Pollution and Poor Land-use Management as Causes of the Harare Water Crisis

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Abstract

This article reviews Harare's water crisis, highlighting two of the most significant causes of the water challenge: pollution of water supply dams and poor land-use management in the catchment area. Using field observations, interviews and secondary data, it also examines the nature of the challenges that exist in providing water to the City of Harare residents. Some of the major causes of Harare's water shortages are revisited. It argues that although many scholars have already identified pollution as a major threat to Harare's water supply, very little, if any, scholarly work links Harare's water crisis to poor land-use management. Towards the end of the year 2019, the world was afflicted by the coronavirus (COVID-19). At the same time, housing and political activists were invading wetlands to establish unplanned housing settlements whilst planning authorities often exacerbated the problem by corruptly parcelling out fragile ecosystems for commercial and other urban developments. The wetland functions of these ecosystems have been destroyed in the process. The article concludes that different stakeholders in Harare are contributing towards worsening the already bad water situation.

Keywords: *water shortage, supply dam, pollution, wetland, planning*

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INTRODUCTION

Most African traditions place great importance on water sources. Any behaviour that threatens water supplies is looked down upon. An example of the worst village citizen according to the Shona culture is a *Nhundiramutsime*- one who urinates in the village well. (The Shona are one of the largest groups of indigenous people found in Zimbabwe). Water is critical to life. Its importance has assumed increased status as good hygiene is the first line of defence in the fight against viruses, such as the coronavirus that causes COVID-19. One of the most effective methods to curb the spread of the virus is the washing of hands. The importance of a reliable regular supply of potable water in fighting the COVID-19 motivated this relook at the need for sustainable water supply. Without water, people are denied this simplest defence against the virus. Even without health challenges, many African cities are experiencing rapid population growth (UN-HABITAT, 2015). Although Africa is the least urbanised region in the world, due to the rapid population growth, it is projected that more than 50 percent of the continent's population will live in urban areas by 2030 (United Nations, 2014).

The rapid urbanisation in Africa is sadly characterised by rising poverty and food insecurity, high levels of informality and poor infrastructure for water and sanitation (Chirisa, 2008; Toriro, 2018b). Many of Africa's cities are already failing to provide adequate potable water to current residents (Falkenmark, 1989, 1990; Reddy, 2002; Dagdeviren and Robertson, 2011; Jacobsen *et al*, 2012). For many cities, water demand is increasing faster than population growth. This presents opportunities and threats (Jacobsen *et al,* 2012). The City of Harare in Zimbabwe is not an exception. For several years now, the Harare City Council has not been able to supply adequate potable water to its residents.

During the month of September 2019, the water crisis reached a new low when authorities were unable to pump a single drop into the city for a few days (Cable News Network (CNN), 2019; Reuters, 2019). The Harare City Council had run out of money to procure water treatment chemicals. In an interview with one of the country's daily newspapers, a city technical officer said:

> "As we speak, Morton Jaffrays (Harare's water treatment plant) is not operating, we ran out of the critical chemicals early this morning (yesterday) and the plant had to be shut down so we have to run around to try and get supplies from even suppliers whom we do not have contracts with." (Madzimure and Ruzvidzo, 2019:1).

Soon after this crisis, the COVID-19 outbreak erupted. The Harare water issue prompted considerable debates on several online platforms and in newspapers. What has been absent from these discussions and debates has been scholarly insights that seek to understand and link the causes of Harare's water challenges to developments within the city beyond the socio-political emotional rants. Nhapi, one of the most consistent scholars on Harare water, asserts that the City of Harare has 'systematically destroyed its major source of potable water supply, Lake Chivero,' causing a severe water crisis (Nhapi *et al*, 2003:11).

Whilst much existing research has explained Harare's water problems from technical, engineering and chemical perspectives, this article re-examines the water problems within the context of a new health scare and from a largely planning perspective. The article argues that Harare residents, both municipal officials and residents, are behaving irresponsibly when they already have a water crisis. It discusses the Harare water shortages from a land-use and urban management perspective. The Harare water issue is important, not only because water is a basic need, but for many years it also supplied water to the neighbouring towns of Chitungwiza, Ruwa, Norton and Epworth. COVID-19 has reignited discourses over Harare's water crisis as water provides the easiest defence against the pandemic. Meanwhile, few scholars, if any, have examined the link between declining water supply, increasing concentration of pollution in the water supply dams and poor land-use management practices in Zimbabwe. As the water supply situation worsened amidst a health scare, anger debates and discussions have increased. What most scholars appear to miss is that different stakeholder groups in Harare are behaving like the proverbial village fool who urinates in the village well. This perspective adds to discourses on the Harare water shortages. A comprehensive understanding of the causes of Harare's water crisis is necessary to finding lasting solutions to the problem and improving the city's health and sanitation status.

LITERATURE REVIEW

Many countries in Africa, including Zimbabwe, face water scarcity (Jacobsen *et al*, 2012). The quantity of water that is accessible to an individual on the continent of Africa is considerably lower than the world average at 4000m^3 per person, when globally the average is 6,500m^3 per person (UNEP, 2010). As Harare residents appear shocked at their water challenge, there is abundant literature that documents the genesis and growth of the problem. Harare residents and governing authorities seem to have forgotten two things. First, they have had water problems for over 20 years now (Zinyama *et al*, 1993; Nhapi and Hoko, 2004). Second, they are not alone in this. Water scarcity is a current and future global challenge that is already affecting several Zimbabwean urban areas (Chenje *et al*, 1998; Musemwa, 2010; Hove and Tirimboi, 2011).

Literature indicates that many South African cities are also affected (Falkenmark, 1990; Reddy, 2002; Jacobsen *et al*, 2012). As residents of African cities face these water shortages, scholars of development studies may not be surprised by the prevailing situation because it was predicted many years ago that future wars would be over water due to its growing scarcity. In the early nineties, water shortages were already being reported as a 'perennial problem' in many countries (Engelman and LeRoy, 1993). Harare's water shortages and pollution challenge are as old as has been shown for many African cities. There were several studies in the nineties that showed a growing pollution challenge as a precursor to the water shortages (Moyo, 1997; Hranova *et al*, 2001). As early as when the current Harare Master Plan was prepared in the late eighties, water was already a major consideration. The master plan's forecast was that Harare would run out of adequate water by the turn of the century (City of Harare (CoH), 1993). A plan was therefore mooted to build another dam in Murewa on the Nyagui River, away from the polluted Manyame Catchment. Although this dam project that has been named Kunzvi Dam, was planned many years ago, it is yet to be built (Mate, 2005). It has been noted that there 'has been high incidence of waterborne diseases in areas of Chitungwiza and Norton as a result of untreated sewage finding its way into drinking water sources' (Masere *et al*, 2012:755). Indeed, there is abundant evidence of pollution as a major contributor to Harare's water problems.

Harare gets its water from four dams, all located downstream of the city and the other towns in the Greater Harare region, such as Ruwa, Chitungwiza, Epworth and Norton (Zinyama *et al,* 1993; Masere *et al*, 2012). The four water supply sources are Harava Dam, Seke Dam, Lake Chivero and Lake Manyame. These are shown on Figure 1. Only the first water supply dam, known as Cleveland Dam, was built upstream of the City of Harare in 1912 (Zinyama *et al*, 1993). Harare's waste-water treatment facilities are also located downstream of the city, towards the water supply dams. Harare's two main sewerage treatment works, Firle and Crowborough, were situated along rivers upstream of the two largest dams, Lake Chivero and Lake Manyame. Because these plants were very efficient at commissioning, they could treat effluent to an extent where it could be safely discharged into the river (Chenje *et al*, 1998). Even smaller treatment plants in Harare, Chitungwiza and Norton all discharge in tributaries of rivers feeding the Manyame Catchment. This was a perfect system that also served to recharge the catchment. Harare could, therefore, be guaranteed of a good flow of water even during the years of droughts (Moyo, 1997).

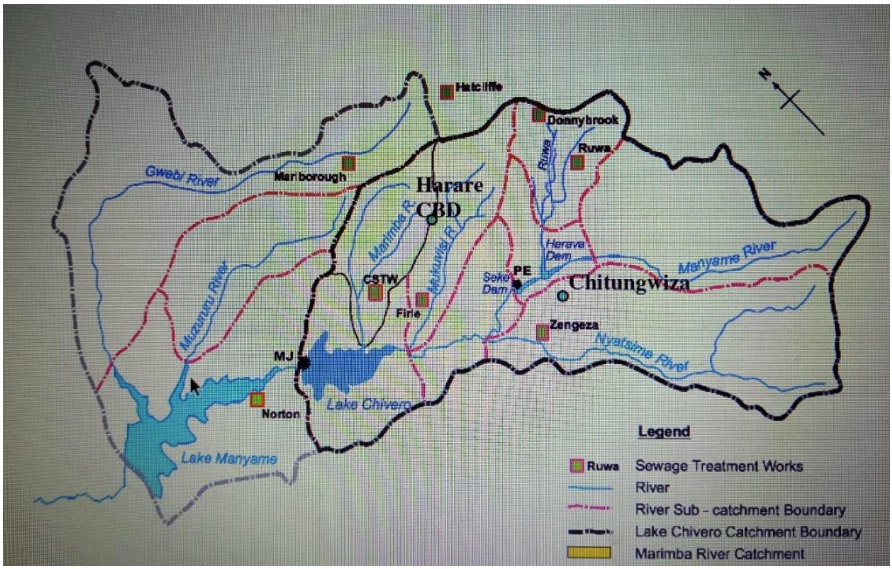

Figure1: Location of Lake Chivero and Manyame in relation to Harare and Chitungwiza settlements and Sewerage Treatment Plants (Nhapi and Hoko, 2004)

However, that was positive only when the plants worked efficiently. The idea assumed that the state of the facilities would always be efficient to ensure the environmental integrity of the catchment through sound maintenance. When the biggest sewerage treatment plant for Harare, known as Firle, was commissioned in 1986, it was the biggest and the most modern sewage treatment plant in Sub-Saharan Africa (Toriro, 2018a). The situation has, however, changed significantly, with the facilities now overloaded with high volumes of untreated effluent now finding its way into the water supply dams (Moyo, 1997; Nhapi and Hoko, 2004; Masere *et al*, 2012).

Water supply depends on both quantity and quality of water in the catchment. Challenges in the catchment are worsened by the emerging challenge of climate change that is causing variations in rainfall patterns. (Jacobsen *et al*, 2012). Harare gets its raw water from four dams, namely Harava Dam, Seke Dam, Lake Chivero and Lake Manyame. All the four Harare water supply dams are located in the Upper Manyame Catchment with two large ones (Lake Chivero and Lake Manyame) being down stream of Harare, Ruwa, Epworth and Chitungwiza as shown in the map on Figure 1.

POLLUTION AND HARARE WATER

The history of Lake Chivero's pollution is long, dating back to the 1960s (Munro, 1966; Moyo, 1997; Magadza, 2003). It has been noted to contain such high levels of pollutants that even by the turn of the century, it was being described as 'eutrophic' and even 'hypertrophic' (Mhlanga *et al*, 2006; Ndebele and Magadza, 2006; Nhapi *et al*, 2004). Pollution of Lake Chivero and Lake Manyame is documented as being caused by several stakeholders. The first one is industrial pollution where toxic liquid waste is discharged into drains and finally into rivers without treatment (Nhapi and Gijzen, 2002). The other are nutrients from crop fields as a result of urban agriculture (Mpala and Davis, 2006). Some scholars warned of the threat of industrial pollution many years ago. One example are two University of Zimbabwe academics who concluded that 'water quality is an urgent problem in the Lake Chivero catchment, Zimbabwe, whilst water scarcity will be a problem soon' (Nhapi and Hoko, 2004:1281).

The municipal sewerage treatment works also contribute to water pollution. Since its commissioning, Lake Chivero has received significant volumes of sewage effluent since 1952 (Marshall and Falconer, 1973). Over the years, the sewerage treatment plants' capacity has been exceeded. Therefore, most of the effluent can no longer be treated before discharge. There is evidence that sewage effluent is a major cause of pollution in Lake Chivero (Nhapi *et al*, 2004; Ndebele and Magadza, 2006). This has led to the build-up of algae that has caused serious complications to the water treatment process (Hoko and Makhado, 2011). It has also caused the growth of the water hyacinth weed on the lake, prompting the formation of the Zimbabwe Aquatic Weed Management Committee to try and control the invasion of weeds feeding on the nutrient rich water flowing into the lakes (Chikwenhere, 2001).

Some scholars argue that the toxins in Lake Chivero water are harmful to human health and may be condemning Harare residents to diseases (Ndebele and Magadza, 2006). A water quality monitoring study conducted in Harare as early as 2000 revealed 'serious water pollution problems due to urbanisation in the catchment' creating potential health risks (Nhapi *et al*, 2006:101). Pollution of the lake is causing water-borne diseases. Such shortages caused the cholera outbreak of 2008 (Hove and Tirimboi, 2011). This cholera outbreak was described by some scholars as the worst such outbreak in Africa in 15 years (Manzungu and Chioreso, 2012).

As already explained, Harare sits on its catchment, therefore all management weaknesses and waste ends up in the city's water supply dams. Poor refuse management has been observed as one major cause of pollution as much waste is not collected (Nhapi, 2008). Poor urban governance and a multiplicity of jurisdictions, among the different authorities, was also documented as causing the situation (Magadza, 2003). This is compounded by poor regulatory monitoring and low fines for offenders (Nhapi, 2008). Other studies attributed the pollution to inadequate management of urban growth coupled with disproportionate investments in waste management in the city and its hinterland (Magadza, 2003).

Environmental management is documented as a major challenge. According to one scholar who has done extensive studies on the Lake Chivero basin, one

of the major drivers of pollution is an environmental management breakdown in the catchment management (Magadza, 2003). This is supported by other scholars who found that the recycling model that was assumed to recharge the catchment by locating sewerage treatment works along rivers was no longer working since the systems were overloaded and contributing to water pollution (Nhapi *et al*, 2003). There was, at the turn of the century, high expectation that the coming in of new legislation on environmental management would lead to sustainable water resources management (Nhapi and Gijzen, 2002). The Environmental Management Act (Chapter 20: 27) was enacted in 2003 amidst high expectations of better catchment management (Government of Zimbabwe, 2003). However, there is now evidence showing that there was no improvement as the poor environmental management continued and pollution levels remained high (Hove and Tirimboi, 2011; Masere *et al*, 2012).

There are several other documented negative outcomes of Harare's polluted water. When it rains and Lake Chivero fills up and spills, fish die in the lake (Moyo, 1997). A similar study found that 'high nutrient levels have led to excessive productivity and periodic fish kills due to ammonium toxicity and low dissolved oxygen levels' (Nhapi *et al*, 2003:12). Every year during the summer months of August, September and October, Harare's water problems worsen due to the high temperatures that increase demand for water at a time when dam levels are at their lowest (Moyo, 1997; Nhapi, 2008). In addition to health challenges posed by excessive pollution, the problems are exerting severe financial pressures on the City of Harare. The city now uses approximately eight different chemicals to treat water to a standard where it becomes potable (Nhapi and Hoko, 2004; Musemwa, 2010; Hoko and Markado, 2011).

It has been suggested that Harare could postpone huge investments in capital projects, such as new dam construction if they could deal with the pollution problems upstream of Lake Chivero. With improved management of sewage plants and encouraging industries to adopt cleaner production approaches, pollution into the existing lakes could be reduced to levels that removed the urgency of new dams and postpone huge investments by at least 10 years

(Nhapi and Hoko, 2004). The situation is made worse by the fact that the pollution concentration increases as the volume of dam levels decrease. So, during the periods of low dam levels, the water treatment process is reported to be most difficult technically and financially most expensive (Musemwa, 2010).

The high levels of pollution in the Manyame Catchment has prompted discussions to build new dams away from this polluted river system. For Harare, two dams have been proposed on the Nyagui River in the eastern province of Mashonaland East whilst similarly Muda Dam has been proposed on the Mupfure Catchment for Chitungwiza, again away from polluted rivers (CoH, 1993; Mathe, 2005). The choice of these new dam sites was caused by the perennial pollution problems of Lake Chivero that are well-documented and started even in the 1960s (Moyo, 1997; Magadza, 2003; Ndebele and Magadza, 2006; Hove and Tirimboi, 2011). Whilst building new dams is a strategic decision to meet the needs of the growing population in the Greater Harare region, it is also a ploy to run away from the unsustainable pollution levels in the four existing dams.

Climate change has also caused declining water availability in the Manyame Catchment over the years. In Zimbabwe, the documented 10-year drought cycles have become more frequent. According to the country's meteorological records, in the past decade alone, there have already been four seasons with below average rainfall (Toriro, 2020). Interviews with City of Harare officials also indicate that two upstream dams, Seke Dam and Harava Dam, were decommissioned from water abstraction mid-year during the years 2019 and 2020 because the water fell below lowest abstraction levels for purposes of treatment before consumption. Similarly, bio-monitoring by the author revealed that Lake Chivero did not spill in 2019 due to poor rains causing lake levels to decline significantly. Records from the Zimbabwe National Water Authority (ZINWA) also show declining water levels comparing the year 2004 and 2020 (Table 1)

Table 1: Harare's Sources of Water: June 2004 and June 2020

Water Reservoir	Percentage Full (June 2004)	Percent Full June 2020
Lake Chivero	94.1	55.3
Lake Manyame	65.3	66.8
Seke Dam	32.0	15
Harava Dam	30.8	8.2

Source: Zimbabwe National Water Authority (ZINWA) Research Department July 2020

WETLAND DEVELOPMENTS AND POOR LAND-USE PLANNING: CRITICAL REFLECTIONS

One of the natural sources of water in any catchment is its wetlands. These are described as important ecosystems that store water when it rains and release it slowly throughout the year as sources of rivers (Mpala and Davis, 2006). This section presents data on how poor planning on Harare and Chitungwiza wetlands is contributing to increasing pollution and declining water supply as urban development encroaches on the wetlands, thereby destroying their functions. Four different sites that were found to demonstrate high levels of encroachment onto wetlands and poor planning were chosen to show how extensive the wetland loss has affected Harare water. These are Monavale, along the Marimba River, portions of Chitungwiza that feed into Nyatsime River, Harare South along the Manyame River and two high-density suburbs near Lake Chivero.

Monavale is a suburb in central Harare. It has a vlei that has significant importance in that it is a habitat for thousands of flora and fauna. The area also has within it a wetland that has been designated as a Ramsar site. This is 594 hectares in extent and is part of the headwaters of Marimba River. This important wetland, with its rich biodiversity, however, faces several threats. These include illegal dumping, veld fires, invasive plant species and illegal cultivation (Mpala and Davis, 2006). Perhaps the biggest threat is authorised inappropriate development that goes against sound urban ecological planning. The worst example is a gated residential development known as Mayfield Estate. Interviews with members of a community organisation known as

Conservation Society of Cosmo indicated that they were not consulted during the project EIA as required by Zimbabwe laws and for those that objected to the development, their concerns were not considered as must happen. Residents indicate that due processes for approval of this development were not followed and they allege that some of the permits were issued corruptly. The development has visible impacts of being inappropriate location. Most of the houses are developing cracks and whenever it rains, the area is flooded as it lies in the flood plain of the passing Avondale stream.

Chitungwiza is one of the four urban settlements that drain into Harare's water supply dams. It is, therefore, one of the areas that determine the flow of water into the metropolitan area's bulk water sources. Most of the wetlands that lie east of the settlement have, however, been occupied by housing activists and illegal land developers commonly known as 'land barons'. It is the commission of inquiry set up by the Minister of Local Government in 2014 that found out that most subdivisions around Chitungwiza to have been led by illegal land developers, that as land barons. Thousands of such residential plots were created and sold to home-seekers. These developments were unauthorised and unplanned. Crude allocation methods were used and little or no consideration was made of the suitability of sites. Most tributaries of Nyatsime and Manyame Rivers were occupied and destroyed in this manner. Later on, a decision was taken to regularise some of these developments. Whilst the regularisation and re-planning process was done by professional planners and approved by the national planning regulatory body, the Department of Physical Planning (DPP) now the Department of Spatial Planning and Development, most of the damage could not be undone. An underlying objective of the process was to accommodate all settlers, hence little movement of the settlers was possible.

Harare South refers to new settlements south of what used to be the southern boundary of Harare, including Hopley, Stoneridge, Saturday Retreat and Ordar Farms. These farms were occupied beginning the year 2000 as part of

the fast-track land resettlement programme (FTLRP). Many beneficiaries of these plots proceeded to build residential structures but suffered some setbacks. In the year 2005, as part of the government clean-up project, *Operation Murambatsvina*, the houses were demolished. The occupiers, however, remained on the ground and re-planned the settlements. Second time around, the beneficiaries engaged the government and had most of the settlements regularised and the layout plans were approved. It is estimated that there are more than 100 000 new residential plots in the Harare South area, according to revelation of the nterview with a senior planning official from the Department of Physical Planning.

Although most of the developments in Harare South are now regularised and, therefore, legal in terms of planning law, there are still many anomalies with them. Firstly, they are outcomes of a political decision, hence do not strictly follow planning parameters. The Harare South area had a local development plan known as Southern Incorporated Areas Local Development Plan No.31 (CoH, 1996). The local plan proposed to have all developments in the area to be connected to a reticulated sewerage system where the waste would be treated at a plant off-site. This was done to avoid possible water pollution since the studies preceding the plan preparation indicated that the soils were sandy and could not accommodate any on-site waste treatment. The plan, therefore, had proposed a series of sewerage treatment ponds initially, that would ultimately be transported by a trunk line to a new treatment plant that would be built on the Mupfure Catchment. Neither the ponds nor the main sewerage treatment plant was constructed. All developments have *in-situ* sewerage treatment in the form of septic tanks and soak-aways or pit latrines.

Second, most of these 100,000 properties are not connected to the municipal water supply. They rely on shallow wells for domestic water. The area has a fairly high-water table and most wells have sufficient domestic water at only four metres in depth as emerging from an interview with a water engineer working for Harare City Council. This is, however, problematic, considering

the on-site sewerage treatment. Most properties measure between 300 and 400m^2 in extent. Even with a well in front of the house and a toilet behind, the maximum distance between the toilet and the well in many cases is less than 25 metres. Since most of the structures were built without municipal approval, there are no set standards being enforced to avert or reduce the risk of water wells being contaminated by toilets. The risk of cross-contamination from the toilets to the wells is very high.

Third, the Harare Master Plan (CoH, 1993) and the Southern Incorporated Areas Local Plan 31 (CoH, 1996) both had provided large buffers between urban developments and the Manyame River that drains into Lake Chivero and ultimately Lake Manyame. There were large agriculture plots planned almost a kilometre from the river to reduce the population density next to the river and protect it from overdevelopment and possible pollution and degradation. This large greenbelt was ignored in the new settlement plan (Toriro, 2003). In some areas, houses were built almost to the edge of the river. Many wetlands and other smaller river buffers were similarly affected. This has the effect of destroying the wetlands and exposing Harare to flash flooding and limited capacity to self-purify water. There is evidence that wetlands and rivers help in naturally purifying polluted water (Moyo, 1997). In most areas of these new developments, that opportunity is lost.

Other areas that have been developed without consideration of sound urban environmental planning include parts of Kuwadzana and Budiriro low-income suburbs of Harare that also clearly shows this wetland invasion. These areas have been developed by private individuals and the Harare municipality itself. Large portions of Kuwadzana have been developed along the Dzivarasekwa Stream. Many houses have been developed very close to the river and within the flood plain. In Budiriro, there are new developments that have encroached onto wetlands and river courses. Studies that were done using satellite imagery between 2009 and 2019 clearly show the extent of the loss of wetlands (Cunliffe, 2020).

Plate 1: Budiriro B (02 September 2009)

Source: Cunliffe (2020:15)

Plate 2: Budiriro B (30 March 2019)

Source: Cunliffe (2020:16)

Plates 1 and 2 show Budiriro in 2009 and then 10 years later in 2019. They reveal how rapid the encroachment has occurred. From the generous buffers that existed to the new developments encroaching right onto the river taking up most of the wetlands, these houses were planned and developed within a 10-year period.

Several refuse dumps were observed in many parts of Harare. Most informants reported that there was uncollected waste in many parts of Harare, leading to the accumulation of uncollected garbage. According to one key informant interviewed on 12 May 2020 in Harare,

> "Harare City Council collects less than 50 percent of waste generated in the municipal area. The uncollected waste is disposed by residents in open spaces outside their properties and this is what is causing the accumulation of waste dumps".

When it rains the accumulated waste is taken into municipal drains and eventually finds its way to the water supply dams. This further contributes to polluting the water sources.

Many Harare residents cultivate on open spaces. Some of the spaces on which crops are grown are fragile ecological areas susceptible to erosion since they are along rivers or on steep hill slopes. Several food crop spaces were observed in wetland areas. Most key informants also confirmed the existence of urban agriculture and that most of it was negatively impacting on the environment. This has also been widely documented in several studies on water and agriculture in Harare (Moyo, 1997; Toriro, 2009; Mutonhodzo, 2012; Taru and Basure, 2013). These activities discharge nutrients to water bodies that, in turn, feed plants, such as water hyacinth.

Harare has poor water management practices that must be addressed. Most key informants indicated that Harare's water leaks through an aged pipe network were 'unsustainably high'. The high-water losses are estimated to be between 40 and 60 percent of all treated water. This is caused by the old pipes that frequently burst and the city's slow reaction to repair or replace these burst pipes. One key informant, in an interview on 16 May 2020, in Harare,

indicated that 'the city does not have a robust reaction system to its frequent pipe bursts. Many times, we see leaking pipes unattended for days, even weeks'. A responsive pipe replacement and repair system could reduce water losses significantly, thereby reducing the water crisis.

To understand the views of residents regarding the extent of the water crisis and the causes, interviews were conducted with randomly selected residents from different income groups in Harare. Most respondents did not appreciate the extent of the water crisis. Many also believe that the cause of the problem is operational inefficiencies by the municipal officials. One resident of Harare, interviewed on 18 May 2020, argued that,

> Providing Harare residents with water is very easy. What is difficult about taking water from a dam, purifying it and pumping it to residents? Let them avoid corruption and we will all have water in Harare in no time. But we cannot have water when our officials are busy cutting deals and enriching themselves.

The response by another a resident, interviewed in Harare on 18 May 2020, reflects a recurring opinion blaming municipal inefficiency:

> City of Harare are inefficient; that is why we face water shortages. When pipes burst, they take forever to come and repair them. When they come, they dig up the burst pipe, close off the local area supply and go away. They may only come back after a week with wrong spares and disappear again. When they finally repair the pipe, another burst will occur at the same spot or next to the repaired point. Lots of water is lost this way and hence we rarely have municipal water'.

Only a small number of the respondents realised that the problems confronting the Harare water sector were huge and required many stakeholder groups to contribute towards resolving the challenges. The residents did not appreciate the planning and environmental problems that have contributed to the water crisis. When probed about the role of planning and environment to the water problems, most residents reluctantly acknowledged them but emphasised that the 'real' causes were poor management and corruption.

CONCLUSION

There are different stakeholders that have contributed to many bad habits that contribute to Harare water shortages and pollution is a major challenge. The city authorities have badly managed land-use by not reacting swiftly to illegal developments in wetlands. They have also permitted developments on some wetlands. The residents that have illegally occupied wetlands disturb natural water supplies and natural water purification systems. Collectively, Harare residents have become the proverbial village fool in African traditional folklore who urinates in the village water well, knowing fully well that this is where they all drink from. Although there have been plans to build new water supply dams away from the polluted Manyame Catchment, this has not materialised.

The municipal authorities and Government of Zimbabwe have failed to attract the necessary capital to build new dams. Even if funds were to be found, building dams is a complex process that takes several years to get to a stage where residents access the water. Even though there is a huge water crisis, there appears to be little realisation that it is a monumental crisis that has grown gradually over a few decades. Most Harare residents attribute their water shortages to poor management of the water sector by the Harare City Council. To a large extent, this is true. However, many residents do not think they are part of the problem or that they can contribute to improving the water situation. Harare residents must understand their water crisis from a collective behaviour. By destroying wetlands, poor waste management, discharging raw sewerage effluent into rivers, unplanned urban agriculture, and poor land-use planning, they are making the water crisis worse. They are behaving like the proverbial village fool urinating into the village well.

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