

**The Republic of Uganda**

**OAG**



**Office of the Auditor General**

**VALUE FOR MONEY AUDIT REPORT  
ON DISTRIBUTION OF WATER TO URBAN AREAS BY  
NATIONAL WATER AND SEWERAGE CORPORATION**



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**LIST OF ABBREVIATIONS:**

|         |   |
|---------|---|
| bn      | Billion   |
| DWD     | Directorate of Water Development  |
| FH      | Fire Hydrant  |
| F/Y     | Financial Year  |
| GoU     | Government of Uganda  |
| IDAMC   | Internally Delegated Area Management Contract   |
| INTOSAI | International Organisation of Supreme Audit Institutions  |
| ISO     | International Standards Organisation  |
| IWA     | International Water Association   |
| MoFPED  | Ministry of Finance, Planning and Economic Development  |
| MoU     | Memorandum of Understanding between Government of Uganda and the Corporation in respect to the payment of Government Bills. |
| MoWE    | Ministry of Water and Environment   |
| NRW     | Non Revenue Water   |
| NWSC    | National Water and Sewerage Corporations  |
| OAG     | Office of the Auditor-General   |
| QMS     | Quality Management System   |
| PEAP    | Poverty Eradication Action Plan   |
| Shs     | Shillings   |
| UN      | United Nations  |

**GLOSSARY OF TERMS:**

|                                  |   |
|----------------------------------|---|
| <b>Arrears:</b>                  | Means and refers to accounts receivables of more than 30 days.  |
| <b>Clarification:</b>            | Sedimentation is done, where bigger particles are introduced to a deep tank and clear water is schemed-off to another area.   |
| <b>Coagulation:</b>              | Involves mixing aluminum sulphate solution to form aluminum iron and sulphate irons, when they stick on dirt they charge and attract each other under intense mixing to avoid competing reactions. The particles stick together and sink. |
| <b>Disinfection:</b>             | Chlorine gas is added to kill microorganisms in the water instantly with no effect on human life.   |
| <b>Fire Hydrant:</b>             | This is a connection that provides access to a water supply for purposes of fighting fires.   |
| <b>Flocculation:</b>             | After Coagulation, gentle mixing is done to enable formation of larger particles from clear water.  |
| <b>Non-Revenue Water:</b>        | Means and refers to the ratio between non-billed water to water produced (m <sup>3</sup> ).   |
| <b>Rapid Gravity Filtration:</b> | The process allows water to move quickly and clear. Water passes through a layer of sand which is graded to allow it move fast and clean. The sand media for filtering is 1.5metres.  |
| <b>Screening:</b>                | This involves sieving water to prevent bigger particles from entering the pumping system.   |
| <b>Suppressed Accounts:</b>      | Accounts off-supply   |
| <b>Water Conditioning:</b>       | This involves blending to get a uniform concentration in a large tank and allows chemicals move freely.   |

## **EXECUTIVE SUMMARY**

The Auditor General is required under Article 163 (3) (b) of The constitution of the Republic of Uganda to conduct financial and value for money audits in respect of any project involving public funds. This mandate was amplified under Section 21(1) of the National Audit Act 2008 which requires the Auditor-General to carry out value for money audits for purposes of establishing economy, efficiency and effectiveness in the operations of any department or ministry.

NWSC is mandated to provide water services on a commercial and viable basis<sup>1</sup> and improve water and sanitation services in major urban centres of Uganda<sup>2</sup>. It is estimated that about 70% of the people living in urban areas have access to water against the national target of 100% set by the National Water Policy, for urban areas.

The Office of the Auditor-General instituted a Value for Money Audit to assess the operations of NWSC in the distribution of water to urban areas and provide possible recommendations that will address the challenges undermining the distribution system.

The audit was carried out in accordance with INTOSAI Auditing Standards and Guidelines. This report covers Three and a half Years from July 2004 to December 2007. The focus of the audit is on water distribution in urban areas of Uganda by the NWSC. Areas covered include Arua and Gulu in the Northern region; Kampala, Masaka and Mubende in the Central region; Soroti, Tororo, Jinja and Mbale in the Eastern Region; Masindi, Mbarara, Bushenyi and Kasese in the Western region.

In collecting data, we conducted interviews, reviewed documents and carried out physical inspection/observation of the facilities.

### **Audit Findings:**

The audit revealed that there are deficiencies in Water distribution and Revenue Collection. These are:

- (i) Delays in addressing leakages and bursts.
- (ii) Inadequate rehabilitation of the distribution network.
- (iii) There are delays in payment/collection of water bills.
- (iv) NWSC is not meeting adequately their target in connecting new customers.
- (v) Inadequate stakeholder coordination.

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<sup>1</sup> NWSC Act, 1995

<sup>2</sup> Decree No. 34 of 1972

- (vi) Inadequate monitoring of accessibility of water at fire hydrants.
- (vii) Intermittent supply of water to consumers.
- (viii) Non-Revenue Water in larger towns stood at 32.5% as at 30<sup>th</sup> June 2007 against the NWSC set target of 28.7% and best practice for developing countries of 20%.

These weaknesses impact on NWSC's delivery of services to customers as described below.

The Water losses through NRW caused by leakages and bursts, inadequate rehabilitation of the network, inadequate stakeholder coordination and inadequate monitoring of water at fire hydrants reduces the water available for distribution.

Delayed collection of bills and billing related errors have resulted into a high level of arrears (32.65bn at the end of December 2007 of which Government Ministries accounted for 15.8bn or 48.4%). This negatively impacts on the liquidity and ability of the Corporation to effectively fulfill its mandate.

Poor accessibility of water by the consumers caused by long delays in connecting new customers and the inadequacies of the size of the pipe network and booster pumps to extend water to higher areas of the network or hilly terrain denies people water services.

### **Conclusions:**

It takes long to rectify technical faults like leakages and bursts which lead to NRW.

Lack of adequate maintenance of facilities is responsible for water losses and increased revenue loss to the Corporation.

There is an increased level of arrears.

Due to inadequate stakeholder coordination, there has been unnecessary damage to the distribution network which disrupts water supply.

Fire hydrants have not been adequately monitored resulting into uncontrolled use of water, thus increasing NRW.

### **Recommendations:**

- (i) A map of all key points like valves should be availed to staff in charge of operations/maintenance to ease their work. Staff should be regularly inducted and trained to acquaint themselves with the locations of valves.

The illegal use reduction measures should be extended to all areas served by the Corporation and staff in upcountry stations should be attached to this unit to gain necessary skills. Materials and other facilities to address leakages and bursts should be readily available to reduce the delays in rectifying faults. The Corporation has given more autonomy to area offices by increasing their procurement threshold.

- (ii) There is need to balance between rehabilitating existing old infrastructure and undertaking new capital projects.
- (iii) Debt collection should be prioritized countrywide and efforts towards implementing the MoU, should be strengthened to recover arrears from government ministries and departments. Contracting out debt collection should be regularly reviewed, adopted countrywide and consistently. Use of pre-paid meters to reduce arrears should be evaluated. It is also recommended that disconnection of defiant customers be improved to recover arrears.
- (iv) There should be close supervision of commercial/Billing staff to minimize billing errors. Monitoring of set standards should be employed to assess performance.
- (v) To minimize the delays when connecting new customers, NWSC should put in place a requirement for prospective customers to obtain authority from neighbors when applying for new connection. Sensitization of existing and potential customers, local leaders, and landlords is vital in enhancing the distribution network and supply of water to the urban population.
- (vi) NWSC should play a leading role in steering coordination and liaising with urban authorities and other stakeholders to ensure that a coordinated plan for all developments is discussed and understood by all players to minimize damages to the infrastructure.
- (vi) There should be proper coordination between NWSC and the Fire brigade to identify the location of the fire hydrants and assess their viability. A map of these points should be made and reviewed periodically to establish the appropriateness, adequacy and convenience in order to reduce misuse of water. A mechanism of recognizing private water operators with an option of licensing them should be considered. Designated points for this purpose alone should be identified to enhance monitoring and revenue collection.

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background to the Audit:

This Value for Money audit on the Distribution of Water to Urban areas in Uganda by the National Water and Sewerage Corporation (NWSC) has been conducted in accordance with Article 163(3) of the Constitution of the Republic of Uganda. This mandate was amplified under Section 21(1) of the National Audit Act 2008 which requires the Auditor-General to carry out value for money audits for purposes of establishing economy, efficiency and effectiveness in the operations of any department or ministry.

#### **Motivation:**

The study was motivated by public concern about provision of clean water to the urban population in Uganda as highlighted in media reports and the general public outcry. There is a high concentration of people living in urban areas who do not have access to clean water. Supply of clean drinking water is estimated to have risen from an average of 54% in 2002<sup>3</sup> to 70% in 2006<sup>4</sup> against the national set target of 100% by the year 2000 in urban areas<sup>5</sup>.

Provision of safe drinking water is one of the millennium development goals adopted by the UN member countries in 2000. The Government of Uganda has made the water sector one of the priority areas of its development strategy (PEAP) because safe and clean water is considered to be a major factor in social economic development. Providing water services to the informal urban poor settlements is a major objective of National Water and Sewerage Corporation (NWSC).

The population in urban centres is currently growing at a faster rate than water supply in the major towns of Uganda. There has been an outcry from potential water customers who expect water services, while those already connected to the system spend long periods without water despite Government and development partners' support to the Corporation's development initiatives in providing water to the population.

This audit was conducted to assess the operations of NWSC urban water distribution and provide possible recommendations that will improve the operations of NWSC in addressing the challenges undermining the urban water distribution system.

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<sup>3</sup> NWSC Corporate Plan 2003 - 2006 page x

<sup>4</sup> NWSC Corporate Plan 2006 - 2009 page xi

<sup>5</sup> National Water Policy 1999 page 15

## **1.2 Description of the Audit Area:**

The Ministry of Water and Environment is responsible for the planning, management and provision of water and sanitation services in Uganda.

The two key agencies under the Ministry of Water and Environment which are responsible for the implementation of the water sector activities are the National Water and Sewerage Corporation, which is responsible for the Large Urban Centres, and the Directorate of Water Development (DWD) which provides water to small towns and the rural centres.

NWSC is an autonomous public corporation while DWD is a department under the Ministry of Water and Environment.

At the national level, the MoWE is responsible for policy issues and political direction to the water sector in Uganda. The NWSC is mandated to provide water and sanitation services to urban centres.

## **1.3 Statutory Mandate:**

The National Water and Sewerage Corporation is a public Corporation wholly owned by Government. It was established by Decree No. 34 of 1972 to improve water and sanitation services in the major Urban centres of Uganda.

The NWSC Act, 1995 was enacted to give the corporation more autonomy to provide water services on a commercial and viable basis.

## **1.4 Vision, Mission, Goals and Objectives:**

The Vision, Mission, goals and objectives of NWSC set in the Corporate Plan are:

### **Vision:**

*"To be one of the leading water utilities in the world"*

### **Mission Statement:**

*"To provide efficient and cost effective water and sewerage services, applying innovative managerial solutions to the satisfaction of our customers."*

### **Goal:**

*"To improve operational efficiency by reducing water losses, improving staff productivity, strengthening customer care, ensuring 24hour quality water supply, reducing suppressed accounts."*

**Objectives:**

- To improve financial sustainability by increasing revenue, improving on billing, ensuring growth in operating profit and reducing debt age.
- To increase water and sewerage coverage and increase service to the poor.
- To carry out internal reforms and restructuring aimed at achieving the enhanced mandate of the corporation.
- To undertake capital works projects.

**1.5 Major Activities:**

The principal business of the corporation as defined by the NWSC Act, 1995 is to operate and provide water and sewerage services to 19 urban areas of Kampala, Entebbe, Masaka, Mubende, Jinja/Njeru, Lugazi, Mbale, Tororo, Soroti, Lira, Gulu, Arua, Masindi, Hoima, Mbarara, Kabale, Bushenyi/Ishaka, Kasese, Fort-Portal. The major activities include:

- To manage the water resources in ways which are most beneficial to the people of Uganda.
- To provide water supply services for domestic, stock, horticultural, industrial, commercial, recreational, environmental and other beneficial uses.
- To provide sewerage services in an area in which it may be appointed to do so under the Act or the Water Act, to the extent and standards that may be determined by its corporate plan, any performance contract, and regulations made under the Act or the Water Act.
- To develop the water and sewerage systems in urban centres and big national institutions throughout the country.

**1.6 Organization Structure:**

The Corporation is headed by a Board of Directors which gives guidance on strategic policies while the day to-day management of the Corporation is the responsibility of the Managing Director and other Technical staff comprising 6 major departments.

These departments which are headed by Chief Managers, include; Institutional Development and External Services, Engineering Services, Management Services, Finance and Accounts, Commercial and Customer Services and Internal Audit. The Chief Internal Auditor reports directly to the Board of Directors.

An organization chart showing the above relationships is attached as Appendix (i).

## 1.7 Financing:

National Water and Sewerage Corporation is funded by internally generated revenue, Government of Uganda, and development partners who include the German Government, World Bank, European Union, French Government, Belgian Government and the Austrian Government.

The table below shows the different sources of funding over three years 2004/05 – 2006/07.

**Table 1:**

### **NWSC Source of funds 2004/05 to 2006/07:**

| <b>Financial Year/Source</b> | <b>2004/05<br/>Shs (billion)</b> | <b>2005/06<br/>Shs (billion)</b> | <b>2006/07<br/>Shs (billion)</b> |
|------------------------------|----------------------------------|----------------------------------|----------------------------------|
| <b>Revenue:</b>              |                                  |                                  |                                  |
| Internally Generated         | 52.44                            | 57.98                            | 69.16                            |
| GoU Funds                    | 0.099                            | -                                | -                                |
| Donor Funds                  | 1.25                             | 0.56                             | 1.24                             |
| <b>Total Income</b>          | <b>53.78</b>                     | <b>58.54</b>                     | <b>70.40</b>                     |

Source: NWSC Accounts Division

(Allocation of the above funds to different systems like distribution and production could not be easily identified).

## 1.8 Scope:

This report covers Three and a half Years from July 2004 to December 2007. The focus of the audit is on water distribution in urban areas of Uganda by the National Water and Sewerage Corporation. The areas were selected to cover the Northern region towns of Arua and Gulu; Central region covering Kampala, Masaka and Mubende; Eastern region covering Soroti, Tororo, Jinja and Mbale; and Western region covering Masindi, Mbarara, Bushenyi and Kasese. Kampala area was selected because the main water plant and the NWSC headquarter are located there. For the other towns, a mixture of non-viable towns (Mubende and Masindi) and those operating fairly well were selected in order to create a balanced opinion.

## 1.9 Methodology:

The audit was carried out in accordance with International Organisation of Supreme Audit Institutions (INTOSAI) Auditing Standards and guidelines. Those Standards require that the Performance Audit should be planned, conducted

and reported on in a manner, which ensures that an audit of high quality is carried out in an economic, efficient and effective way and in a timely manner. In collecting data from the field, the team carried out interviews, reviewed documents and physical inspection/observation of the facilities.

**Interviews:**

We interviewed Area Managers, customers, Engineering staff and customer/billing staff to gain a general understanding of the billing, maintenance and payment procedures. Area managers were interviewed to ascertain the use of water at fire hydrants.

**Inspection:**

We inspected water facilities such as water plants, fire hydrants, water storage and distribution systems to obtain an understanding of the adequacy, operation and maintenance of facilities.

**Document Review:**

We obtained and reviewed the documents below to obtain information in relation to the legal framework of NWSC, assess financial performance, obtain organisation Vision, Mission, Goals and Objectives, financial forecasts for the period under study:-

- NWSC Act, 1995
- Water Act , 1997
- National Water Policy, 1999
- Corporate plans 2003-06 and 2006-09
- Budgets 2005/06 and 2006/07
- Performance reports July 2006 – December 2006, January 2007– March 2007, July 2007 – December 2007
- Annual reports 2004/05, 2005/06 and 2006/07
- Internal Audit Reports
- Complaints registers
- Water Herald Jan-March 2007 and April-June 2007
- Internally Delegated Area Management Contracts (IDAMC) for Area offices

## CHAPTER 2

### WATER DISTRIBUTION PROCESSES

#### 2.1 Roles and Responsibilities of Key Players:

NWSC **management** is responsible for the day-to-day administrative functions of the Corporation.

##### **Engineering Services Division:**

The Engineering Services Division is responsible for the execution of capital development works, extension of water services, monitoring quality of water produced and distributed, maintenance of the system and general operations procedures.

##### **Commercial and Customer Services:**

Commercial division is responsible for routine operations like billing, addressing customer complaints, revenue collection and marketing operations.

##### **Fire brigade department:**

This is a department of the Uganda Police Force charged mainly with the responsibility of putting out fires. They have unlimited access to free water at fire hydrants. It is a statutory requirement for the corporation to distribute water to the fire brigade department. The department is required to furnish accountability for the water used to extinguish fires.

##### **Customers:**

Customers to whom the water services are ultimately delivered determine the Corporation's performance and growth. The Corporation relates to customers when they apply for new water connections, payment of bills, reporting leakages, pipe bursts and other related problems. They interact with the Corporation through strategic alliance meetings, front desk office customer sensitization programs and periodic customer surveys.

#### 2.2 Water Distribution System:

##### **Water Production and Treatment:**

The raw water is abstracted by gravity and is treated through a conventional water treatment process incorporating screening, settlement, coagulation-flocculation, clarification rapid gravity filtration, disinfection and water conditioning.

**Transmission:**

From the water treatment plant, water is transmitted to the main reservoir. Some consumers however are served directly from the transmission mains.

**Storage:**

Water from the plant is stored in primary and secondary reservoirs. Primary reservoirs store water from the plant to serve low lying area while Secondary reservoirs store water for raised/higher areas of the network.

**Booster Pumps:**

Delivery to higher areas is achieved by online boosting or energizing the flow of water, by pumping water to a secondary storage tank for distribution to consumers.

**Distribution:**

Water distribution from high level network is by gravity from the reservoir to the consumer or other reservoirs/tanks. Delivery to higher areas is by the online boosting. Water passes through a pipe network of different sizes and materials from one level to another and ultimately to the final consumer.

Primary distribution systems have large diameter pipes for transmitting water from storage reservoir. These pipes have a diameter greater than 300mm while Secondary distribution systems have pipes with a diameter of 200-300 mm. Tertiary distribution systems have pipes of between 50-200mm diameter.

**Maintenance:**

Tanks are cleaned and main pipes flushed bi-annually. Teams, using leak detection and pressure level monitoring equipment, detect leaks and bursts and monitor pressure levels. IDAMC specify a period ranging from 3 to 8 hours within which to address leaks and bursts.

The average life of most of the machinery and equipments is estimated at 10 years. The useful life of other static plant is estimated at an average of 33years and a depreciation of 3%<sup>6</sup> is charged on straight-line basis for this purpose.

**Monitoring of Quality and Quantity of Water:**

**Quality Control:** There are laboratories in all NWSC areas to assess quality on a regular basis in the production and distribution processes with the main one at the Bugolobi plant. This process entails taking samples at different levels of production and distribution to ensure that the water quality conforms to the required standards.

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<sup>6</sup> NWSC Annual report 2005-2006 page 68 (iv) Depreciation of property plant and equipment

**Measuring Quantity:** Regarding monitoring quantity levels, bulk meters are installed at the reservoirs and booster stations to monitor the quantity of water in the various distribution processes.

**Connection of new Customers:**

Customers fill in application forms attaching passport size photographs and evidence of land ownership. The surveyor inspects the premises and determines the costs involved. The customer is then required to pay the connection fee and a deposit. NWSC staff are expected to connect the customer within a period of three days as specified in the NWSC charter.

**Billing and Payments Procedure:**

Meter readings are made monthly to determine units consumed for onward computation at existing rates. At the time of reading, previous bills are also delivered. Consumers are required to make payments at the nearest area office or designated commercial banks within a period of between 2 and 4 months after receipt of water bills.

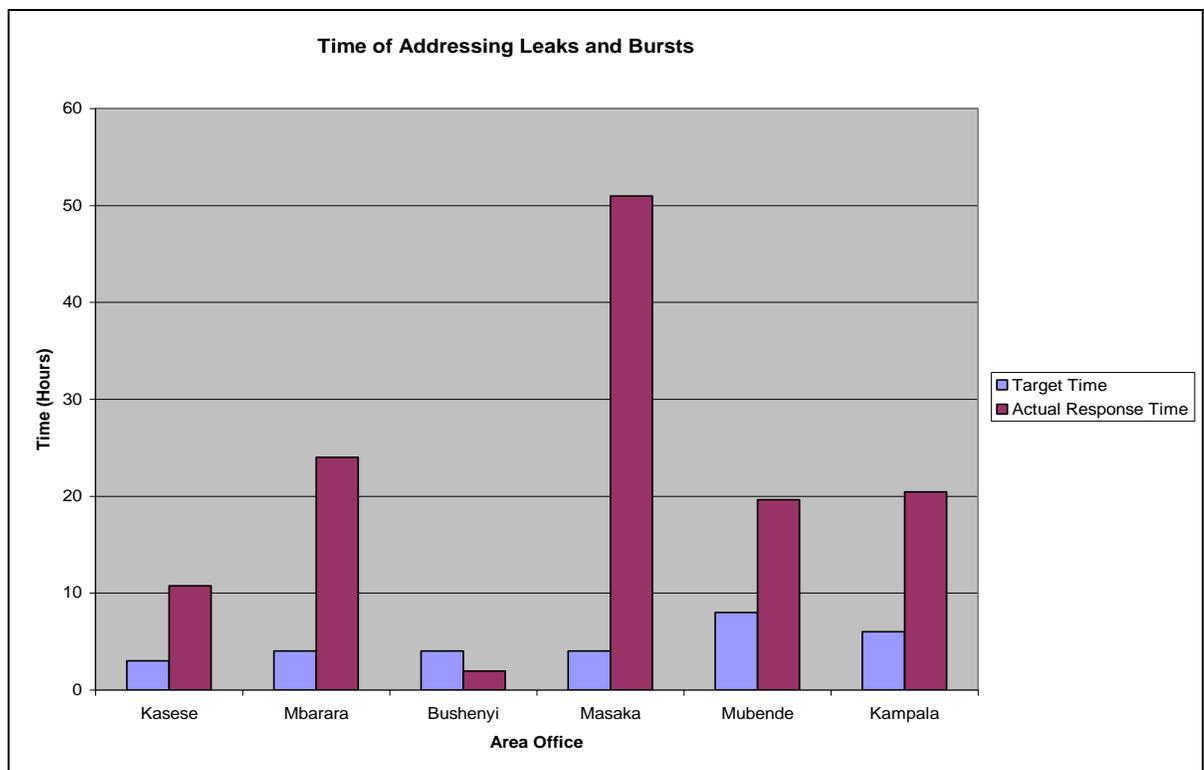
## CHAPTER 3

### FINDINGS

#### 3.1 Leakages and bursts:

Each area office of NWSC is required to set a minimum standard for addressing leaks and bursts as an operational indicator in accordance with IDAMC of each area ranging from 3 to 8 hours.

We noted that in different area offices, response time for addressing leaks and bursts on mains and service lines is at an average of 2 hours to 50 hours based on available data as shown in the graph below.



Source: OAG analysis

While it takes on average 10 hours or less in areas like Kasese and Bushenyi, in bigger operational areas like Mbarara, Masaka and Kampala it takes on average 20 hours or more to rectify these faults.

The delays are mainly caused by shortage of repair materials like delays caused by the centralized procurement system and Area offices storing materials for addressing simple leakages while materials for major repairs would be requisitioned from headquarters. To mitigate this bottleneck, management of NWSC has now given the autonomy to areas to procure all repair materials under the IDAMC.

Buried valves also take long to excavate and in the process this increases water losses. Besides, locations of the valves are in many cases known to only few staff members. For performance efficiency, management is training area technical staff under the QMS [ISO certification programme], to improve on network operations and maintenance activities.



*Water gushes out along Busega round-about FH on 21<sup>st</sup> January 2008 3:38pm.*

These delays translate into huge amounts of water losses especially on the water mains which distribute substantial amounts at high pressure (like the picture above). NRW for all areas stood at an average of 32.5% as at 30<sup>th</sup> June 2007 while in Kampala area alone, NRW was at an average of 38.5%<sup>7</sup>. This is considered high compared to 20% acceptable for developing countries and the Corporations target of 28.7%.

### **3.2 Rehabilitation of the distribution network:**

In execution of the routine maintenance/rehabilitation work, it is good practice that NWSC staff are guided by documented policies/procedures.

NWSC also has a policy which requires replacing the distribution network system ranging from 10 to 33 years<sup>8</sup>.

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<sup>7</sup> NWSC Annual report 2006-2007

<sup>8</sup> NWSC Corporate Plan July 2003 – June 2006 page 40

We noted that there is lack of clear policy/procedures to guide staff Corporation-wide in applying standard procedures to carry out maintenance and rehabilitation work.

During the course of the audit however, NWSC management informed us that the manuals are being developed under the QMS (ISO certification for each area) and are in advanced stages of completion.

We also noted that part of the Corporation's distribution network was installed more than 50 years ago. These systems have exceeded their economic life and are currently too small and inadequate to satisfy the ever increasing urban and peri-urban population in view of the high per capita water use. These assets are not being replaced after expiry of their economic/useful lives as per depreciation policies.

Key aspects of Asset management remain a responsibility of the headquarters. Area offices carry out rehabilitation work only after their budgets are approved by the head office.

The old pipe network receives water from sections of recently improved, new and expanded state of the art facilities with higher pressure.

The current Corporation's Capital Development initiatives are mainly focusing on the construction and expansion of new water systems. There has been inadequate rehabilitation of the network and as a result there is a growing need for investment in maintenance and repairs which will ultimately require huge investments in future if the current practice persists.

**Table 2:**

**NWSC Capital Development Projects for the period 2006-2009:**

| <b>Project Name</b>                                 | <b>Amount<br/>(bn Shs)</b> | <b>Nature/type</b> |
|---|----------------------------|--------------------|
| Mukono Water and Sanitation Project                 | 6.4                        | New                |
| Gulu Water and Sewerage Systems                     | 9.0                        | New                |
| Gaba I Rehabilitation Project                       | 9.9                        | Rehabilitation     |
| Entebbe Water Supply Project                        | 40.5                       | New                |
| Kampala Sanitation Master plan                      | 1.6                        | New                |
| Kampala Water Supply Network Rehabilitation project | 7.2                        | Rehabilitation     |
| Gaba III Project                                    | 31.2                       | New                |
| Kampala Urban Poor Project                          | 0.4                        | New                |
| Kampala Peri-urban Project                          | 4.0                        | New                |
| Kabale Additional Works Project                     | 4.0                        | New                |
| <b>Total</b>  | <b>114.2</b>               |                    |

Source: NWSC Corporate Plan 2006-2009

From the above table, of the Shs 114.2bn earmarked for capital projects in the 3 year period, only Shs 17.1bn (9.9+7.2) was planned for rehabilitation works. Management also indicated that 6% of its operating budget is allocated for repair of assets in addition to annual provisions for depreciation.

The existing old facilities like outdated pipe network and old storage tanks have continued to deteriorate and are a major source of water losses contributing to the problem of overall NRW in the Corporation.

Failure to rehabilitate the old facilities has resulted into interruptions by some customers who experience low pressure since the amount of water received by the customers is determined by the size, age and type of the facility.

### **3.3 Payment/Collection of Water Bills (Arrears):**

When meter readings are taken by Commercial Division staff, bills are supposed to be generated and sent to customers within 2 weeks of the following month after billing<sup>9</sup>. In order to direct efforts towards collecting all bills, NWSC set a target collection/Billing ratio including arrears of 100%. Once bills are delivered, Area staff are required to continuously carry out door to door follow-up of payments from customers on a monthly basis.

With regard to, Government ministries and departments, a memorandum of understanding (MoU) signed between the Government (represented by the MoFPED) and NWSC to address arrears requires NWSC to furnish MoFPED and the Auditor-General with monthly and quarterly status reports, procurement of appropriate pre-paid metering technology, and take remedial measures for non-compliance.

It was established that collection takes a period of between 1 day to more than 3 years.

The audit also established that NWSC furnished MoFPED with quarterly reports since the signing of the MoU. However the money released was not sufficient to cover outstanding Government arrears.

The possibility of using pre-paid meters to reduce arrears by Government departments/Ministries had not been considered by NWSC at the time of audit. Management of NWSC was piloting pre-metering among the small income earning category (urban poor) in Kisenyi I, Kisenyi II and Ndeeba after which pre-paid metering shall be scaled up to include ministries.

As a result, arrears for the Ministry category of customers have continued to accumulate from 8.1bn in June 2005 to 15.8bn in December 2007.

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<sup>9</sup> NWSC Commercial Manual paragraph 6.5.1

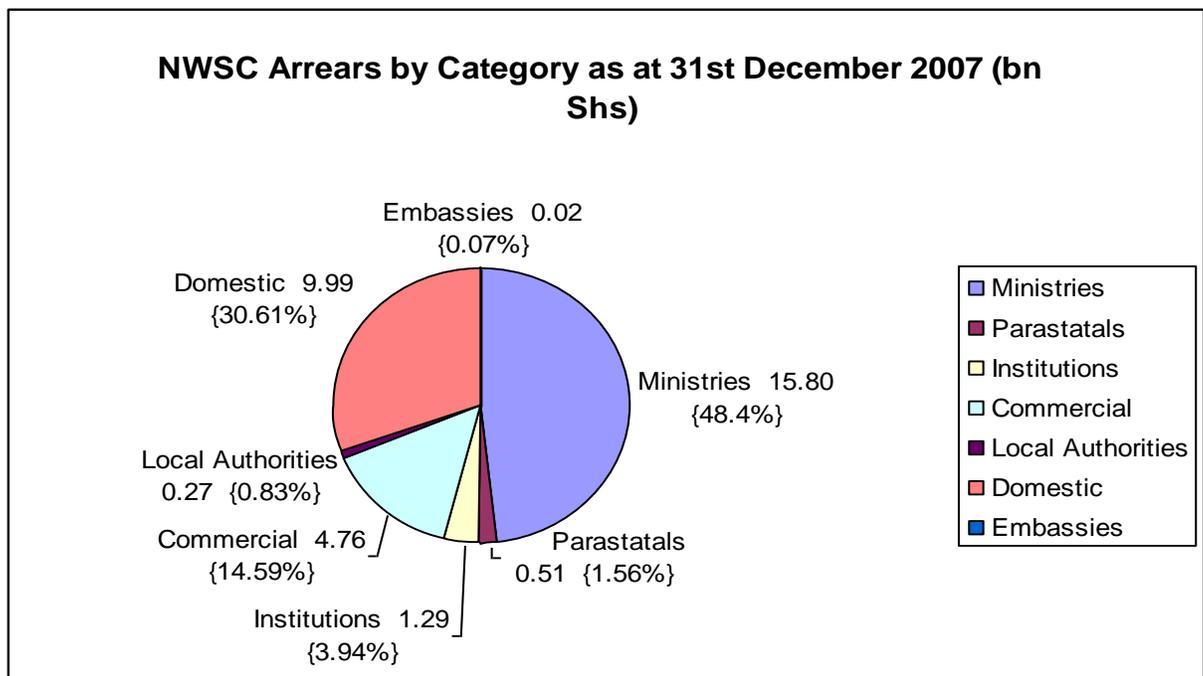
For other category of customers, NWSC hired debt collectors during the first half of FY2007/2008 to pursue customers who have failed to pay water bills, to complement efforts within the Corporation of collecting arrears.

This is attributed to under-provision for water bills by MoFPED in the annual budgets for the Ministries and the fact that MoFPED releases money quarterly, which releases do not sufficiently take care of actual billing and arrears.

In the areas visited, the study revealed that non-payment of the bills from other categories other than ministries was mainly attributed to low willingness to pay by customers.

The Corporation does not encourage the practice of disconnecting customers as a method of collecting/recovering outstanding debts. Follow-up of payment agreements, billing errors and the time taken to address these problems ultimately affect the customers in deciding when to settle water bills, usually after their concerns have been rectified. In the process, revenue is tied thus affecting cash-flow.

Delay in collecting payments has consequently increased the arrears portfolio from Shs 26 billion at 30<sup>th</sup> June 2005 to Shs 32.6bn as at 31<sup>st</sup> December, 2007. The status of arrears by different consumers as at 31<sup>st</sup> December 2007 is shown in the chart below.



Source: OAG analysis.

Government ministries and domestic customers comprise about 80% representing Shs 26bn of the total Shs 32.6bn arrears. Ministries are bulk consumers and their payments depend on the amount and timing of releases

from MoFPED. Domestic consumers on the other hand are many but aggregate amounts billed are substantial and follow-up can be challenging.

Consequently, the Corporation has lost money through writing-off bad debts to the tune of Shs 5bn over the last 3 financial years as shown in Table 4 below.

**Table 4:**

**NWSC Bad Debts Written-off - (2004/05 to 2006/07):**

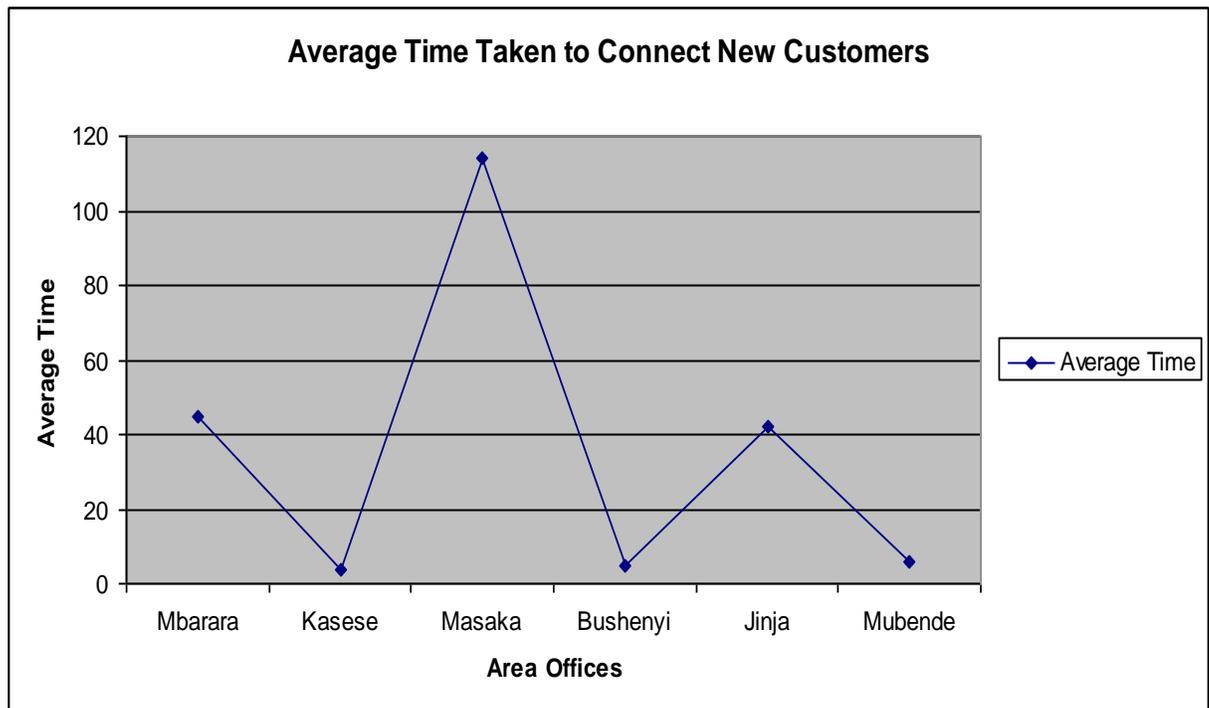
| Item/Year             | 2004/05<br>(bn Shs) | 2005/06<br>(bn Shs) | 2006/07<br>(bn Shs) | Total<br>(bn Shs) |
|-----------------------|---------------------|---------------------|---------------------|-------------------|
| Bad Debts written-off | 1.51                | 1.38                | 2.13                | 5.03              |

Source: NWSC annual reports, 2004/05 to 2006/07.

**3.4 Connecting new customers:**

NWSC staff are expected to connect new customers within a period of three days upon payment of a connection fee as specified in the NWSC charter.

We noted however that connecting new customers takes a period ranging from 4 days to 114 days. Details are shown in the graph below.



Source: OAG Analysis

From the above graph, Areas like Kasese, Bushenyi and Mubende takes less than ten days to connect new customers. This is mainly because the towns are relatively smaller than Mbarara, Masaka and Jinja where the customer applications are relatively more.

The reasons advanced for the delays in connecting new customers through interviews and review of documents were lack of meters, delays in getting connection materials and delay of funds from head-office as well as difficulties in accessing or locating customer premises.

These delays deny the customers timely access to clean water. NWSC on the other hand loses revenue due to delayed new connections.

### **3.5 Stakeholder Coordination:**

The Water Act requires providers of water and sewerage services to provide their services in consultation with appropriate public authorities and relevant community groups. It is good practice to involve relevant stakeholders in planning and implementation of service delivery to the urban population.

We noted that there was lack of coordination and understanding between the Corporation and various stakeholders like municipal/urban authorities, telecom companies, road contractors and individuals when laying infrastructure of different projects which require excavation work.

Development committees in local authorities that used to coordinate infrastructure development [roads, railways, water works, and telecom facilities] are currently non-functional.

This arises mainly because of limited sensitization of stakeholders about the location of water infrastructure and access of premises during expansion of the distribution network.

Inadequate coordination is evidenced by delays in connecting new customers because of failure by the Corporation staff to access premises.



Above: A 6 inch pipe on the mains at Wairaka (Jinja-Iganga Road destroyed during road construction). Taken on 14<sup>th</sup> November, 2007 at 11:35am

The Corporations' existing facilities have also been damaged by new excavations by other utility and service providers such as when road works, telecom and electricity cabling are taking place. The Corporation ultimately loses a lot of water when water mains are cut resulting into water shortages in urban areas like the example of Wairaka above.

The open points can expose the distribution network to contamination and cross-contamination with changing pressure levels, which ultimately affects the quality of the water.

Besides, the Corporation suffers road reinstatement costs (shown in the Table 3 below) where the new pipe network crosses an existing road. With better coordination however, these costs could be shared with other stakeholders.

**Table 3:**

**Road reinstatement costs for Kampala Area for the period 2004/05 – 2006/07:**

| <b>Financial Year</b> | <b>Amount (Million Shs)</b> |
|-----------------------|-----------------------------|
| 2004/05               | 144.4                       |
| 2005/06               | 206.5                       |
| 2006/07               | 162.2                       |

Source: NWSC Finance and Accounts Division.

### **3.6 Access to water at fire hydrants:**

The Water Act requires NWSC to erect fire hydrants and standpipes for supply of water for extinguishing fires in convenient places and at distances that they consider appropriate and in an effective manner. The Act also requires them to provide services efficiently and economically. It is good practice that the department furnishes NWSC with accountability for the water used in extinguishing fires.

We noted that the Corporation has designated various points in different towns and Kampala city where the Police Fire Brigade can obtain water for fire fighting. The water consumed at fire hydrants is given to the police free of charge.

Through interviews, it was established that because of unlimited access, some of the water was being misused by the police, construction companies and private operators who access water from un-metered fire hydrants.

The Corporation has no mechanism in place to monitor the use of water for fire fighting purposes.

Misuse of water was caused by unlimited access to un-metered points by the police fire brigade and other illegal users and private water operators. In Kampala alone, 1751 fire hydrants exist but only 8 of these are metered, making it difficult to control the amount of water used at these locations.

This increases NRW which consequently denies genuine customers water services. The Corporation also loses revenue.

### **3.7 Supply of Water to Consumers:**

Areas with hilly terrain require the use of booster pumps, re-enforcing the mains and restructuring the pumping and distribution network to improve the distribution of water uphill in order to sustain a 24hour water supply.

NWSC has invested resources in extending infrastructure and pipe network in several areas up to individual homes which occupy a hilly terrain in various urban areas within the country. A number of customers in these areas either do not receive water at their premises or in some instances the pressure is so low that it takes long to receive meaningful quantities/volumes of water to satisfy an individuals' domestic water requirements.

We noted for example, that in the suburbs of Kampala city like Kawempe, Nansana, Nabbingo-Buddo, Kalinabiri, Kulambiro, Kanyanya, Namugongo,

Ntinda and Seeta-Mukono, residents take over 6 hours a day without water against NWSC target of 24hour supply.

Consumers in these areas either take long periods without water or water supply is erratic, insufficient and unreliable.

Installation of boosters and bigger pipes for water distribution on the existing network has not been adequate in areas experiencing low pressure to meet the customer expectations.

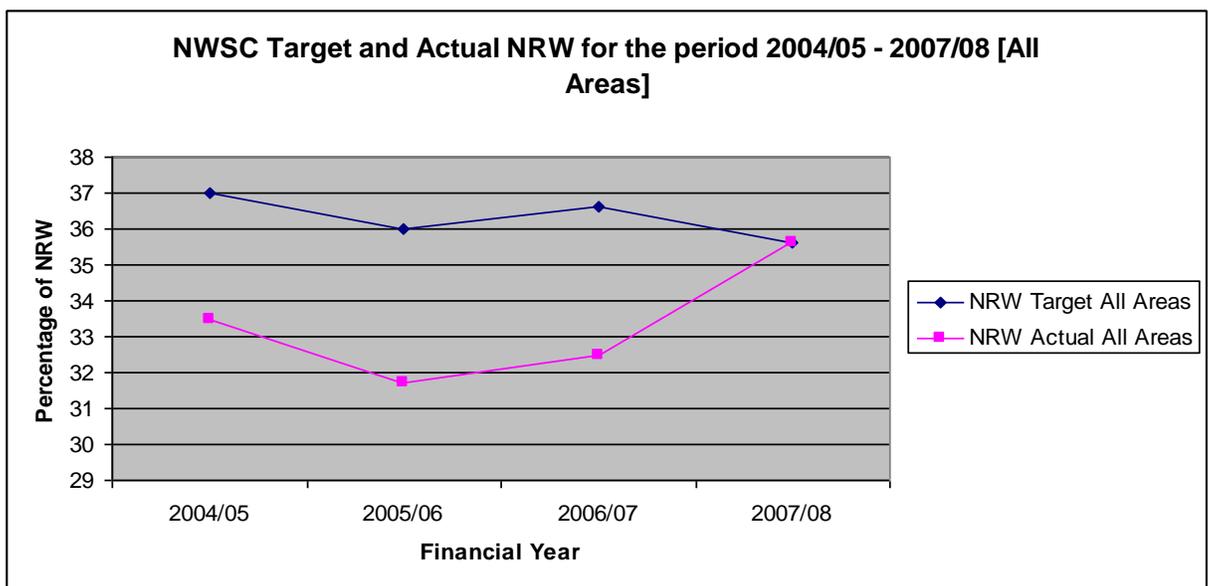
Because of the inadequacies along the mains and the distribution network, long queues are evident at public standpipes, a clear manifestation of insufficient water supply within urban areas. People resort to use of alternative sources. Water in some of these sources is contaminated and not suitable for human consumption.

The infrastructure put in place in the process of expanding the networks remains underutilized because of the dry pipes besides attracting a lot of criticism and public outcry.

### 3.8 Non-Revenue Water (NRW):

The International Water Association (IWA) has set an average of 20% as an acceptable level of NRW for developing countries.

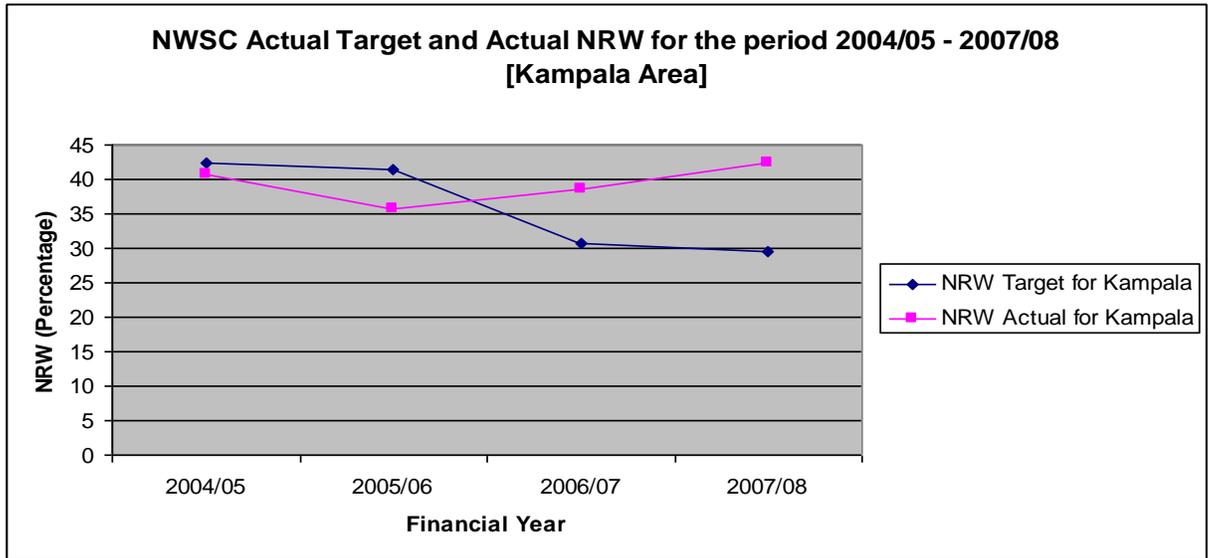
The NWSC Corporate Plans 2003-2006 and 2006-2009 set targets of NRW (shown in the graphs below) as a percentage of water produced. The first graph shows the performance of NRW for all areas while the second graph highlights the performance of Kampala alone.



Source: [Figures for 2004/05-2006/07 were extracted from Annual reports and those of 2007/08 from Performance reports]

While NWSC achieved the set targets, the actual NRW performance is gradually increasing and by the end of December 2007, it had reached the level of the set standard.

For Kampala Area, the set targets were not being achieved for the period 2006/07 and 2007/08 as shown below.



Source: [Figures for 2004/05-2006/07 were extracted from Annual reports and those of 2007/08 from Performance reports]

The amount of water lost through NRW is still high and exceeds IWA acceptable standards for developing countries.

The above losses are mainly caused by leakages and bursts, illegal connections, under-registering meters, water used for fire fighting, old distribution network and overload on service lines.

This has resulted into loss of revenue to the Corporation and overall water shortage to consumers.

Positive steps taken to reduce NRW include the creation of an illegal use reduction unit in Kampala and conducting a study which revealed that an average of 20% losses occur due to meter under registration after two year of use.

## CHAPTER 4

### CONCLUSIONS

From the audit findings above, the following conclusions were made to highlight opinions observed during the course of the audit.

#### 4.1 Technical Aspects:

- NRW through leaks and bursts reduces the amount of water available for distribution to the final consumer, increases the problem of water scarcity in urban areas and loss of income to the Corporation. The time taken in long queues to collect water reduces the population quality time for productive work. Consumers spend highly as water prices from these alternative sources escalate affecting customers' spending patterns and payment of water bills.
- The Corporation facilities are not adequately maintained, which further compounds the problem of leaks and bursts and increases water losses.
- Stakeholder coordination has been inadequate resulting in disruption of the distribution network, leading to poor service delivery, water losses and water scarcity in urban areas. The ability of NWSC to expand and provide water services to prospective customers is also impaired.
- Failure to put in place monitoring and accountability mechanisms of water use at fire hydrants increases the problem of NRW and loss of revenue to the Corporation.

#### 4.2 Commercial Aspects:

- NWSC takes long to disconnect customers with overdue water bills. This has greatly increased the level of uncollected debts.
- While management has put in place possible methods of collecting arrears like direct debits, direct payment at financial institutions and other cash payment incentives, the amount tied in arrears still appears to be quite high compared to the financial needs and set targets of the Corporation. This growth in arrears impairs the ability of the Corporation to effectively expand the distribution network and curb water shortage due to the reduced cash-flow. It may also affect the long term financial sustainability of the company. Billing errors also translate into customer complaints and delayed payments which further increase the accumulation of arrears and bad debts.
- Delay in connecting new customers ultimately leads to customer dissatisfaction in NWSC services. These delays may also affect the image of the Corporation.

## CHAPTER 5

### RECOMMENDATIONS

After conducting the audit and in light of the findings and conclusions, we wish to make the following recommendations which are aimed at improving the deficiencies observed in the distribution of water in urban areas.

#### 5.1 Improvement in Water Distribution:

- A map of all key points like valves should be availed to staff in charge of operations/maintenance to ease their work. Staff should be regularly inducted and trained to acquaint themselves with the locations of valves.
- Illegal Use Reduction service should be extended to all areas in country. Officers from area offices can be attached to the unit in Kampala to gain essential skills required in fighting illegal water use.
- Management of NWSC should regularly review the policies on replacement of worn out assets and implementation of these policies should be adhered to. Rehabilitation of existing old infrastructure is vital in view of the water losses. The Corporation should balance the needs of undertaking new capital development projects with routine maintenance and rehabilitation of existing infrastructure taking into consideration other factors like the age of the pipe network and other facilities, soil type, pipe diameter and traffic load where the network is laid. Management should also ensure that the process of compiling the manuals is completed for a proper maintenance plan and clear operations procedures.
- Where appropriate NWSC should request prospective customers to obtain authority from neighbors when applying for new connection. Sensitization of existing and potential customers, local leaders, and landlords is vital in enhancing the distribution network and supply of water to the urban population.
- Measures aimed at improving stakeholder coordination at planning and implementation of NWSC development projects should be put in place to ensure that the roles of the various players are properly executed and expectations are met. In this regard, NWSC should play a leading role in steering coordination and liaising with urban authorities and other stakeholders to ensure that a coordinated plan for all developments is discussed and understood by all players to minimize damages to the infrastructure.
- There should be proper coordination and improved relationship between NWSC and the Fire brigade to identify the location of the fire hydrants and assess their viability. A map of these points should be made and reviewed periodically to establish the appropriateness, adequacy and convenience in order to reduce

misuse of water. A mechanism of recognizing private water operators using water at fire hydrants with an option of licensing them should be considered. Designated points for this purpose alone should be identified to enhance monitoring and revenue collection.

- The social/mandatory obligation of providing water for fire fighting should be streamlined without compromising the Corporation's mandate of operating as a viable commercial enterprise in an effort to reduce overall NRW. NWSC should also put in place a reporting mechanism to ensure proper accountability of water consumed at fire hydrants.
- NWSC should develop a comprehensive master plan for both water and Sewerage Systems to enable it execute long-term capital development projects and distribution network.
- NWSC should prioritise re-enforcing of the mains and restructuring the pumping and distribution capacity of the network to improve on water distribution and curb the effects of low pressure. Enhancing education and incentive programs for customers to use water saving methods is essential in supplementing NWSC efforts of providing water to the urban population.

## **5.2 Improving Revenue Collection:**

- We recommend that the practice of contracting out collection of arrears to debt collectors be regularly reviewed and applied consistently countrywide in line with NWSC mandate, to reduce the high level of arrears. Efforts towards implementing the MoU, should be strengthened to recover arrears from government ministries and departments.
- The Corporation should assess the benefit of acquiring pre-paid meters against the costs of bad debt write-off, engaging debt collectors and the time value of money, with a view of mapping a clear strategy to eliminate arrears.
- It is also recommended that disconnection of defiant customers be re-enforced to recover arrears.
- There should be close supervision of commercial/Billing staff to minimize billing errors. Monitoring of set standards should be employed to assess performance.

Appendix (i)

**NWSC ORGANISATION CHART**

