporarily stopped due to the breakdown of a part. In the past, water supply was frequently disrupted because of the instability of electricity supply, but the status of power supply improved a lot after a submarine cable from mainland Tanzania was opened in 2013. While the details on the number of power cuts and the durations of power cuts were not captured as there were no records available, water supply disruptions due to power cuts have been greatly reduced and no significant negative effects on operations were observed.

An annual maintenance plan for the water supply network, including these facilities, have been formulated with assistance from the African Development Bank, and a team of technicians are inspecting the facilities at least once a month based on this plan.

In spite of the regular O&M of the facilities without major problems based on this maintenance plan, however, mainly due to budget shortage, there is no preventive maintenance mechanism in place to replace pipes and other parts on a regular basis and breakdown maintenance has been the reality. Also, while frequently replaced spare parts are kept in stock, a lack of budget allocation mechanisms to respective departments based

on their budget request has made the procurement of spare parts a time-consuming process when breakdown occurs, leading to an issue of being unable to do repair work immediately after the breakdowns.

The facilities developed under this project have generally been maintained in good conditions despite some issues. However, as an entire water supply service area, there are a number of leakage spots due to the deterioration of distribution pipes, but the overall picture has not been sufficiently understood. As described in 'Effectiveness', leakages of distribution pipes have become chronic and the water from the facilities developed under this project has not fully reached the users. While these problems occur outside the scope of this project, it is important to do as much repair as possible on the distribution pipes so that water supply will become more stable.

No issues were identified in terms of the institutional aspect of O&M of this project as the roles of each department are clear and the number of staff was sufficient. It was also confirmed that efforts were made to employ qualified staff. In relation to the technical aspect, it will be necessary to provide its own training programmes to develop capacities of respective staff members, and to ensure better quality by setting sufficient installation standards of materials and equipment. As for the financial aspect, while the efforts are being made these days to improve revenue collection, it is requested that revenue collection capacities be strengthened and water supply be stabilised to move into the black as the subsidies are expected to phase out. Operation and maintenance conditions of the facilities developed under this project were generally good, but a lot of leakage spots were observed due to the deterioration of distribution pipelines. Therefore, it is required to immediately comprehend the current status of transmission / distribution pipelines and expedite procurement of spare parts.

Based on the above, some problems have been observed in terms of technical and financial aspects, as well as operation and maintenance statuses. Therefore, the sustainability of the project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

In this project, water-sources were developed and old pump / distribution stations, as well as pipelines, were improved to provide Zanzibar's residents in urban and western districts with safe and reliable water. Relevance of this project was high as the project was consistent with the development plan and needs of Zanzibar and was also with one of the priority areas of Japan's ODA policy. With regard to the effectiveness of the project, while a 24-hour water supply was not realized and the overall improvement in water quality was limited, there were

increases in the size of the population with a water supply as well as the amount of the water supply. The quality of water at the source and the minimum water supply pressure were also generally achieved. On the other hand, contributions of the project in economic and social development and stabilization were limited mainly due to problems in distribution networks. As a whole, the effectiveness and impact of the project was fair. The efficiency of the project was fair as both the project cost and period exceeded the plan after a tender failure occurred for Phase II due to a surge in material costs, followed by the Implementation Review Study to revise the project cost. With respect to operation and maintenance, while there were no particular issues identified in the institutional aspects, there were some problems in technical and financial aspects as well as the current status of operation and maintenance. Therefore, the sustainability of the project was judged to be 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

4.2.1.1 Importance of Data Collection and Compilation

In Zanzibar, as the information regarding transmission / distribution pipelines had not been recorded for a long time during the time of DWD, ZAWA does not possess the records of transmission / distribution pipe installation except for some of the major pipes and it is difficult to accurately understand the water supply network. As the customer database is being developed and an installation and leakage status of transmission / distribution pipes is being identified in JICA's technical cooperation project, these efforts need to be strengthened so that ZAWA as a whole will be equipped with basic information. On that basis, it will be important to understand the leakage rates and non-revenue water rates of each district so as to achieve stable water supply services and revenue collection in all districts in the medium to long term.

4.2.1.2 Necessity to Repair/Replace Deteriorated Water Pipes

While this project assisted with water development and installations of main transmission / distribution pipes as part of the entire water supply system in Zanzibar's urban / western districts, the project objective of supplying safe water to residents in a stable manner has not been sufficiently achieved due to the problems with the distribution network. In order to reduce water leakages, it is essential for ZAWA to take a comprehensive view of the entire water supply network and, with support from donors as necessary, to rehabilitate the facilities such as deteriorated distribution pipes which have become bottlenecks.

4.2.1.3 Importance of Developing Human Resources

One of the important factors to improve water supply is to secure staff members with technical knowledge for long periods and cultivate them. It is important to continue hiring the staff with qualifications, as seen for the first time in 2014, provide training courses within ZAWA, and improve data development capacities on transmission / distribution pipelines and customers so that the management capacities of the entire ZAWA in water supply services will be enhanced.

4.2.1.4 Tightening of Security Measures at Facilities

It was found in the site survey of the ex-post evaluation that fencing work (obligation of the Tanzania (Zanzibar) side) had not been implemented at many of the project facilities. From the viewpoint of water supply safety, it is essential to tighten security measures at the facilities to prevent free access by non-authorized personnel. For this purpose, it is necessary to immediately increase the allocation of security officers and install fences around wells and reservoirs as agreed by the two governments.

4.2.2 Recommendations to JICA

At the time of ex-post evaluation, a technical cooperation project on enhancing the capacities of ZAWA's non-revenue water measures and improving revenue collection rates was being implemented as stated above, and the capturing of the current status of transmission / distribution networks was progressing within the framework of this project. While this project covered water development and enhancement of transmission / distribution capacities, it is indispensable to understand the water supply network including distribution networks, the current status of leakage rates and non-revenue water rates, and the customers within the supply areas to improve the entire water supply services. In this context, continuation of the current technical cooperation project, trying to capture these situations by setting a pilot area, seems to be effective so that ZAWA will be able to keep supplying safe water in a stable manner.

4.3 Lessons Learned

4.3.1 Assistance on Capacity Development in Addition to Facility Development

In addition to this project that aimed to enhance the capacities of water supply facilities, a technical cooperation project was implemented to improve management foundation by establishing a revenue collection structure. In order to achieve the improvement of the entire water supply services, efforts to sustain the project effects, i.e. to develop capacities to maintain those facilities and manage the water supply network, in addition to the

development of facilities in this project, are effective as a combination in generating synergetic effects and can be a good reference when formulating similar projects.

4.3.2 Implementation of Project based on the Entire Water Supply Network

Water supply services are a service that functions as a series of network from water intake until distribution. This project supported part of the water intake and distribution system. It was, however, observed that there were some aspects where the project effects were constrained by leakages associated with the deterioration of distribution networks, which was outside the project scope. Since a challenge the Government of Zanzibar had at the time of project planning was particularly on water development in its supply network, it can be said that it was appropriate for this project to put a priority on water development and the installation of main transmission / distribution pipes. However, in order to realise a project design that would achieve that effectiveness and impact, it will be important even in a project with a focus on water intake and transmission to (1) conduct interviews on the installation year, pipe types and leakage spots as well as survey actual installation points with GIS data and estimate non-revenue water rates roughly by capturing flow volumes so that the statuses of distribution networks will be understood as accurately as possible at the time of project planning, (2) thoroughly examine the implementation structure, schedule and financial backups among the stakeholders at the time of planning to have common understandings on the development of other facilities and equipment that had become bottlenecks to achieve the project objective at a higher level.

(End)