Kenya

Nairobi Water Supply Project

Report Date: October 2002
Field Survey: August 2001

1. Project Profile and Japan's ODA Loan

Project Site (Northern Nairobi)

Picture of transmission pipeline (Japanese ODA financed portion)

1.1. Background

The population in Nairobi city was about 1.3 million in the mid-1980s. While the population of Kenya increased about 4% per annum from the 1960s, the population in Nairobi increased more than 5% per annum as a result of urbanization. The population in Nairobi was expected to reach about 2 million in 1995 and about 3.9 million in 2010. To cope with the rapid population increase in Nairobi, an expanded water supply system was urgently required.

International donors, following the lead of the World Bank, had assisted in promoting this expansion by supporting several water supply projects. The Nairobi Water Supply Project (hereinafter 'the Project') was co-financed by the World Bank, the African Development Bank (AfDB), the European Investment Bank (EIB) and the JBIC.

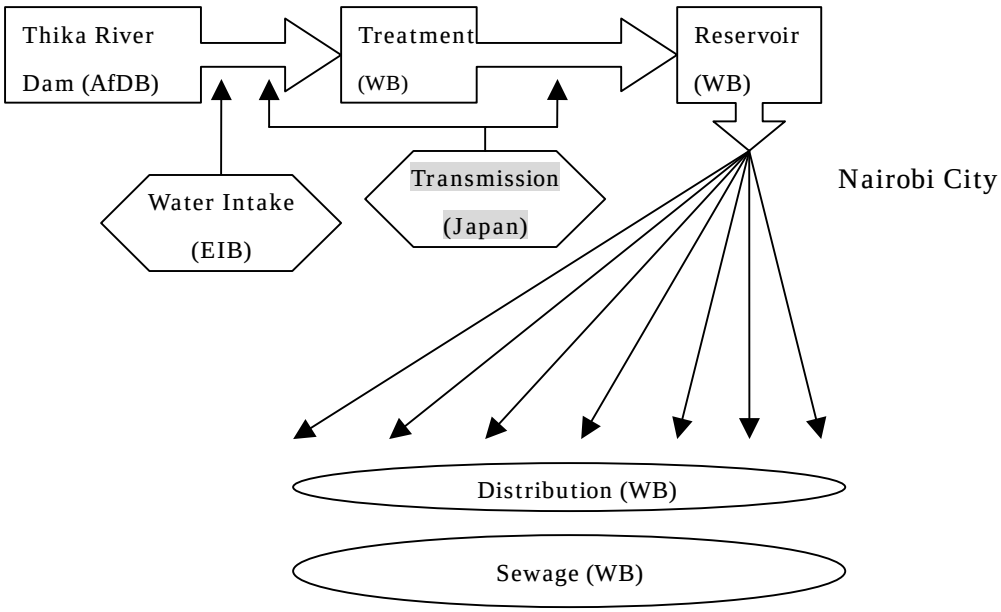
1.2. Objectives

To expand the water supply system in the project area (Thika River resources), from 194,000m^3/day at the time of appraisal, to 492,000 m^3/day as of 2002, in order to meet growing

water demand in Nairobi (Japan's ODA loan portion). The objectives of the whole project (hereinafter 'the project') include improvement of water supply and sewage treatment capacity, expansion of water supply to low-income communities, and institutional development of the Water and Sewerage Department of the Nairobi City Council.[1]

1.3. Project Scope

The total scope of the project consists of (1) construction of transmission pipelines, (2) construction of a dam, (3) construction of a water intake system, (4) construction of a water treatment system, (5) construction of a water distribution system, (6) construction of a sewage water treatment system, (7) consultant services, and (8) technical assistance. The Japanese ODA loan portion covers (1) construction of transmission pipelines, which is detailed as follows:



[1] Known as NCC for the purposes of this report.

Scope of Japanese ODA Loan Portion

a) Raw Water Transmission Mains	(1) Tunnel outlet structure at Mwagu (2) Raw Water Transmission Pipeline: DN 1200mm; 6.5 km (3) Inlet pipe work arrangements at Ngethu
b) Treated Water Transmission Mains	(1) Outlet pipework arrangements at Ngethu (2) Treated Water Transmission pipeline DN 1400mm; 13.8 km DN 1200mm; 17.0 km DN 1000mm; 5.5 km (3) Inlet pipe work arrangements at Gigiri reservoir

Source: JBIC Appraisal Report

1.4. Borrower / Executing Agency

The Government of Republic of Kenya / Nairobi City Council (formally called Nairobi City Commission)

1.5. Outline of Loan Agreement

Loan Amount	5,342 million yen
Loan Disbursed Amount	4,963 million yen
Exchange of Notes	March 1989
Loan Agreement	March 1989
Terms and Conditions	
Interest Rate	2.5 % p.a.
Repayment Period (Grace Period)	30 years (10 years)
Procurement	General Untied
Final Disbursement Date	August 1994

2. Results and Evaluation

2.1 Relevance

In the National Development Plan 2002-2008, the importance of water as both a basic need and an input in the economic and social development process is emphasized. In addition, providing a

sufficient quantity of good quality water is listed as an overall goal of the national water development policy. In this light, it can be concluded that this project is still relevant.

2.2 Efficiency

The Japanese ODA loan portion has been implemented with no substantive change in scope, despite nine months' delay in project completion mainly due to delay of tender evaluation process. The loan amount was 5,342 million yen, of which 4,963 million yen was disbursed. This decrease is largely attributable to the depreciation of KSh against Japanese yen during the construction period. It is concluded that the Japanese ODA loan portion was efficiently implemented.

2.3 Effectiveness

2.3.1 Physical Effectiveness

With completion of the project, water production capacity was expanded from 194 thousand m^3/day to 455 thousand m^3/day, slightly lower than the Target of 492 thousand m^3/day. At the time of appraisal, it was expected that water production through this project would meet the water demand until 2000. As Table 1 indicates, although the actual volume of water production was lower than the target in 2000, volume exceeded demand and the project, therefore, accomplished its objective. The lower volume of production is due to the lower water demand than expected.

In spite of the increase of water production, sales of water seem to be almost unchanged from 1985, before the project. This may be attributed to the high rate of unaccounted for water. In fact, the rate of unaccounted for water is getting worse. According to the NCC, (1) the number of unmetered estates and illegal connections is quite high, (2) even if metered, the quality of meter readings is inadequate, and (3) water pipelines that are not repaired leak and burst frequently.

It can be concluded that this project helped cope with growing water demand in Nairobi; however, unaccounted for water rates must be improved in the future.

Table 1 Physical Effectiveness Indicators

Indicators	Before Project	After Project			Target
	1985	1995	1997	2000	2000
1.Population (thousand)	1,162	1,995	2,090	2,143	2,490
2.Production capacity (thousand m^3/day)	194*	455	455	455	492**
3.Production (thousand m^3/day)	n.a.	269	347	396	466
4.Demand (thousand m^3/day)	203	n.a.	n.a.	370	466
5.Sales (thousand m^3/day)	149***	194	170	n.a.	n.a.
6.Unaccounted for water (%)	30*	28	51	52	20

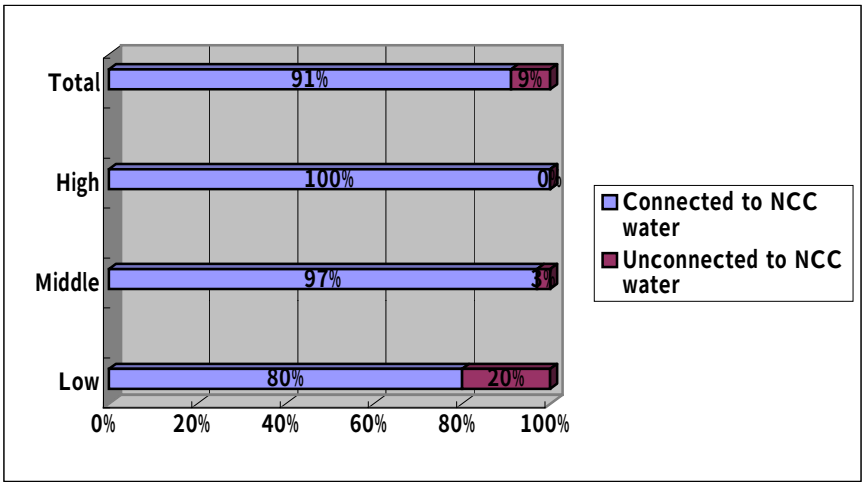
Source: JBIC Appraisal Report, NCC, World Bank *World Development Indicators 2000*

Note: *1989 (appraisal) figure, ** or incremental capacity of 259 mil. /day; ***1988 figure

2.3.2 Interview Survey

In order to assess the effectiveness and impact of the project from the stakeholders' perspective, an interview survey of sample a population (size=100 people) was conducted in high, medium and low income areas (sample sizes of 30, 30, and 40, respectively, representing the population ratio).[2] Responses that reflect the effectiveness of the implemented measures are summarized below.

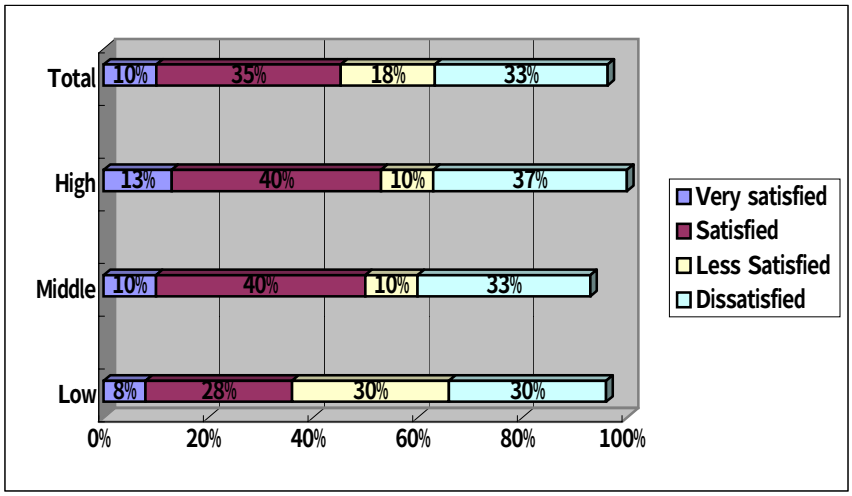
Q1. Are you connected to the Nairobi water supply system?



[2] Nairobi city is clearly divided into "rich areas" "middle class areas" and "poor areas," with the ratio of population sizes roughly 2:3:4. This population ratio was applied for sampling.

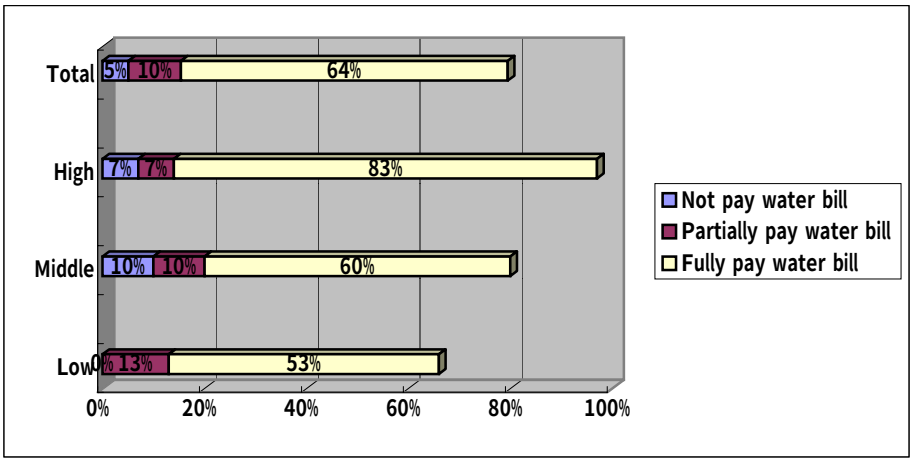
On average, 91% of respondents were connected to the Nairobi water supply source, although a correlation between income and connection ratio was apparent.

Q2. Are you satisfied with the water supply after 1994?



While more than half of the higher and middle-income groups expressed satisfaction with the project, 60% of the lower income sample responded they are less satisfied or dissatisfied with the project. The reasons turn out to be income sensitive. When 25 lower income people were asked to give reasons for why they were “less satisfied” or “dissatisfied” with the project, 11 responded “unstable water supply,” 6 responded “insufficient amount of water,” 4 responded “bad water quality,” 1 responded “unreasonable water charge,” and 1 responded “inadequate maintenance.”

Q3. Do you pay your water bill?



While more than half of the sample residents in any income group fully pay their water bills, 7%

of the higher income and 10% of the middle-income group do not pay their water bills at all.

2.3.3 Financial Effectiveness

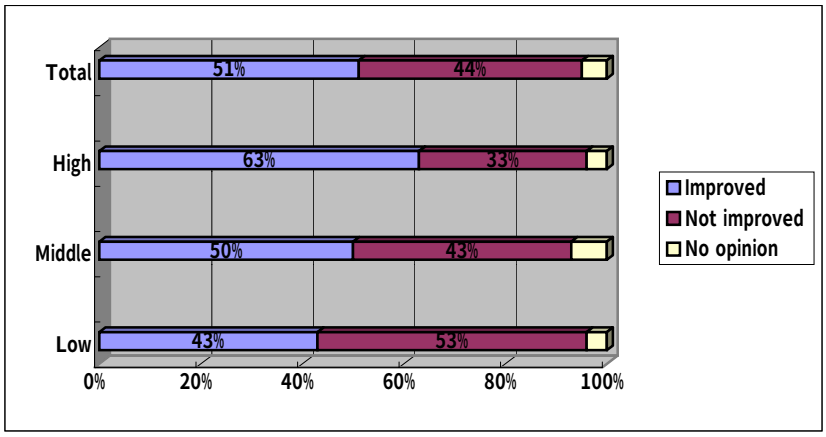
As Table 1 and the interview survey suggest, there is a large portion of water that remains unaccounted for. As of 2000, 52% of water is unaccounted for. This figure represents a sharp increase from the estimate made at the time of appraisal in 1989, and is much lower than the target figure of 20%. In order to re-calculate the FIRR, unaccounted for water was assumed to be 50% after 1997. The re-calculated FIRR is 5%. The original FIRR at the time of appraisal was 7%. This discrepancy is due to the high rate of unaccounted for water (about 50%) compared with the original plan (20%).

2.4 Impacts

2.4.1 Decrease in water-borne diseases

Half of the sample population interviewed for the survey responded favorably when questioned about the impact of the project on the incidence of water-borne diseases; 63% of the higher income group, 50% of the middle-income group, and 43% of the lower income group replied positively, respectively.

Q. Has the project reduced the number of water-borne diseases?



2.4.2 Environmental and Social Impacts

The Government of Kenya undertook a study on the environmental impact of the project.[3] Although the Japanese portion of the project (i.e., transmission pipes) did not involve any resettlement or environmental externalities, other co-financed portions, especially dam construction, involved an inundation of land and the resettlement of 335 families. They received a compensation package for relocation.

2.5 Sustainability

2.5.1 Operation and Maintenance

The Nairobi City Council's Water and Sewage Department (WSD), with a total staff of 506 as of 2001, is directly responsible for the operation and maintenance (O&M) of the project. The division responsible for water transmission is under the authority of the Deputy General Manager, Operations and Maintenance (Water).

Currently, there is a severe lack of financial and managerial sustainability at the WSD. With more than 50% unaccounted for water rate, the financial situation of the WSD has deteriorated. The extent of the financial distress is not totally clear, to date, as no financial audit of the WSD has been conducted in the past several years. According to the investigation, payment of WDS staff salaries has been delayed for months. This makes it difficult to offer much-needed services such as meter reading and bidding to the Nairobi population.

In order to arrest the deteriorating situation, with the guidance of the World Bank, the WSD has been studying the possibility of privatization in the form of divestiture, concession, leasing or management contracting.

2.5.2 Present conditions of facilities and materials

All Japanese financed pipelines remain functional and operational as of today, and WSD inspectors are routinely inspecting them for cracks, leakage and any other technical problems. However, according to the WSD, no major maintenance work has been carried out since the completion of the project. At present, maintenance works such as protection works on sections damaged by erosion and general maintenance of access roads are needed. To keep the whole project sustainable, it is essential to conduct this maintenance work.

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[3] Nairobi City Council (1998), *Third Nairobi Water Project – Environmental Appraisal Report*.

3. Recommendations

To keep the whole project sustainable, it is essential to conduct the maintenance work mentioned above and examine countermeasures to reduce unaccounted for water.

Comparison of Original and Actual Scope

(Japan's ODA laon portion only)

Items	Original	Actual
(1) Project Scope		
a) Raw Water Transmission Mains	(1)Tunnel outlet structure at Mwagu	As planned
	(2) Raw Water Transmission Pipeline: DN 1200 mm, 6.5 km	As planned
	(3)Inlet pipe work arrangements at Ngethu	As planned
b) Treated Water Transmission Maina	(1) Outlet pipe work arrangements at Ngethu	As planned
	(2) Treated Water Transmission pipeline DN 1400 mm, 13.8 km DN 1200 mm, 17.0 km DN 1000 mm, 5.5 km	As planned
	(3) Inlet pipe work arrangements at Gigiri reservoir	As planned
(2) Implementation Schedule		
Approval of Tender documents	Oct 1988	Nov 1988
Tendering	Nov 1988-Feb 1989	Jan 1989
Approval of Evaluation	June 1989	Nov 1989
Contract Negotiation	July 1989	Nov. 1989
Approval of Contract	Aug 1989	Dec 1989
Construction		
Raw Water Mains	Sep 1989-Aug 1991	Feb 1990-Nov 1992
Treated Water Mains	Sep 1989-Feb 1992	Feb 1990-Nov 1992
(3) Project Cost		
Foreign currency	3,740 million yen	2,780 million yen
Local currency	2,742 million yen	2,269 million yen
Total	6,482 million yen	5,049 million yen
ODA Loan Portion	5,342 million yen	4,963 million yen
Exchange Rate	1 Ksh = 7.43 yen (as of Jul 1988)	1 Ksh = 5.14 yen (average during construction)