

ASSESSMENT OF HARARE WATER SERVICE DELIVERY

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ABSTRACT

Water service provision continues to dog most water utilities in developing countries including Zimbabwe. In Zimbabwe's capital, Harare, the service delivery has been declining from 2005 when Zimbabwe National Water Authority (ZINWA) took over the mandate from Harare City Council (HCC). The challenges were evidenced by unrelenting water shortages which forced people to adopt unsafe water sources leading to outbreak of waterborne diseases such as cholera. In February 2009, HCC repossessed the mandate. This study assesses HCC's performance by focusing on water service delivery. Key aspects investigated included service quality, affordability, water production and demand, coverage and Non Revenue Water. The nerve centre to this research is a sample study that was carried out in Harare from January to March 2010. Data was collected by means of reading secondary and primary sources, interviews and field observations. Harare water utility has a Non Revenue Water of 35-40% and coverage of about 98%. The study established that active coverage was 88.1 % and residents without tap water were resisting payment of monthly fixed charges. Only 50.4% of the population had a 24 hour service and 54.8% of the residents perceived water to be of poor quality and have resorted to household level disinfection methods, drinking borehole and bottled water. Service availability was still bad in the eastern suburbs compared to western areas. It is suggested that the Government and other stakeholders form and capacitate a strong regulatory board, diversify water sources, outsource some of the water service divisions and also scrap off fixed charges for residents without tap water.

Keywords: Harare City Council, Water service delivery, service delivery indicators

INTRODUCTION

Water is an indispensable human right and access to it is therefore critical for human development. This view point is in line with one of the Millennium Development Goals (MDGs), Goal 7, target 10 which aims to halve the proportion of world population without access to safe drinking water and sanitation between 1990 and 2015 (United Nations, UN, 2006a). Integrated Water Resources Management's observation also emphasises on equitable access to water resources.

The World Health Organisation (WHO) and the United Nations International Children's Education Fund (UNICEF) 2010 update on global access to water and sanitation show that about 884 million people in the world are still using unimproved water sources and unserved urban population is growing (WHO and UNICEF, 2010).

Africa has a gigantic challenge in providing tolerable service to its people and this harmfully impact household water security. Studies show that only 64% of Africa's population had access to safe water supply in 2006, (UNICEF and WHO, 2008). UNICEF, (2009) noted that fulfilling acceptable targets in developing countries remains an area of concern

as over 884 million still lack safe drinking water sources. Projections by UNDP, (2006) cited in Water Operators Partnership (WOP), (2009) show that Sub-Saharan Africa would only reach the MDG targets for water services by 2040, and those for sanitation by 2076. The major set back is the inefficiencies of water utilities and the problem is magnified in urban areas due to limited alternatives. The Asian Development Bank (ADB), (2009), singled out government crisis which is often associated with how countries manage their water resources as the major limitation.

The situation in developing countries is further aggravated by urbanisation. This challenge as noted by WOP (2009) and is revealed by Africa's lagging behind other regions in the context of the MDGs. Zimbabwe is not an exception as its track record of urban water supply has been dogged by challenges. Its urban water supply was mandated by Urban Councils up to 2005 when the 1998 Water Reform Act was implemented. Urban water users had a sentiment that since the system take over by ZINWA, the organisation has been unable to execute its mandate leading to the gradual deterioration of the service.

Subsequently, water challenges hit Zimbabwe's urban areas during ZINWA's era and residents could hardly maintain hygienic living conditions. The peak of the service deterioration was manifested in a cholera epidemic which gripped many parts of the country with 191, 164 reported cases and 4,047 reported deaths for the period 15 August 2008 to 17 March 2009, (Office for the Coordination of Humanitarian Affairs), (OCHA, 2009).

Causes of the outbreak as unravelled by Jonga and Chirisa (2009) were but not limited to lack of water to flush toilets, lack of clean water supply and bursting sewerage pipes. Unlike Zimbabwe's second largest city, Bulawayo, whose water challenges are aggravated by poor rainfall that characterise the catchment, Harare's are intertwined.

The focus of this research was the residential areas where the water woes culminated into the cholera epidemic. The hardest hit or the hotspots were western areas such as Budiro among others (Jonga and Chirisa, 2009). Acute water shortages were also experienced in Harare's eastern suburbs and a research by Musemwa, (2008) listed Mabvuku among others to have been experiencing erratic supplies. Residents adopted various coping strategies notably the use of ground water which according to the War Act is illegal in high density areas. In low density areas, residents were drilling boreholes without permission. Some residents had to walk for long distance and queue the whole day to get water from the surrounding farms and low density areas. It was also reported that some residents were using toilets without flushing.

In response to this predicament the Government of Zimbabwe changed the management body and HCC repossessed the water sector in February 2009. Given this background, this research assessed Harare water utility's performance as reflected in water service delivery.

A paper by Baietti, Kingdom and Ginneken (2006) acknowledged that many public utilities in developing countries find themselves locked in the vicious cycle from which they cannot escape due to poor performance. They added that the poor performance creates a vicious spiral as the problems regenerate. Savedoff and Spiller cited in Berg, (2008), in their survey of the provision of water services in Latin America, described utility performance as a low level equilibrium where low prices lead to low quality, limited service expansion, operational inefficiency and corruption, thereby further eroding public support.

A paper by Musemwa (2004) indicates that Harare water woes can be traced way back to the late 1990s and they were triggered by drought, increased consumption and mismanagement. Mtisis (2008) discusses a number of factors which were hindering the provision of clean water to Zimbabwe's urban areas, particularly Harare, Gweru, and Mutare. The underlying causes are; economic decline, poor local governance structures, political interference, corruption, population growth, dilapidation in water supply infrastructure, and sheer disregard of water quality standards and laws. Harare water sector is mandated by the City Council which as well supplies bulk water to Norton, Ruwa, Epworth and Chitungwiza. It is a local Public Organisation administered by the Government through its local arm, HCC. This utility gets its bulk water allocation from ZINWA. The water sector comprises of seven divisions which are production, quality control, distribution, infrastructure, support service, sewerage and finance.

Harare water service provider classifies residential areas into major groups which are high and low density. According to the Service Provider, acting on WHO directive in response to the 2008-2009 cholera epidemic, all western suburbs are scheduled to get supplies every day for twenty four hours whereas eastern suburbs are supposed to get water for three days per week. This entails that Mabvuku because of its eastern location gets water three days per week even if it is a low income residential area. In contrast, all western suburbs are on daily water supply schedules. This puts at an advantage even high and medium income suburbs which are located in the western part of the city.

Description of Study Area

The city of Harare is surrounded by satellite towns of Chitungwiza, Norton, Epworth and Ruwa. Harare, founded in 1890 is Zimbabwe's capital and largest city which is located in the north-east of the country (Figure 1).

Harare urban has a tropical continental type of climate which is characterised by winter and summer seasons. According to Mapsofworld.com, (2008), the winter season is dry with the coldest month temperature varying from 7°C to 20°C. The average annual rainfall in Harare is approximately 840 millimetres and it varies from year to year. The city sits on a watershed plateau between Limpopo and Zambezi and is located upstream in Manyame River catchment at an elevation of 1,483 m. Storm runoff and waste water generated from the city flow down to Lake Chivero which is the capital's source of domestic water, where Morton Jaffrey Water Works is situated. Harare population has been growing rapidly for the past three decades and is estimated at population size of about 2, 3 million (Mongabay.com, 2010). The population has been growing rapidly for the past three decades. Between 1982 and 1992, it had a sudden population increase from 656 011 to 1 189 103 (Zimbabwe City Population, 2007) and in 2002 there were 1 435 784 people (CSO, 2002).

Chitungwiza was established during the colonial period. The reason behind its establishment was the need to decongest the city of Harare. The decision was politically motivated and it was not planned to house thousands of people. After independence in 1980 Chitungwiza developed an industrial area. The establishment of industries led to the increase in the number of residents but without corresponding development of water sources and treatment plants to service the satellite town. Harare's water sources and treatment plants were further strained by the establishment and growth of Norton and Ruwa after 1980.

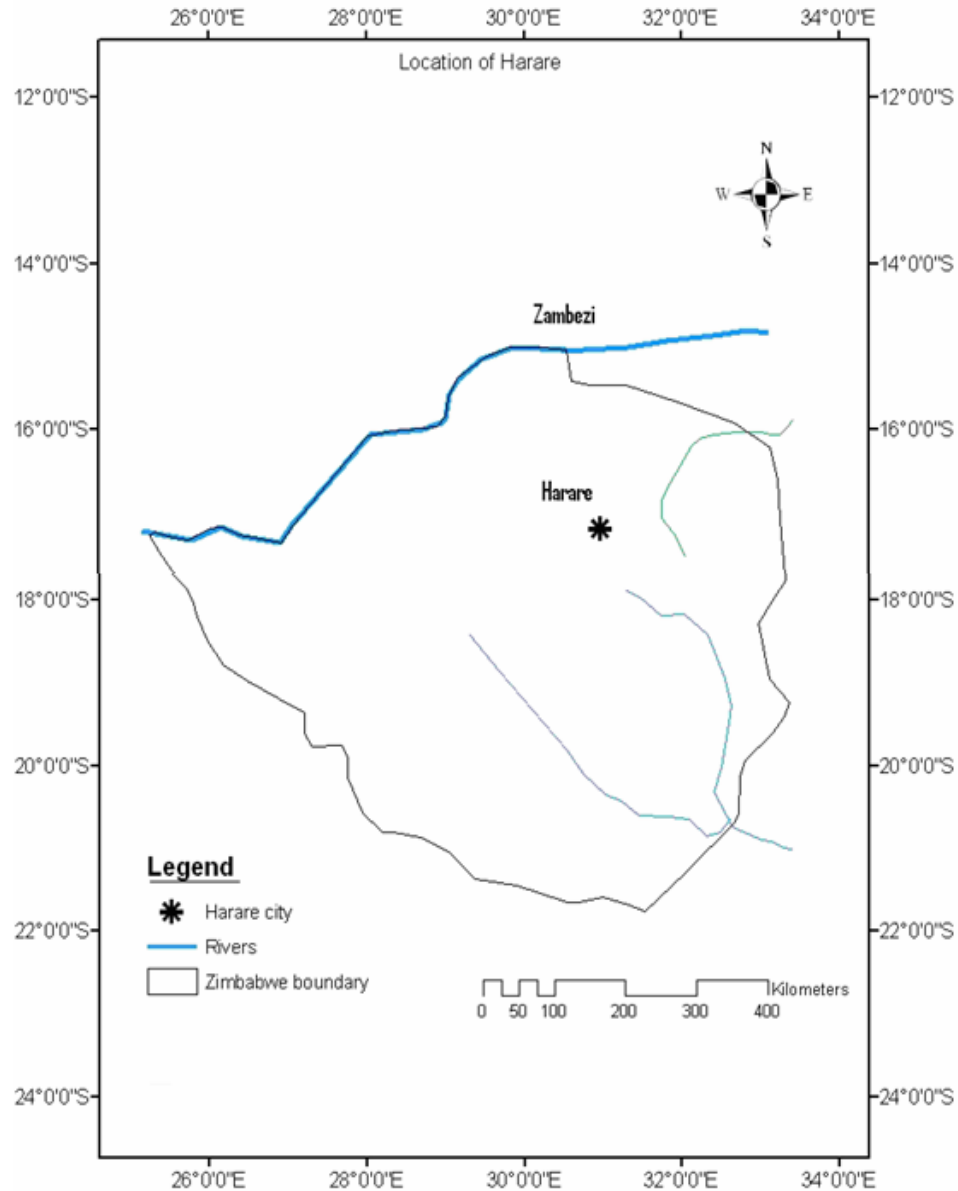


Figure 1: The Location of Harare in Zimbabwe (Source: Authors)

Harare Suburbs

High density suburbs are concentrated in the western part of the town where two of the sampled areas, Budiriro and Kuwadzana Phase 3 are located. The eastern suburbs are a home to medium and high income earners with some exceptions of high density suburbs such as Mabvuku and Tafara. The sampled areas are shown in Figure 2.

Mabvuku is a high density suburb in Harare, located about 17 kilometres east of the city centre. The area incorporates Old and New Mabvuku with the former dating back to the 1950s and the later was built in 1972 (WorldLingo, 2010).

Population figures for 2002 Census, (Central Statistics Office, CSO 2002: 82), show that Mabvuku had 57 082 people and data collected from Mabvuku District Office in February 2010 showed that there are about 6 374 residential stands, of which 1 333 are in Old Mabvuku and 6 374 are in New Mabvuku. To this end, Mabvuku together with Tafara have been undergoing a lot of water cuts, known to be the worst scenario throughout the whole city.

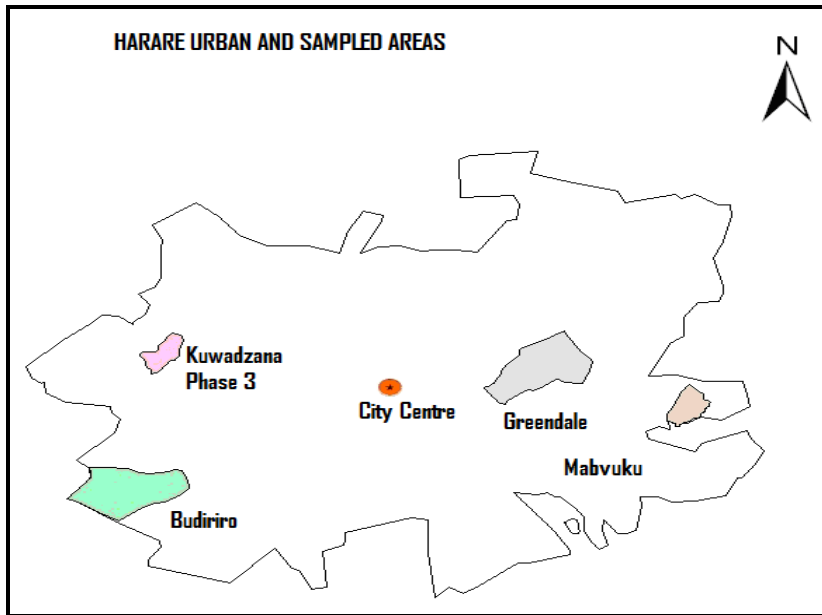


Figure 2: Sampled Residential Areas in Harare Urban
 Source: Adopted from OCHA (2009)

Budiriro is a high density residential area located about 10 kilometres west of the city centre and it falls into five sections. February 2010 statistics from Budiriro District Office indicated that the area has 11 687 residential stands and a population size of about 106 801 as of 2002, (CSO, 2002: 82). The five sections have 2 696, 1 700, 1 109, 1 260 and 4 922 residential stands in their respective ascending order (statistics provided by Budiriro District Office). Owing to the persistent water cuts, Budiriro among other suburbs was a cholera hotspot in 2008-2009. However unlike Old Mabvuku, Budiriro is a relatively new suburb with its water infrastructure still intact.

Kuwadzana Phase 3, established in 1998 is a new expanding high density western suburb. Dzivarasekwa District Office, (March 2010) said that the suburb has around 2000 housing stands. Greendale is a medium density suburb which lies to the east of Harare and is surrounded by a number of other medium and low density areas such as Athlone and Chisipite. This suburb houses 8 803 people (CSO, 2002: 82) and has roughly 1 282 housing units (Greendale District Office February 2010 statistics).

Problem Statement

Zimbabwe’s urban areas have been experiencing water supply challenges for the past years under the management of Urban Councils and Zimbabwe National Water Authority (ZINWA). Researches show that the water service delivery has

been deteriorating from the late 1990s up to the present day, (Jonga and Chirisa, 2009 and Musemwa, 2008) especially in the large cities of Harare and Bulawayo. In the city of Harare, poor performance which reached its peak during ZINWA's regime was causing persistent water shortages as reported in media (Zimeye 7 June 2009). The most affected areas were low income residential areas for instance Mabvuku, Tafara and Budiriro due to limited alternative sources of water and high population densities. Nonetheless, high income suburbs located in the eastern and northern areas for example Greendale, Glen Lorne, Chisipite and Meadowlands also suffered from this crisis. Some of the causes as noted by Manzungu and Machiridza (2005) were institutional, economic and demographic. The water challenges resulted in a cholera epidemic which the World Health Organisation (WHO) declared the worst in Africa in the past 15 years. This research aimed at assessing the current utility's water service delivery.

The Aim

- To assess Water Service Delivery by Harare City Council.

Objectives

The study sought to;

1. make an inventory of the service delivery indicators specific for Harare.
2. develop a framework for the assessment of Harare Water Service delivery.
3. assess Harare Water Service Delivery.

Justification of Study

The assessment of a utility's social performance warrants attention if political leaders, utility managers, citizens and other stakeholders are to have a good understanding of the quality of service offered. In addition, this study will motivate the Government and policy planners to monitor and adjust sector institutional set ups and water policies to improve water services in large urban areas. Resultantly, this research can be an entry point for substitute providers with alternative water sources other than surface, to be part of reform design because they play a pivotal role in alleviating urban water insecurity. Assessment of HCC water service delivery is strategic for the service provider to plan for the increasing demand and find new strategies to further improve service delivery in effort to achieve the MDGs. Overall, it is hoped that findings from this study will provide basis for intervention from various stakeholders and bring more sustainable solutions to the challenge of urban water crisis in Zimbabwe.

Scope and Limitations

This study dwelt much on service delivery because it is a critical aspect in Harare urban household water security.

METHODOLOGY

Introduction

This research was based on a case study approach. Residential areas and the service provider were the main sources of data. Sampling was used to get the actual respondents from the residential areas.

Data Collection Methods

The researchers collected information through literature review, structured questionnaires, semi-structured interviews and observations. A total of 353 questionnaires were administered in the four sampled residential areas. The formula, suggested by Israel, (1992) as shown below was used.

$$n = \frac{N}{1 + N (e)^2}$$

Where – n Sample size

N Number of houses

e Precision size or sampling error (0.08)

Sampling error is the range in which the true value of the population is estimated to be (Israel 1992). A number of factors were considered to come up with study areas. Mabvuku suburb was sampled because it is Harare's oldest suburb which has been suffering from erratic water supplies. Budiro suburb was selected because it suffered severely from the cholera epidemic (2008-2009) due to acute water shortages which forced people to rely on unsafe water sources. Two more study areas, Kuwadzana Phase 3 and Greendale were sampled from the west and east for comparison purposes so as to have a clear picture of the service delivered.

Methods for Specific Objectives

Data for various indicators was collected using various methods. **Objective 1: To make an Inventory of the Service Delivery Indicators Specific for Harare.** The first step of the study involved examining existing data and carrying out a preliminary survey to establish indicators which had an impact on Harare's service delivery. An inventory of the indicators specific for Harare was therefore created from literature reviewing, interviews and survey data. The researchers identified nine indicators which are: Production and consumption, Non Revenue Water, Coverage, Continuity of service, Water quality, Bill affordability, Connection fees, Response to customers and Cost recovery.

Objective 2: To Formulate a Framework for the Assessment of Harare Water Service Delivery. Having created the inventory, a framework for the indicators was formulated by assessing expected targets using International and WHO guidelines and local standard specifications. Data for this objective were collected from literature reviewing and the key interview respondents.

Production and Demand

Information on the utility's total production and service area demand was collected from key interview respondents. It was difficult to get figures on actual consumption per capita or household as residents relied on multiple water sources and some of the water bill statements did not show monthly consumptions.

Non Revenue Water

According to the information provided by the Service Provider, it is the difference between total production and billed water expressed as a percentage.

Coverage

This was calculated from the reticulated percentage using the formula

$$\frac{\text{Population with tap water}}{\text{Total population}} \times 100$$

For Harare urban, the number of reticulated houses was considered because residents have yard or stand connections.

Service Continuity

The availability of service was measured from the duration residents were getting tap water. According to international specifications, the desired standard is a 24 hour service. Local specifications as well stipulate the same duration but only for western suburbs. This indicator was addressed through the household questionnaire which focused on daily hours of service. Additional information to verify the continuity was provided by interviewees at the Head Office, Pumping Stations and Water District Offices.

Water Quality

Harare Water did not grant permission for water sampling to test for pathogens and other standards such as compliance with the residual chlorine rule to mention only a few. This indicator was therefore assessed from incidences of disease outbreak and media reports. Customer perception approach was also used.

Bill Affordability

In this research bill affordability was assessed against the country's GNI using 6m³. The yardstick for 6m³ was 3% of per capita GNI. Bill affordability is calculated using the formula;

$$\text{Bill affordability} = \frac{\text{Households with unaffordable bill}}{\text{Total Households}} \times 100$$

That is households for which rates may represent an unaffordable level: number of households served as a percentage.

Additional information on bill payment to have a clear picture on affordability was covered under the household questionnaire. Attempts to get residents' bills from the service provider were fruitless because they did not provide with recent information.

Connection Fees

This indicator can be assessed using household income or a country's GDP. The benchmark for connection fees is 5% of the income and if measured against a country's GDP, the ceiling is 20% of the GDP per capita.

Customer Complaints

Average response period was measured against 24 hours because Harare water's emphasis is placed on immediate resolution of customer complaints. The researchers established that few people launched complaints to the service provider. This was not because they were getting satisfaction from the service offered, but due to poor response. Assessment of this indicator thus was based on the average response period of the few reported problems.

Cost Recovery

A financially sustainable utility should have a ratio of 0.68 or less. Utility records could not be accessed so assessment of this indicator was based on interview responses and media reports.

Objective 3: To Assess Water Service Delivery by Harare City Council. Data for the analysis of specific indicators was collected through questionnaires, interviews and field observations. SPSS was used to analyse the questionnaires and graphs were drawn using excel for evaluation against expected standards and specifications as outlined in the discussed framework. The researchers' point of view was also given for a comprehensive picture of the performance.

DATA PRESENTATION AND ANALYSIS

Introduction

This study presents data that was collected from the field. Graphs and tables were the major tools used to present the results. In addition, it identified water service delivery indicators specific for Harare and then developed a framework which was used to assess HCC performance. This was followed by assessment of the service delivered to Harare residents.

An inventory of the Service Delivery Indicators Specific for Harare

The researchers identified nine indicators which are: Production and consumption, Non Revenue Water, Coverage, Continuity of service, Water quality, Bill affordability, Connection fees, Response to customers and Cost recovery

HCC performance indicators were mainly those which satisfy societal needs because the scope of the project was to assess water service delivery after changes in the management board. The aim was to establish if this reform has succeeded in addressing water challenges at household level to reduce the use of unsafe alternative water sources so as to curb water borne diseases.

A framework for the Evaluation of Harare Water Service Delivery

The framework for service delivery analysis was formulated from local and international specifications as shown in table 1.

Table 1: Framework for Service Delivery Analysis

Indicator	Yardstick
Production and consumption	Production which meets demand Consumption of at least 50 litres per capita per day
Non Revenue Water	15% to 25%
Coverage	100%
Continuity of Service	24 Hours per day
Water quality	Residual chlorine which is 1mg/l Microbial, chemical and radiological components
Bill Affordability	<3% of GNI per capita for 6m ³ US \$ 1 to \$12 per 15m ³ \$0.11 to \$53 per m ³ 0.2% of GDP per 20 litres of water <5% of monthly household income
Connection fees	5% of consumers' household income 20% of GDP per capita
Customer Complaints.	Response period of 24 hours Number of complaints per 1000 consumers
Cost recovery	0.68 or less

Assessment of Harare Water Service Delivery

The service quality was assessed using field data.

Production and Consumption

Harare has an unrestricted demand of about 1200 megalitres per day. The utility relies on surface water abstraction from Lakes Chivero and Manyame to Morton Jaffray Water Treatment Plant and from Harava and Seke dams to Prince Edward Water treatment Plant (Figure 3). It is imperative to note that these water treatment plants, the lakes and dams named above were built before the huge increase of the city's population. Moreover as the economic melt down continued the treatment plants and water sources were strained and as a result they failed to satisfy the needs of the population. Among other factors shortage of chemicals for purifying water was principal due to foreign currency reserves which dwindled.

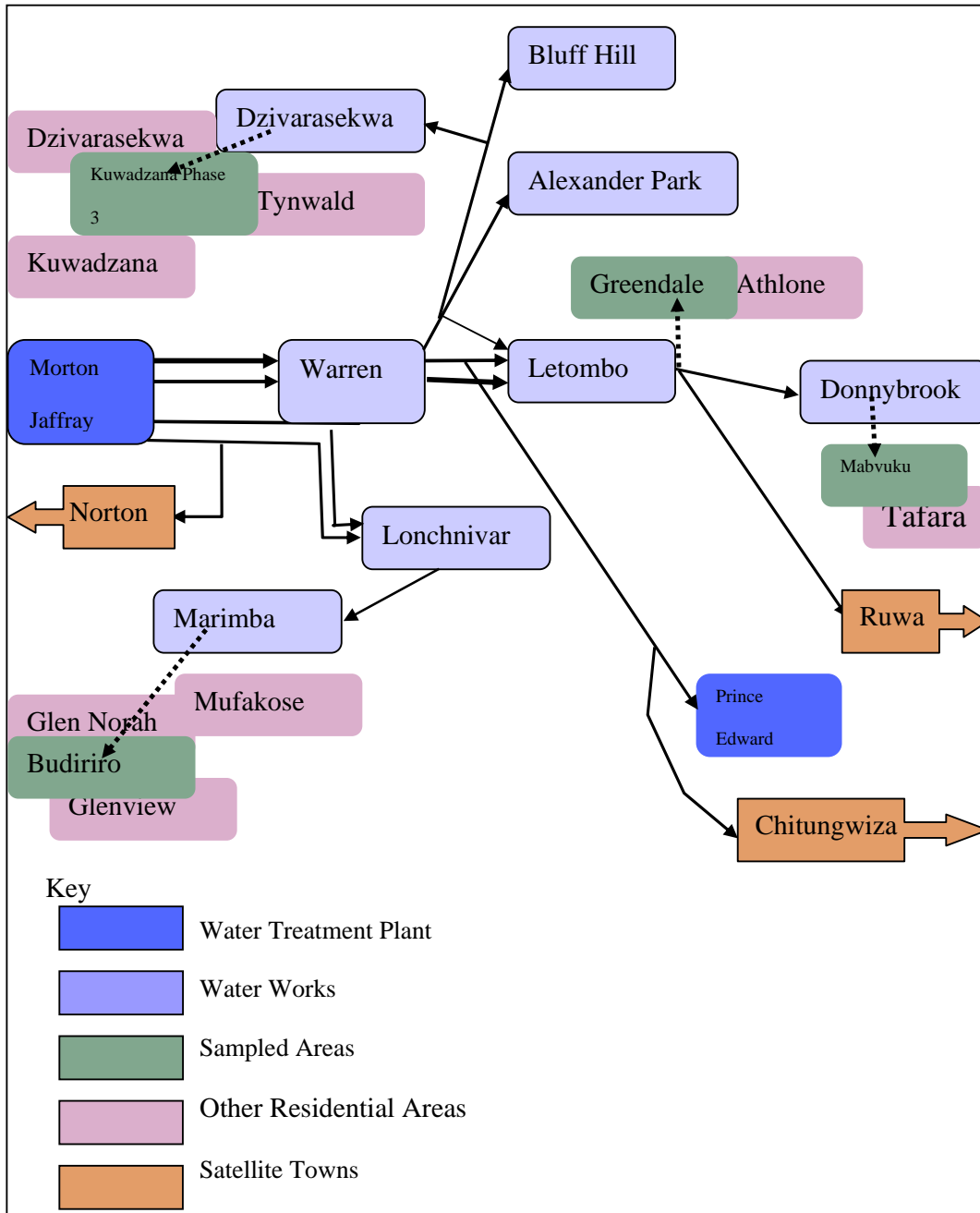


Figure 3: A Sketch Map of Harare's Reticulation System

Source: Warren Control

The two plants, according to the Service Provider have a maximum daily production of about 600 megalitres and roughly a third of the demand is met. Figure 4 shows the relationship between daily production, supply and demand for Harare.

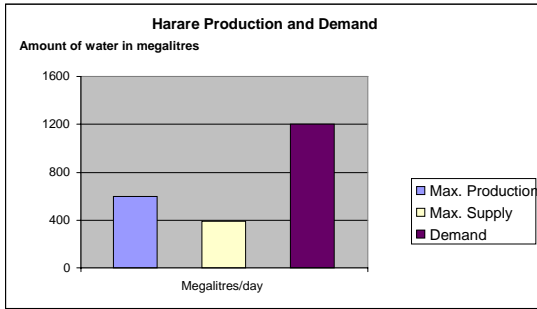


Figure 4: Daily Production and Demand (Source: Harare Water)

Key interview respondents indicated that 35% to 40% (210 to 240 megalitres) of the production is lost as NRW. The remaining 360 to 390 megalitres (< 32.5%) of the total demand is partitioned among various uses of which the major are domestic (2, 3 million people) and industrial. The amount of water produced is not sufficient for Greater Harare and this is the chief cause of water rationing and dry taps in most of the eastern suburbs.

Key interview respondents cited low production capacity by the water treatment plants as the major cause of the problem. The two treatment plants' total designed capacity is about 704 megalitres per day but their daily capacity has gone down due to dilapidation. However, average consumption per capita could not be calculated because some bill statements did not show residents' monthly consumptions.

Non Revenue Water

Harare utility's NRW stood at 35-40%. This was largely attributed to infrastructure dilapidation and in case of pipe ruptures, it would take time to repair them because the reticulation system was not computerised. Residents indicated that some reported bursts (Figure 5 a and b) went unrepaired for up to three months and Harare Water attributed this to lack of capital to buy the required inputs for infrastructure maintenance.

Harare's NRW went down slightly from about 45% (The Herald, 18 May 2009) after renovations in the city centre. This loss exceeds the recommended 15% to 25% for a well performing water utility and if all the losses are incurred by consumers, they end up having exorbitant monthly bills. Harare Water confirmed that it was losing a lot of water due to financial problems to refurbish the reticulation system. Although some renovations were done in the city centre in 2009, they said that the whole system including the treatment plants and pumping stations required a complete overhaul. According to the Herald (13 April 2010), Morton Jaffrey alone was losing 13 megalitres of water daily which is 2% of its production. Leakages as well were going unnoticed because the system is not computerised.



Figure 5: Water Loss from Pipe Bursts in the Residential Areas

Source: Field Photographs by Auxillia Tirimboi.

Coverage

According to key respondents from the Head Office, the reticulated population in its jurisdiction is about 98%. However some of the respondents said that they did not have the exact coverage figure due to urban expansion. The existence of unplanned settlements for instance Hatcliffe Camp was a chief cause of the utility's failure to achieve 100% service coverage. Another obstacle was the recently constructed high density suburbs where residents were allowed to settle without piped water and sewerage, for instance Dzivarasekwa Extension. However it was established that some taps were dry. Some eastern residents had been without supply up to the end of February 2010 due to a major burst between the main pumping station, Warren Control and Letombo Water Works. When the supply resumed in, active connections rose to 88.1%. The water works personnel at Donnybrook pointed out that dry taps in some areas, was due to high level pumping machine outages.

Harare water utility falls within the developing and medium income countries' coverage which ranges from 18% to 100% and is even lower than Namibia's which was found to be 98% from 2001-2005, (Ndokosho, Hoko, Makurira, 2007). To improve the coverage, HCC should refurbish dilapidated machinery and look for alternative water sources.

Continuity of Service

Harare water Utility was failing to provide its consumers with continuous running tap water. Some of the residents were spending day hours without tap water. Reports given by various organizations such as Combined Harare Residents

Association (CHRA), Zimcode, Harare Residents Trust and Transparency International of Zimbabwe in Public hearing meeting on Harare services on 19 February 2010 shows that many suburbs had residents without tap water. Out of the total 353 questionnaire respondents, only 178 (50.4 %) had a 24 hour service and 37.6 % had less than 24 hour service but with varying durations, as shown in Figure 6.

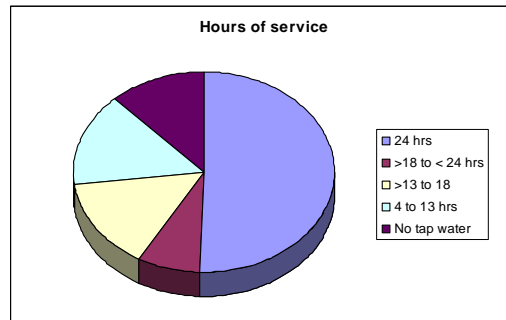


Figure 6: Hours of Service (Source: Field Data)

In most cases tap water would stop flowing at 5 in the morning and resumption varied from 11 in the morning up to 2 after midnight. This is in line with Schwartz’s observation that most low and middle income countries’ utilities can deliver a 24 hour service only to 50% of their consumers, (Schwartz, 2009). A number of reticulated residents relied on alternative water sources such as boreholes, elephant pumps, deep wells, shallow wells and rainwater harvesting. Most of the low density suburbs in the northern part of the city were not getting water. This area deserves attention if water security is to be realised in Harare urban because the utility’s water production of 50% is very low.

Failure to provide water for 24 hours is common in African countries as noted by Kimey (2008) in his study on Tanzania’s water utilities that on average Korogwe and Muheza town residents receive water for 4 to 10 hours per day. The hours of service varied greatly from one residential area to the other. Key interview respondents explained that failure to maintain a 24 hour flow was water demand management among other causes. Each water works had a daily stipulated amount of water which could not keep the taps flowing for 24 hours. Other major causes were power cuts, main pipe bursts and low pumping pressure.

Most residents in the less than 24 hours service said tap water would stop as early as four and supplies would resume from 11 in the morning up to two after midnight. People had to wake up at night to do their laundry and fill up storage containers for household use. Other residents did not have tap water, evident by borehole drilling in low density areas and ongoing illegal deep well digging in high density areas. Figure 7 shows deep well digging in Mabvuku where residential stands are small and there is risk of the water being contaminated by sewage.



Figure 7: Deep Well Digging in Old Mabvuku.

Source: Field Photograph by Auxillia Tirimboi

Questionnaire respondents reported that the service was not reliable due to unexpected water cuts which could go for 1 to 3 days. Media reports show that service disruptions are common in Harare. According to the Herald, (23 March 2010), Harare urban taps ran dry on the 18th of March 2010 due to a power cut and the situation returned back to normal over the weekend. Another widespread service disruption occurred during the second week of April due to some repairs at Morton Jaffrey and residents spend the weekend with dry taps. (The Herald, 13 April 2010). In response to the persistent cuts, people were storing water for domestic uses. Figure 8 **a b** and **c** show evidence of water storage in sinks and containers. People were also storing grey water for flushing toilets as shown in Figure 8 **d**.

The varying scenarios in the continuity of the service were determined by an areas altitude. Areas at lower altitudes rarely experienced water cuts and the duration of cuts increased with increase in altitude, thus some residential stands were only getting water at night when pressure was high. This was as well confirmed by the District Office Personnel particularly for Budiriro and Kuwadzana Phase 3.



Figure 8: Household Water Storage. (Source: Field Photographs by Auxillia Tirimboi)

Water cuts were compromising with standards of hygiene. Residents were resorting to unsafe water sources and in Mabvuku there was a typhoid outbreak which affected more than 140 people with 5 deaths cases in February 2010.

Water Quality

Although the detrimental drinking water components are microbial, chemical and radiological, which have undesirable impact on public health, Harare Water did not allow the researchers to take water samples to check these parameters. The production team at Warren Control indicated that they were supplying consumers with clean water. Required amounts of ammonia were added to increase the duration period of the water and that at drawing points, the water had 1mg/l of chlorine to prevent recontamination in the distribution system.

The researchers had to assess the quality of water from disease outbreak in Harare suburbs but statistics on disease outbreak could not be obtained from the City Health Department due to bureaucracies. Areas such as Kuwadzana Phase 3 which relied on tap due to limited alternatives did not have a history of waterborne disease outbreaks but in places such as Mabvuku, typhoid outbreak was attributed to the use of possibly sewage contaminated ground water.

The major problem that existed pertaining to the quality was lack of transparency. The service provider did not want to disclose any information on water quality results. According to media reports, as of December 2009, HCC was buying poor quality aluminium sulphate and was failing to buy algae kill, (The Herald, 28 December 2009), which meant that chances of supplying residents with water of poor quality were high. Consumers had different perception on colour, taste and odour (Figure 9).

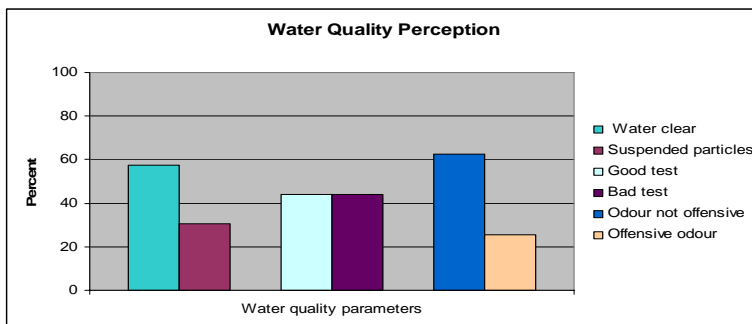


Figure 9: Residents' Perception on Water Colour, Taste and Odour.

Source: Field Data

They were forced to rely on their perception as indicated by WHO (2004) that acceptability is determined by senses if consumers are unable to verify the drinking water safety. Those who were not contented complained about suspended particles which settled in stored water and rust when supplies resumed. Residents added that the water would turn green if stored for more than three days. This was confirmed by the Combined Harare Residents Association (CHRA) which had water samples collected from 2007 up to 2009. Respondents from this Civic Organisation said that tap water had become greenish whereas ground water samples had settled particles only.

The researchers noted that residents' perception of the taste was determined by whether one was accustomed to drinking the water or not. Residents without drinking water options were now used to the taste. This goes hand in hand with what Kimey (2008) established for Korogwe and Muheza residents.

Despite having bad taste and suspended particles, few respondents found the water odour offensive. In spite of this, residents indicated that Harare water was of poor quality and that they had no trust in the service provider because of the water quality history. Residents reported that during the 2009 cholera epidemic, they were advised not to drink tap by UNICEF, unless disinfected at household level. During the time of study they perceived the water unsuitable for drinking due to lack of assurance by the Service Provider and the Water Quality Regulatory Board, the Ministry of Health.

To overcome this uncertainty, residents adopted various coping strategies which included drinking ground water boiling water, using aqua tablets to disinfect the water and drinking bottled water. However most of Kuwadzana Phase 3 residents were drinking water direct from the tap due to limited alternative drinking water sources.

Bill Affordability

Harare water bill has a rising block tariff structure with different unit prices for low income, high income and commercial areas. The least amount that residents can pay is US\$ 10.75 per month and the maximum is determined by one's consumption because the utility does not have a consumption ceiling. Table 2 shows cost per m³ for different categories of consumption.

Table 2: Monthly Bills for Varying Consumptions

High Density Domestic Consumers	Water Tariff per m³	Total Monthly Water Bill with Fixed Charges (US\$) for	Cost per m³
Monthly cost for 6 m ³	0.30	6 m ³ =12.55	2.1
Monthly cost for 15 m ³	0.30	15 m ³ =15.25	1.02
Monthly cost for 20 m ³	0.30	20 m ³ =16.75	0.84
Monthly cost for 21 m ³ to 30 m ³	0.40	30 m ³ =20.75	0.69
Monthly cost for >100 m ³	0.70	>100 m ³ =>61.45	0.61
Low Density Domestic Consumers		Total Monthly Water Bills without Sewerage Charge/ with Sewerage Charges	
Monthly cost for the first 20 m ³	0.40	20 m ³ =18.75 /28.75	0.94/ 1.44
Monthly cost for 21 m ³ to 30 m ³	0.50	30 m ³ =23.75 /33.75	0.79/ 1.13
Monthly cost for >100 m ³	0.80	>100 m ³ =71.55 /81.55	0.71/ 0.81

Source: Harare Water Billing Section

This study noted that the cost per m³ for various consumptions ranges between \$0.61 and \$2.1. This exceeds US\$ 0.11 per m³, the average tariff for poorest developing countries by far, not to mention the average global tariff which is US \$0.53 per m³.

The minimum household consumption of 6m³ means that some households spend \$12.55, equivalent to 2.5 % of Zimbabwe’s GNI (\$506.89) on their monthly water bills. This is in within WOP’s (2009) recommendations that in Africa, poor households should not pay more than 3 % of per capita GNI for 6m³ of water per month, implying that Harare bills are affordable. However, this gives a misleading conclusion because the minimum typical consumption per month is 15 m³. Kalulu, (2008) indicated that in most developing countries, the amount for 15 m³ varies between less than US\$1 and US\$12 per month, but for Harare \$15. 25 are above the average figure.

Nonetheless, the real situation on the ground remains concealed as there were some residents paying monthly water bills without any service rendered. Harare Water commented that their water bills were only 30 cents per m³ (for the first 30m³ in high density residential areas) and 366 times less than private suppliers’ charges (The Herald, 15 March 2010). Justified as they were, residents were complaining about excessive bills. Harare’s water bills had some extremes and a notable example is Kuwadzana Phase 3’s March 2010 bills which had consumptions of around 90 kilolitres, requiring them to pay at least US \$40. This was reported by Kubatana.net (9 September 2009) that residents were getting exaggerated consumptions because Harare Water officials had not been conducting any meter readings.

These bills were creating suspicion among residents given that some statements did not provide residents with information on meter readings. Only detailed statements could clear this. Failure by some residents to settle their accounts could be an indication of unaffordable bills. According to The Herald, (15 March 2010), the Competition and Tariff Commission was investigating the public outcry on Harare water bills.

A bar graph in Figure 10 shows average monthly water bills for the sampled area.

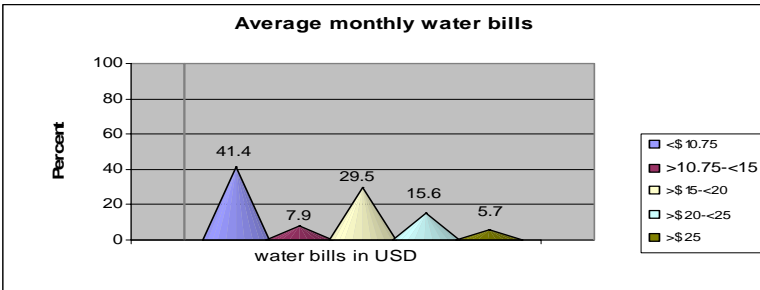


Figure 10: Residents' Monthly Water Bills (Source: Field Data)

Monthly water bills were dominated by \$10.75 comprising of 41.4% of residents who had been without the supply and the lowest was 5.7% for residents who had consumption exceeding \$25. However, these bills could not be verified because District Offices did not provide the researchers with information on the residents’ recent water bills.

Added to that, Harare Water does not have a pro-poor services policy such as free basic water as all consumption is billed. This shows that even the disadvantaged notably the unemployed, disabled, homeless, orphans and HIV patients to

mention but a few are not catered for which can negatively impact on equity in water allocation at local level and the achievement of MDGs.

The utility expected all residents to pay monthly fixed charges. This had resulted in some people’s bills accruing to US \$400 (for Mabvuku, as of December 2009). In Greendale and Old Mabvuku residents particularly those with their own water sources have since stopped paying the fixed charges. The researchers also assessed bill payment (Figure 11).

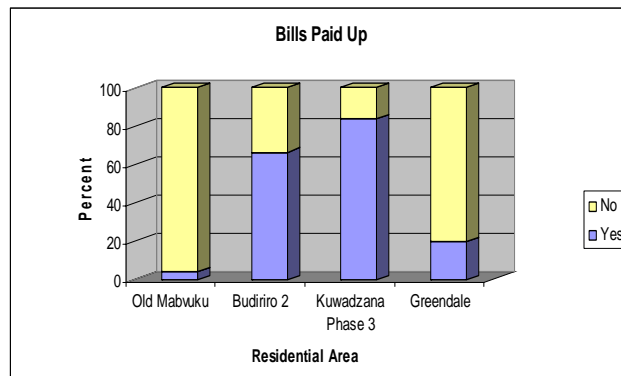


Figure 11: Bill Payment According to Residential Areas. (Source: Field Data)

84% and 66.4% in Kuwadzana Phase 3 and Budiriro 2 were paid up, mainly because they had limited alternative water sources. 95% of Old Mabvuku residents were not paid up because they had no service for long and most of them had dug deep wells. Greendale residents were reluctant to pay because they had their own reliable water sources. It was established that the payment of monthly fixed charges was unfair as these residents were meeting alternative water costs such as well digging, borehole drilling, buying the water from neighbours or from bowsers.

Connection Fees

According to Harare Water Billing Section, the connection fee is US \$50. The recommended percentage is 20% of a country’s GDP. In Harare, this fee takes 11.4% of US \$438, the 2010 estimated GDP per capita (Global Finance, 2009). Residents were silent on connection fees because it is embedded in land cost. Such costs are met during the initial stages when residential areas are serviced by responsible authorities. There are a few exceptions where residents moved in before servicing and for low income residents, the fee can be a hindrance from having yard connection because some consumers indicated that they were getting a monthly salary of around US \$100.

Customer Complaints

Harare water said that complaints were mainly on sewerage bursts, piped water bursts, dry taps and billing. The service provider did not provide figures on the number of complaints and average response period because there is a lot of decentralisation in the system. Some of the complaints were launched to District Offices and some directly to the Hotline Department.

At water District Offices, it was observed that the personnel did not record all grievances and the response period varied because of different reasons. The utility's target is to address all complaints within 24 hours but key interview respondents acknowledged that some complaints went unaddressed for long periods because of circumstances which were beyond their control. A case in point was dry taps in some parts of Harare especially the eastern and northern suburbs which they attributed to low water production. They also pointed out that financial problems and lack of transport contributed to delays in the repairing of bursts.

Questionnaire responses showed that only 16.7 % (Figure 12) of the respondents had reported their grievances.

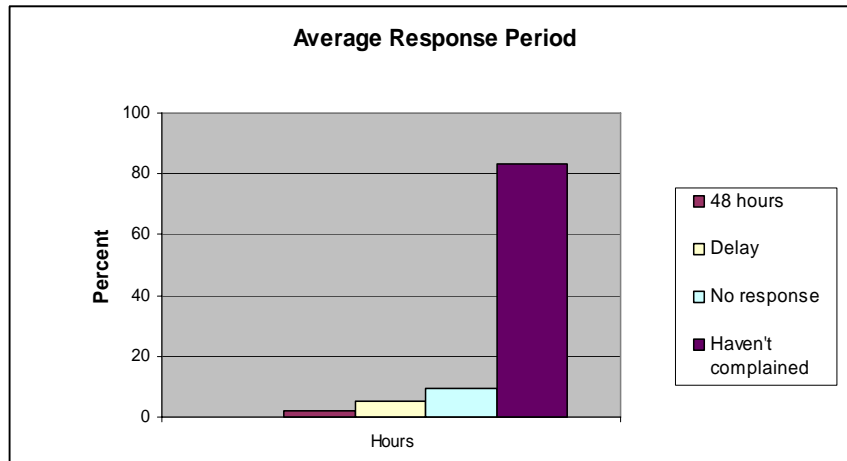


Figure 12: Response Period to Customer Complaints. Source: Field Data

Only 2.3% of the population got responses in 48 hours, 5.1% the responses delayed and 9.3% did not get any response. Residents reported that they would end up contributing money for sewerage pipe burst repairs hence they had formed community groups for this purpose. On a positive note, people indicated that sewerage blockages had markedly decreased because the sewer system had been repaired in some areas.

The rest said they did not report grievances because of various reasons for instance that they had become used to the water crisis, the response was not urgent or that they had their own water sources. From a public hearing on service delivery in Harare which was held on February 19, 2010, there was a sentiment that the utility personnel were not friendly. CHRA reported that some HCC personnel were telling residents not to launch complaints because no changes were going to be made for instance on inflated water bills.

Cost Recovery

No figures were obtained from the utility on cost recovery but HCC which supplies bulk water to Norton, Chitungwiza, Ruwa and Epworth complained that the satellite towns owed it huge sums of money which was a major drawback in service improvement. Media reports indicated that they were using US \$2 million every month for water treatment (Herald, 13 April, 2010). HCC has been failing to sustain itself financially, evidenced by water chemical donations from UNICEF (newZimSituation.com, 15 May 2010), and this might be an indication of low cost recovery.

CONCLUSIONS

Changes in the management of Harare water have made some positive impacts in service delivery. Some suburbs which had a history of dry taps and long queues at alternative drawing points were getting tap water. NRW has also slightly gone down after water infrastructure refurbishment in the city centre.

However, the city has not yet recovered from the persistent water crisis. Major problems noted were low water production, high NRW, water shortages, poor water quality, poor response to customer complaints and paying for undelivered services.

Although the reticulated percentage is high, (about 98 %), the service provider was failing to supply all connected residents with water. This is mainly due to low production and high Non Revenue Water (35% to 40%). Harare Water was supplying residents with only a third of the total demand. High level pumping machine outages were as well negatively impacting the water coverage.

HCC's failure to supply residents with a 24 hour service was forcing residents to use unhygienic strategies which are a health hazard.

Information on water quality was not available to the residents, which made them to believe that the water was unsuitable for domestic use, revealed by ongoing household level disinfection and drinking water from alternative sources. This further impacts Harare service quality as some of the sources are unsafe.

There is lack of a satisfactory regulatory board. Residents who fail to get satisfactory responses from the service provider have limited options to further their complaints. Reported challenges as a result take long to be addressed or remain unaddressed.

Although water tariffs measured against the country's GNI appeared to be affordable, the bills were higher than the global and developing countries' expected standards. Failure by some residents to pay is evidence or testimony that the monthly bills were beyond their reach.

RECOMMENDATIONS

In view of this research's findings, it is recommended that;

1. The utility come up with multiple water sources to reduce reliance on the two treatment plants which have an insufficient capacity. This can speed up the weaning of satellite towns by HCC.
2. The utility put in contingency measures for residents to have alternative water sources in case of tap water service disruptions. This can be done through rehabilitation of boreholes which lie idle in some of the residential areas such as Dzivarasekwa and Mabvuku. For their sustainability, community involvement in the management of these boreholes is called for.
3. In future urban planning should consider leaving space for borehole drilling in high density residential areas and the boreholes should be manned by water utilities.
4. The Water Service Provider rehabilitate all dilapidated water infrastructure, speed up the installation of leak detection devices and computerise the whole system to reduce water losses. Residents should also be given incentives for reporting water thefts.

5. The Government sets a strong capacitated regulatory board for Harare water services. The surveillance agency should be given the necessary powers to enforce standards, laws and regulations for a better water service delivery.
6. Residents need to be provided with detailed statements for cross checking in case of queries to erase suspicions on bill inflation.
7. Monthly fixed charges for residents without water services be scrapped

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