



THE NAIROBI CITY WATER MASTER PLAN STAKEHOLDERS WORKSHOP



MESSAGE FROM THE MINISTER OF WATER

Our Country's development blueprint aims to transform Kenya into an industrialized middle income country that provides a high quality of life for all its citizens by 2030.

The water sector is one of the key drivers to achieving this goal. In the past ten years, the government has been implementing water sector reforms with great success. These developments have significantly impacted on water and sanitation services and on the management of water resources.

The water and sanitation crises call for a new understanding of the country's water situation. We all need to appreciate the enormity of the problem, the urgency of the threats that confront us and the consequences of inaction. We must make water a matter of National Concern. If we do not act in earnest and with steadfastness, our livelihood as a nation is bound to fall into an abyss from the precipice on which it now hangs. It will be a difficult and painful journey to be able to come out of such an abyss and the 2030 vision will surely remain a pipe dream in such circumstances.

Our driving motto has been Water for All - a dictum that takes the availability of water for granted. It is for this reason that I commend Athi Water Services Board under the leadership of the Ministry of Water and Irrigation, and with the support from the World Bank and French Development Agency for undertaking the preparation of the Water Master Plan for the city of Nairobi and satellite towns.

This plan is premised on the hope that all stakeholders - and that includes everyone who



**Hon. Charity K. Ngilu -
Minister for Water &
Irrigation**

resides in Nairobi and satellite towns - will support the proposed plans of action since adequate water supply will blend well with the bill of rights in the envisaged new constitutional order, a decent livelihood for every citizen is conceivable.

It is my hope that actions to solve the water and sanitation crises should lead to reduced poverty and unemployment, enhanced food security, good health, and creation of wealth, all necessary for realization of the vision 2030.

This Master Plan demonstrates that we are taking short term, medium term and long term planning seriously. Stakes are high: far-reaching measures need to be taken before Kenya's water situation turns irreversibly unmanageable. Thus, we must jointly take very determined and active measures in all aspects of water development and management.

This is a responsibility for us all, for most of the other efforts in the country to succeed. This is a responsibility for us all, since we all need and use water for our survival and our economy.

MESSAGE FROM THE PERMANENT SECRETARY

The Ministry of Water and Irrigation is privileged to play a pivotal role in water resources development and management given how central water is to the national development. Water is key for human needs, for food security and for energy security.

However, increasing population, falling levels of water per capita, inadequate investments in new water sources, low utilization of irrigation potentials and destruction of the environment by uncontrolled abstraction, deforestation and pollution has clearly indicated that business as usual is not a sustainable option. Through the 2002 Water Act and 2006 Water Resources Management Regulations, the ministry has subscribed to a more comprehensive reform in Integrated Water Resource Management (IWRM). Implementation in IWRM has been slow, and a concerted effort is needed to accelerate reforms in IWRM. Investment in water supply infrastructure is a high economic priority.

Planning and development can no longer focus mainly on maintenance and rehabilitation of existing water supply systems but needs to explore and develop new water sources. The imperative to develop new water sources for Nairobi is a high political priority.



**Eng. David Stower -
Permanent Secretary
Ministry of Water &
Irrigation.**

I am glad to note that Athi Water Services Board has endeavored to address the current water challenges being experienced in the city of Nairobi by formulating a Water Master plan for Nairobi and satellite towns.

To ensure that this master-plan succeed, concerted efforts by all water relevant stakeholders are needed to support successful implementation of this plan. The ministry is committed to give the necessary support in ensuring successful implementation of this plan.



A Section of Sasumua Dam (spill way)

MESSAGE FROM THE CHAIRMAN ATHI WATER SERVICES BOARD

Athi Water Services Board (AWSB) is a State Corporation established under The Water Act of 2002. Athi Water Services Board is one of the eight (8) water services boards, which were established to oversee the management of water and sewerage services in the country. AWSB area of jurisdiction covers the city of Nairobi and the districts of Gatundu, Thika East, Thika West, Lari, Limuru, Githunguri, Kiambu East, Kiambu West, Gatanga, Ruiru and Kamwangi Districts.

The mandate of AWSB is to develop water infrastructure in our area of jurisdiction. AWSB has been able to execute this mandate effectively and the results have been commendable.

The AWSB has appointed the Nairobi Water & Sewerage Company (NWSC) as the Water Services Provider (WSP) in the City. The 10 other WSPs appointed to work within the Board's jurisdiction area are:

1. Kiambu Water & Sewerage Co. Ltd;
2. Gatundu South Water & Sanitation Co Ltd;
3. Karimenu Community Water & Sanitation Co Ltd;
4. Gatanga Community Water Project;
5. Limuru Water & Sewerage Co Ltd;
6. Kikuyu Water Co Ltd;
7. Ruiru-Juja Water & Sewerage Co Ltd;
8. Thika Water & sewerage Co. Ltd;



**Hon. Reuben Ndolo
Chairman Athi Water
Services Board**

9. The privately-run Runda Water & Sewerage Co Ltd and
10. Githunguri Water & Sanitation Co Ltd.

The Board has been undertaking programmes for institutional strengthening and emergency rehabilitation of water and sewerage infrastructure in its area of jurisdiction; however, even with these measures we cannot meet the demand.

It is imperative to note that investments in water supply infrastructure have lagged behind since 1994 with the completion of the Nairobi Water Supply Project Phase 3 Project. The demand in the Nairobi Metropolitan area now far outstrips supply.

The limited supply is affecting the Government's plans for developing the Nairobi region into a world class commercial center. If this is to be realized water and sewerage services

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BACKGROUND OF FEASIBILITY STUDY AND MASTER PLAN FOR DEVELOPING NEW WATER SOURCES FOR NAIROBI AND SATELLITE TOWNS:

The City, which has been in existence for about 100 years, has grown from a settlement of 25km² to the current 684km². Nairobi City is divided into eight administrative divisions namely Kibera, Dagoretti, Pumwani, Central, Embakasi, Kasarani, Westlands and Makadara.

However, the investments in water supply infrastructure have lagged behind since 1994 with the completion of the Nairobi Water Supply Project Phase 3 Project and the demand in the Nairobi Metropolitan area now far outstrips supply.

The City and its Satellite Towns still face large water

supply deficits, which have been magnified during the past two years of drought. Chronic water shortages are common in many parts of the City. This has made supply unreliable and increased water rationing, the high price paid by consumers for water from vendors, the time spent queuing for water, and increased the incidences of water borne diseases.

Against this background, the Ministry of Water and Irrigation, through the Athi Water Services Board, and with the support of the World Bank and the French Development Agency (AFD) commissioned Feasibility Study

and Master Plan for Developing New Water Sources for Nairobi and 13 Satellite Towns to meet the 2035 water demand.

The population of the Nairobi Metropolitan Region is projected to grow to 7.6 million people (2012), 10.8 million (2022), and 14.3 million (2030) - due to the rapid urbanization. It is estimated that by 2030, Kenya will be 61.5% urban. The adoption and implementation of the Master plan will benefit the Nairobi Metropolitan residents with reliable water supply.

The strategy for Nairobi and Satellite Towns' water supply is to address current challenges by

ensuring that: all water supply demands are fully met up to the Year 2035 horizon, new sources of development are considered, all supplies are to a common approved standard for potable water supply and new water sources and facilities increase the reliability and security of water supply for Nairobi and Satellite Towns through:

- Optimal use of the existing facilities,
- An increase of surface water storage sources,
- Diversification of water sources (surface water, groundwater, rainfall roof harvesting) when appropriate,

■ Development of local or mixed water supply systems for Satellite Towns.

The plan also aims at reducing physical water losses along the system (intakes, transmission pipes, treatment works and distribution schemes as well as diversify water sources through development of boreholes to tap groundwater and promotion of alternative water sources such as rainwater roof harvesting.

It is estimated that water demand in Nairobi metropolitan region stands between 1,621,312 m³/day and 2,117,194 m³/day by 2035. Presently the water

infrastructure design capacity is 522,500 m³/day against supply of 428,519 m³/day.

The current water supply serves approximately 92% of Nairobi Population (approximately 2.9 million inhabitants) who receive water from Nairobi City Water Sewerage Company (NCWSC) piped network either through direct connections, water kiosks or water vendors.

The population served by the company through individual connections presently stands at 65% and is expected to increase

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infrastructure must be developed and expanded. It must be noted that the City and its Satellite Towns still face large water supply deficits, which have been magnified during the past two years of drought. Chronic water shortages are common in many parts of the City. This has made supply unreliable and increased water rationing, increased the price paid by consumers for water from vendors, increased the time spent queuing for water, and increased the incidences of water borne diseases.

To surmount these challenges the Ministry of Water and Irrigation through Athi Water Services Board, and with the support of the World Bank and French Development Agency are developing a Water Master Plan for Nairobi and Satellite Towns. I would like to call upon all stakeholders to interrogate this plan and give their inputs to enable the Board to implement this plan in line with Vision 2030 and the spirit and the letter of new Constitution.

On behalf of AWSB I wish to assure you all of our commitment to develop an efficient and cost effective water infrastructure. I thank you most sincerely for your support.

MESSAGE FROM THE CEO ATHI WATER SERVICES BOARD

Today marks a major landmark in our efforts to develop appropriate and much needed water infrastructure for the city of Nairobi and satellite towns. The completion of this study comes at a time when the country is implementing the new constitution which has enshrined access to water and sanitation in the Bill of Right. The human right to water entitles everyone to sufficient, safe, physically accessible and affordable water for personal and domestic use.

Nairobi faces serious water deficits. In this regard, the Board is keen to develop new water supply infrastructure for the city and Satellite towns. This will not only ensure enjoyment of this right by consumers in our area of jurisdiction but also safeguard future needs of an ever growing population.

It is expected that the gap between the supply and the demand will increase in proportion to the increase in population unless further sources of supply are identified and commissioned.

Athi Water Services Board is recognizing the prevailing water challenges in the city of

Nairobi. The present sources of drinking water supply to Nairobi and surrounding urban centres are insufficient to satisfy the demands of the growing population.

Nairobi, the Capital City and economic hub of Kenya, contributes over 50% of the GDP; the lure of good life in the city has attracted many people to migrate to the city. In effect, the real estate has mushroomed to accommodate the rising population. However, the population growth is not in tandem with the current water supply system.

The City has an estimated resident population of 3 million people and an estimated daytime population of around 5-6 million people. The current population of the AWSB area (the City and surrounding Districts of Thika, Gatundu, Ruiru, Gatanga, Kiambu East, Kiambu West, Lari and Kikuyu Districts) served by the Athi Water Service Board (AWSB) is estimated to be 5 million people and it is projected to increase to 8 million by the year 2030.

Besides unprecedented population growth the city is



Eng. Malaquien Milgo
Chief Executive Officer-Athi Water Services Board

grappling with inadequate water resources, low pressures in the network, leakage in distribution reticulation, deteriorating status of pipes (corrosion and old age), lack of adequate coverage of consumers, leakage in housing connections and vandalism of controls at appurtenances (air valves, hydrants, sectional valves, zonal meters).

As a consequence, the government of Kenya through the Athi Water Services Board, the World Bank and French

Development Agency (AFD) undertook a feasibility study with a view of identifying and continuation of future water resources for Nairobi and selected satellite towns within a 70 km radius of the capital to improve their future water security. The study therefore, is concerned with the future augmentation of drinking water sources for Nairobi and its Satellite towns.

The study has identified and is reviewing several possible scenarios for possible development. These include:

1. Northern Collector Phase I with different sub-alternatives (whole collector from Maragua R. to Thika Reservoir, from Irati R. to Thika Reservoir only);
2. Diversion from S. Mathioya to Maragua River to supplement Maragua Reservoir;
3. Northern Collector Phase II either connected to Northern Collector I to supplement the supply to Thika reservoir or to Maragua 4 Reservoir;
4. Ndarugu 1 Dam on Ndarugu River;
5. Diversion from Chania River

to Komu River to supplement Ndarugu 1 Reservoir.

I call upon stakeholders, to interrogate the main findings and recommendations of the Water Source Options Review, a key study for the Master-plan. We hope that this meeting will provide a platform for the stakeholders to understand the proposed development options that are being reviewed and considered for implementation under the Master-plan.

We appreciate the role and involvement of Kenya government, our development partners-World Bank and French Development Agency (ADB) when formulating this Master-plan. We are confident that you will continue supporting us in this regard. We urge government agencies, civil societies and local communities to support the Board to implement this Master plan.

We have no doubt that the timely implementation of this master plan will form part of building blocks that are necessary for transforming Kenya into a middle income country by year 2030.

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to 80% at the ultimate planning period, year 2035 as new interventions to meet forecasted water demand are developed.

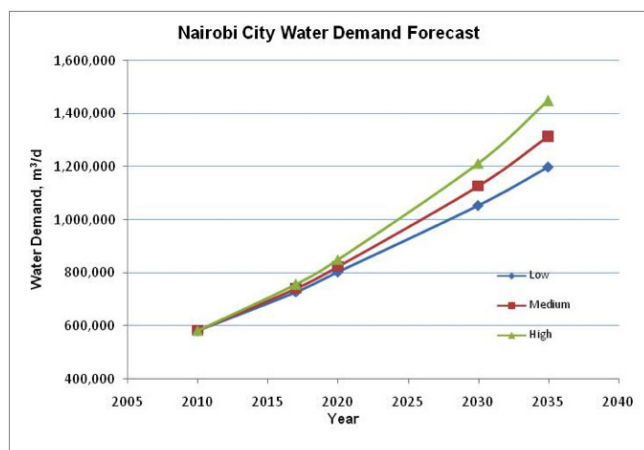
DEVELOPMENT OF SCENARIOS

The planning for Development of Future Water Resources for Nairobi and the Satellite Towns involves a comparison between known sources availability and projected water demands.

Proposed Scenarios Six (6) main Scenarios have been established based on potential sourced under context of meeting the water demand for Nairobi up to Year 2035. These Scenarios have been prepared in view to meet the water demand of Nairobi City without considering the surrounding areas for which other local water resources are considered.

The scenarios involve the combination in different manners and with various scheduling of the following water schemes:

- Northern Collector Phase I with different sub-alternatives (whole collector from Maragua R. to Thika Reservoir, from Irati R. to Thika Reservoir only);



- Diversion from S. Mathioya to Maragua River to supplement Maragua Reservoir;
- Northern Collector Phase II either connected to Northern Collector I to supplement the supply to Thika reservoir or to Maragua 4 Reservoir;
- Ndarugu 1 Dam on Ndarugu River;
- Diversion from Chania River to Komu River to supplement Ndarugu 1 Reservoir.

REVIEW OF SCENARIOS

The scenarios will be reviewed through a step wise and structured process. Each scenario will be examined first for technical soundness.

Next, an economic analysis will be carried out to identify the least cost option. It will also establish the financial costs and economic benefits for each scenario. In addition, environmental and social impacts will be analyzed. Finally, a multi criteria analysis will be carried out to rank and determine the optimal options for meeting the 2035 demands for Nairobi and Satellite Towns.

THE TARGET AREAS

The study area covers the river basins used to supply Nairobi and satellite towns (Tana, Thika and Athi River Basins);

No.	Satellite Town	District
1	Kikuyu	Kikuyu
2	Ruiru-Juja	Ruiru and Thika West
3	Kiambu	Kiambu East
4	Karuri	Kiambu East (Kiambaa)
5	Githunguri	Githunguri
6	Mavoko Municipality (Athi River)	Machakos
7	Ngong Township	Kajiado North
8	Ongata Rongai	Kajiado North
9	Thika	Thika West
10	Gatundu	Gatundu
11	Limuru	Kiambu West
12	Lari (Uplands and Kimende)	Lari
13	Tala-Kangundo	Kangundo

THE PROJECT IMPACT

Some of the impacts from the project include the following;

1. Local employment opportunities and creation of a local market for materials and consumables that can be sourced locally.
2. Construction of access roads will also provide positive impacts to local communities.
3. Construction of transmission

- pipelines and treatment works.
4. Changes to the downstream hydrology of the river basins as result of reduced flow in rivers.
5. Land will have to be purchased to enable construction of and provision of adequate buffer zones round dams and weirs, treatment works, pipeline wayleave, workmen's camps and working areas.

NAIROBI WATER SUPPLY MASTER PLAN STAKEHOLDERS FORUM

Athi Water Services Board will host the Nairobi Water Supply Master-plan Stakeholder Forum on 30th August, 2011.

The aim of this forum will be to inform stakeholders on the progress of the Nairobi Water Master-plan feasibility study and to share with stakeholders the main findings and recommendations of the Water Source Options Review, a key study for the masterplan. The meeting will provide the stakeholders with an opportunity to understand the proposed development options that are being reviewed and considered for implementation under the masterplan. Inputs from stakeholders will help in the finalization of the Water Source Options Review report.

The forum will be centered on the Feasibility Study and Master Plan for Developing New Water Sources for Nairobi and Satellite Towns, funded jointly by the Government of Kenya, through Athi Water Services Board, the World Bank and the French Development Agency (AFD).