

URBAN DOMESTIC WATER CRISIS IN ZIMBABWE: THE CASE OF KADOMA CITY

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ABSTRACT

The city of Kadoma has been experiencing severe water shortages since the beginning of this millennium. Water supply problems have been reported even when the water sources are full. The aim of this study is to establish the causes of the problem, its extent, its impact, and what could be done to mitigate the problem. The study used interviews, observations, and content analysis to establish that population growth, ageing equipment, a lack of foreign currency, and local funding, as well as a lack of expertise and of political will have contributed to the poor water supply in the city of Kadoma. This has resulted in the transmission of communicable diseases, such as cholera and diarrhea, which has wrecked havoc on the city. In 2008-2009, the city was the epicenter of the worst cholera epidemic in Zimbabwe. The city needs to commit itself to turning the situation around by involving the community, building more storage facilities, and by placing monitoring and evaluation mechanisms in place.

Keywords: Kadoma; Domestic Water Shortage; Treatment Works

BACKGROUND

Since the late 1980s, most urban centers in Zimbabwe have been experiencing water problems, and these have been attributed to poor rainfall; insufficient trained water resources personnel; population growth; aging infrastructure; lack of funds; including foreign currency; and corruption, among others (Rondinelli, 1991; Chatora, Taylor and Hoevenaars, 1995). All the major urban centers, Harare, Bulawayo, Mutema, Gweru and Masvingo, are plagued by an inadequate water supply (The Standard, 2010; The Herald, 2010; Gumbo and van der Zaag, 2002; Nhlanhla, 2008; Reuters, 2007; Nel & Berry, 1992). The urban areas go without water for long periods, ranging from 12 hours to one month or more.

The problem of rapidly growing urban populations has contributed significantly to the increase in the demand for fresh domestic water in the urban areas (Mpande & Tawanda, 1998; Nel & Barry, 1992). This increase is causing a water crisis that has serious consequences. Urbanization is increasing in the SADC region, Zimbabwe included, and water experts say that most cities have not been able to develop the basic utilities for water and environmental services (solid waste disposal systems, sewage treatment, and industrial pollution control) to keep pace with the rapid growth (Tsiko, 2007). Incidentally, Zimbabwe's urbanization rates, which are among the highest in the world, are exerting unbearable pressure on the water,

which is a finite and vulnerable resource (Garland & Herzer, 2009). High urbanization rates are also increasing the demand for water for domestic consumption, power generation, industrial uses, and recreation (Chigumira and Mujere, 2009).

Harare, the capital city of Zimbabwe, is one of the towns that are facing water quality problems, whilst water scarcity problems will be a major problem in the next five years (Nhapi, Siebel and Gijzen, 2008). The water quality in Lake Chivero is deteriorating because of regular inflows of poorly treated sewage effluents (Nhapi, Siebel and Dijzen, 2004; & Magadza, 1997). A shortage of water has forced residents to fetch water from the shallow wells and unprotected sources (The Herald, 2010). This exposes the residents to diseases, such as cholera and diarrhea. Toilets at the Mbare residential flats Hostels have been closed, forcing residents to relieve themselves in the surrounding bushes (The Herald, 2010). This situation provides a conducive environment for the propagation of disease. This explains why Mbare recorded some of the highest cholera-related deaths during Zimbabwe's worst cholera epidemic in 2008-2009.

Most of the urban areas in Zimbabwe have obsolete infrastructure. Urban councils are not able to provide services owing to aging pumps and motors. In Gweru, the Whitewaters and Gwenhoro water treatment works are old and malfunctioning (The Standard, 2010). Residents, especially in Gweru's high density suburbs, can go for two weeks without water because the city council does not have the funds to replace the infrastructure. In Harare, the water distribution system was built long before independence in 1980, and has gone without proper maintenance for many years, and its pumps, that have an expected lifespan of between 15 and 20 years, have not been replaced since they were installed (Kwidini, 2007). This means that the water systems are dilapidated and will continuously breakdown; this translates into water shortages. When provision and availability of water becomes inadequate, people are forced to use contaminated water, resulting into water-related diseases (Dungumaro, 2007), such as cholera, dysentery, and diarrhea, as they fetch water from unprotected sources and use the bush system, as toilets are closed because of the shortage of water. Most city treatment works have parts, such as automatic valve actuators, which are out of commission. Delivery pipes and joints leak because of old age (The Standard, 2010). At the height of the cholera epidemic in 2008, Beitbridge, a border town on the South African-Zimbabwe border, had problems bringing water from its water station to town as it did not have the parts to repair a pump.

However, cities and towns cannot readily replace the broken down equipment as they have financial problems. For example, the city of Gweru cannot afford to buy new motors and pumps as it is financially incapacitated. As a result, residents in the city go without water for more than twelve hours, daily (The Standard, 2010). Urban councils also suffer from the limited foreign currency resources. A severe shortage of foreign currency means service providers cannot maintain or replace aging equipment, or import water treatment chemicals, or electricity from neighboring countries to keep waterworks functioning (Reuters, 2007). Despite heavy rains which filled up city reservoirs, Bulawayo, Zimbabwe's second largest city, continued to experience water rationing, as the city did not have foreign currency to purchase purification chemicals (Nhlanhla, 2008). Low revenue levels also meant that the city cannot collect enough money to enable it to treat and deliver water to the residents (Nhlanhla, 2008). Consequently, even though there may be plentiful water in the reservoirs, it cannot be delivered for consumption in its raw state.

The severity of the water crisis in Zimbabwe is attributed to power outages affecting all urban centers in Zimbabwe. The city of Bulawayo cannot pump enough water as its operations are interrupted by power cuts (Nhlanhla, 2008). The water treatment and pumping stations are severely affected, resulting in a trickle-down effect on water supply to the different residential areas. Beitbridge experienced serious water problems during the cholera outbreak in 2008. Its pump station could not pump water from the tower to the town as there was no electricity (Hug, 2009).

Cities and towns encountered several constraints in the delivery of services. They lack autonomy in setting realistic tariffs, which would help them recover costs and ensure that they continue to operate effectively (Davison, 2001). They have to apply for permission from the central government to raise tariffs, which is often delayed by bureaucracy in government operations. As a result, local authorities are hindered in their day to day operations.

Water shortages have had a number of negative impacts. They generally result in stringent water rationing, which further causes an increase in diseases, such as diarrhea, dysentery, and cholera, as people are unable to bathe or flush their toilets (Nyoni, 2007). Many resort to using the bush or open public places. The reduced water flow in the sewage system as a result of the water shortage causes frequent blockages in the system (Nel & Berry, 1992). This is a nuisance as bad odors engulf the affected areas and pools of sewage water cover the streets and open spaces, reducing children's playing space. There is always a potential for an outbreak of various diseases when the sewage water flows all over.

This study was motivated by the fact that Kadoma has been having severe water supply problems since the beginning of the millennium. The problem has got worse over the years with no solution seeming in sight. Discussions on other cities and towns also facing water problems added weight to the desire to conduct this study. Furthermore, Kadoma was one of the epicenters of the worst cholera outbreak in Zimbabwe between 2008 and 2009, which was attributed to the water problems. This paper looks at the causes of the domestic water shortages bedeviling the city of Kadoma, as well as their impacts.

STUDY AREA

The study was carried out in the city of Kadoma, which is about 141 kilometers west of Harare, the national capital city of Zimbabwe. The city had a population of 76,351 people in 2002 (Central Statistical Office, 2002). The study focused mainly on the high and low density areas of Kadoma. As it was practically impossible to study all the residential suburbs in Kadoma (nine in all), one suburb was randomly sampled from each of the low and high density suburbs. For purposes of this study, East View was used as the low density suburb and Ngezi was used as the high density suburb. The findings obtained were generalized to all the other suburbs. The study was conducted from December 2008 to January 2009.

METHODS

The study was qualitative in nature and its data collection was based on both primary and secondary sources. The primary sources included interviews, observations, and open-ended questionnaires while the secondary sources were mainly newspaper articles written about the water situation in Kadoma, as well as in Zimbabwe, as a whole. Questionnaires were

distributed to the residents of Ingezi and East View. They were meant to elicit their perceptions on the problem of the water shortage in the city of Kadoma as well as to determine the extent of the problem.

Interviews were employed in collecting data on the problem of water in Kadoma. Through these interviews, the environmental impact of water shortages was also explored, and proposals and plans for correcting the situation were investigated. Interviews were directed at policymakers and planners in the city council and the Zimbabwe National Water Authority (a parastatal) tasked with the provision of water and sewerage reticulation at the time of the study.

Observations were conducted to have a firsthand experience of the problem as it manifested in the city. It was used to determine the extent of the problem then corroborated with information obtained through interviews and questionnaires. Secondary data sources, such as newspaper articles, motivated this study. A lot was written on the problem of the water shortages in the city of Kadoma and the researcher wanted to get first hand information on the situation in the city. What was obtained on the ground.

FINDINGS AND DISCUSSIONS

Sources of Water

Kadoma City draws its water from two reservoirs, namely Claw Dam and Pasi Dam. Pasi Dam was constructed in the late 1930s. The dam's use is no longer very significant as it is highly silted. It usually holds a mere three months supply of water. Claw Dam, which was built in the early 1980s, is generally 100 percent full, unless there is a drought. It is, therefore, the main supplier of water to the city of Kadoma. The city has two water treatment works. These are the Pasi Dam treatment works, set up in the late 1930s, and the Blue Ranges water works, built in the 1980s. The Blue Ranges water works started the full water production in November 1985. The city engineer, in concurrence with Zimbabwe National Water Authority engineer, mentioned that the water system was operating at 40% of its normal capacity.

WATER CHALLENGES FACING THE CITY OF KADOMA

Ageing infrastructure

The Pasi water treatment plant is old and outdated. It was commissioned in the late 1930s. Over the years, the plant has undergone a series of upgrades; the last one was done in 1972. Equipment in the water provision system is dilapidated as a result of old age. At the time of the study, only six of the fourteen rapid sand filters were functional, whilst the rest were either decommissioned due to old age, or were in need of repair. The pump equipment at Pasi has outlived the efficiency of its design and, as a result, the city council is incurring huge maintenance costs to keep them functional. The tower pump station at the water works has only one working pump, whilst the other two are now obsolete. The same goes for the two Worthington vertical turbine pumps, which have also outlived their usefulness. Due to obsolete equipment, the Pasi water treatment plant is producing an average of 12,000m³/day instead of at least 18,000m³/day. According to the city engineer, there were extensive leakages along the main pipe line that supplies water to the city from the Blue Ranges water works. This resulted in the loss of approximately 30 percent of treated water. Water bursts were also being experienced in the oldest reticulation mains feeding the residential areas. The engineer also revealed that the water system had several underground

leakages and a small leak was estimated to put to waste 500,000 liters of water per year. These were all attributed to the age of the pipes. The aging equipment was compromising the efficiency of the water supply system. This meant that water shortages were becoming a regular occurrence in the city of Kadoma.

Population increase

The city of Kadoma, like most of the cities in Zimbabwe, is experiencing high urbanization rates, which results in an increase in the demand for domestic water. The 2002 census revealed that Kadoma had 76,351 people (Central Statistical Office, 2002). Municipal estimates, at the time the study was conducted, put the population at 120,000 people. In fact, the figure could be even much higher than this. Since the late 1990s, Zimbabwe has experienced economic hardships, coupled with droughts, and these have forced several people to migrate into the urban centers. The city of Kadoma was not spared. The high density suburbs of Rimuka, Ingezi, and Waverly have more people than they can accommodate.

Due to the increase in the population, the city is unable to manage its domestic water efficiently. The city has a storage capacity of 40,400m³. The daily demand for water stands at 30,500m³. Under normal circumstances, the storage tanks should hold supplies for two days. The demand, therefore, means that at any given time the tanks are not full, as all water that is produced is consumed directly with no water stored for a balancing effect. The city engineer revealed that during the peak periods, the city experiences a shortfall of 15,000m³. The areas that were affected the worst were Rimuka, West View, Munhumutapa, and the Central Business District, as these are situated on high grounds. At the time of the study, water demand was at 31,000m³/day, with a peak of 46,500m³/day. The city engineer projected a future demand of 60,000m³/day by the year 2015.

Power outages

Zimbabwe has been experiencing serious power shortages, which have resulted in power cuts, which have negatively affected the supply of water. The magnitude of the problem has worsened in Kadoma, as the water works could go without electricity for periods ranging from 6 hours to 18 hours on a daily basis. The city engineer revealed that this problem started manifesting in Kadoma in 2005. The Zimbabwe Electricity Supply Authority has not been able to dedicate a power line to the water pumps to avert water problems, yet water is a key component for human wellbeing. Load shedding has been on the increase in the recent past. The situation has been exacerbated by numerous electrical faults that were attributed to aging electrical equipment. Electric cable thieves have also been targeting the line that supplies the water treatment works and, according to the city engineer, this was becoming a serious threat to water supply in Kadoma. During the Christmas period in 2009, 5 kilometers of electric cables were stolen, meaning that the residents of Rimuka and Waverly did not have water during the festive period.

Loss of skilled manpower

The city of Kadoma experienced a massive exodus of skilled manpower (plumbers and technicians) for greener pastures. The harsh economic situation that prevailed in Zimbabwe from the late 1990s to the time this study was carried out was the main driving force in the loss of skilled manpower in the city council. Inflation rose steadily and the buying power of many people

was so eroded as to make it virtually impossible to use the Zimbabwe dollar. From the interviews conducted with the city engineer, most of the skilled manpower left because they felt the remuneration they got was not commensurate with their qualifications. Most of them went to neighboring countries where their skills were in great demand. To compound the problem, even the semi-skilled and the unskilled laborers simply stopped reporting for work, as they sought alternative sources of income. This happened mainly in 2008 and 2009. It meant that repairs went unattended to for long periods or that the work that was done was shoddy. The city engineer also claimed that some of the experienced workforce who had either retired or resigned had information on the existing infrastructure networks, which their replacements do not have, so problems such as burst pipes might have taken a long time to rectify.

Lack of political will

The political situation in Zimbabwe, at the time of the study, complicated the service delivery. Residents were of the view that the councilors in office lacked the vision to turnaround the pathetic water situation in Kadoma. They felt most of the councilors were concerned with securing votes from their relative constituencies instead of ensuring that service delivery was improved in a wholesome manner. For example, councilors would insist on their constituencies being attended to first, instead of having refurbishments of the water system being done ward by ward. The end result is a multiplicity of repairs going on at the same time, when there are insufficient funds for such an exercise. According to Chiremba (2010), an instituted probe into the on-goings at the local authority showed that, apart from the salaries of up to US \$3,200 for the 21 council managers, the councilors were illegally granted loans. Interviews with residents revealed that Kadoma councilors were allocating themselves loans using the ratepayers' money instead of channeling the money towards the needs of the people. This reflected misdirected priorities, which only worsened the plight of the citizens.

According to a ZINWA engineer, the Kadoma municipality, like any municipality in Zimbabwe, lacked autonomy in setting tariffs, which impacts its ability to ensure a full cost recovery of the services it offers. It depends on the central government for the funding of capital infrastructure projects, such as the laying of new water pipes and the construction of reservoir tanks. This has severely debilitated Kadoma in its quest to provide water, among other services, to its residents. All major projects must be approved by the central government. Problems that could be corrected early are left to worsen as the municipality waits for approval to buy parts and equipment. This red tape in the government does not help matters.

Shortage of foreign currency

During the time of the study, it was revealed that Kadoma's water problems were partly due to a shortage of foreign currency. The municipality could not raise its own foreign currency, so it depended on the Reserve Bank of Zimbabwe. The central bank was, however, burdened with other responsibilities, such as procuring much needed food for the country, which was experiencing recurrent droughts. The council could not raise the foreign currency from ratepayers as, during that time, the Zimbabwe dollars was the official currency. Foreign currency was necessary for importing spare parts, as well as water treatment chemicals.

At the time of the study, the political turmoil prevailing in Zimbabwe made it difficult for municipalities to import spares. The country was under targeted sanctions and all municipalities fell into this bracket. Kadoma could not import spares from Europe. The water system in place had most of its components originating from Britain. The only way out was to lay a new system, which was impossible as the city did not have adequate funds to undertake such an activity.

Impact of the poor supply of water

The problem of water supply in the city of Kadoma has had very serious consequences, especially in the years 2008 and 2009. During the worst cholera epidemic in Zimbabwe's history, Kadoma was considered a high-risk area for cholera because of the ongoing water and sanitation problems (Medecins Sans Frontiers, 2009). Between November 14, 2008 and April 4, 2009, Kadoma recorded 482 deaths, and most of the deaths were reported in areas, such as the Rimuka high density suburbs, that were characterized by water shortages and poor sanitation (World Health Organisation, 2009).

Prior to the cholera epidemic Kadoma was in the news regarding cases of deaths attributed to the lack of safe drinking water. Council medical staff reported a high incidence of water borne diseases. They said these were prevalent in young children who played in the sewage polluted water. They also drank water from unprotected sources.

Due to the scarcity of domestic water, residents have dug shallow wells from which they draw water for various uses. These wells, instead of bringing relief to the residents, have become a health hazard. Most of the wells are not protected, hence the runoffs after a storm collected in them. Given that Kadoma has experienced serious sewage bursts, raw sewage has found its way into some of the wells. As a result, deaths attributed to diarrhea have been recorded. Information given by the health staff in the municipal council showed that most ailments treated in the council clinics were water related.

The city has also experienced serious water rationing as a way to balance the sharing of this limited resource among all the suburbs in the town, bringing a great inconvenience to residents. Kadoma suburbs have experienced serious sewage blockages. This was due to the reduced water flow in the system, which presented great potential for disease outbreak.

CONCLUSIONS

The city of Kadoma is experiencing serious water problems. These are caused by several factors, namely a rapid population increase due to rapid urbanizations and natural increases, aging equipment, a shortage of foreign currency, inadequate funding, a lack of skilled manpower, and a lack of political will. Besides causing discomfort to householders, the shortage of water has resulted in the spread of diseases such as cholera, diarrhea, and dysentery. The shortage of water has resulted in several blockages in the sewage system. The shortage of water is a serious threat to sustainable development. The economic situation is threatened as industries do not have water for production purposes, while socially the health of the residents is under threat. The environment is polluted as toilets cannot function well without water. It is imperative to turn around the situation in order to avert the further spread of diseases in the city of Kadoma.

RECOMMENDATIONS

There is an urgent need to look into the service delivery issues in the city of Kadoma. Water is an important element in the survival of people. It is imperative to come up with long lasting solutions to the problems of the water shortage. Kadoma was fortunate in the sense that its main reservoir, Claw dam, is usually 100 percent full and its water supply problems are technical in nature. A number of suggestions have been proffered and, if considered, it could go a long way in the sustainable utilization of water.

REFURBISHMENT OF THE WATER SYSTEM

The council must make the refurbishment of the water system a top priority to avert the resurgence of diseases, such as cholera. This is important as access to clean water is essential to ensure human well being. In the year 2000, the United Nations committed itself to attaining one of the Millennium Development Goals, which seeks to halve, by 2015, the percentage of people living without sustainable access to drinking water. This requires the council to adopt new technology with ready spares and better efficiency, instead of the old equipment installed in the late 1930s.

POLITICAL WILL TO TACKLE THE PROBLEM

The government of Zimbabwe should cede autonomy to set the tariffs to local authorities. This will capacitate them to recover costs, as well as embark on new projects in the service delivery without going through the red tape in the government. Residents through this set up will get the services they need urgently. Councilors need to put the residents first in their operations. Instead of awarding themselves loans, they need to channel rates towards improvement in the service delivery. There is need for ethical considerations in the council activities.

Involve the community

There has always been a top-down approach in the provision of services in Kadoma. The community should always be involved by way of informing them on water problems and educating them on conservation measures and on sustainable utilization of water. They should feel that they are part of the system, as they suffer the consequences of water shortages.

Conduct, monitoring, and evaluation of water and sanitation interventions

This is important because if all of the leakages are noticed early, the council can quickly review any strategy in place to see if it is sustainable. This will save water loss through the leakages, while, at the same time, ensuring that the citizens get the best service possible.

Increasing storage capacity

There is need to construct another 20,000m³ storage reservoir at either Moth Hill (Pagomo Heights) or at Kopje (West View) so that, at any given time, there is water in the storage tanks. This will offset deficits during the dry climatic seasons.

Water rationing

This is a last resort measure. The city has to come up with this strategy if it is to equitably distribute water to all its suburbs and industries.

Develop New Sources of Water

The council needs to complement the available sources of water by drilling boreholes. The SADC region is known for recurrent droughts. Since water is critical to development, it is pertinent to come up with alternatives in the face of water shortages.

Recycling of waste water

There is a need to recover all waste water and put it to good use. This water could be used for cooling purposes in industries or for watering gardens, instead of letting it flow and pollute the environment. In the long run, this is a sustainable way of utilizing water resources.

References

- Central Statistical Office. (2002). Census 2002. Zimbabwe Preliminary Report. Harare: Government Printers.
- Chatora, C, Taylor, P., & Hoevenaars, J. P. M. (1995). Identification mission Mupfure catchment integrated water management. Identification paper on behalf of the Royal Netherlands Embassy, Harare, Zimbabwe.
- Chigumira, E. & Mujere, N. (2009). Variability of urban water supply and demand. In J. Feyen, K. Shannon, & M. Neville (Eds.), *Water and Urban Development Paradigms: Towards an Integration of Engineering, Design and Management Approaches* (pp. 431-434). London: CRC Press.
- Chiremba, T. (2010). Probe Team Exposes Kadoma Corruption. *The Sunday Mail*, Zimbabwe. (Sunday, March 14).
- Davison, C.A. (2001). Urban Governance and the Effective Delivery and Management of Infrastructure Services in Urban areas in Zimbabwe: An Appraisal of Water and Sewerage Services Delivered in Ruwa. *Urban Forum*. 12(2), 139-170.
- Dungumaro, E.W. (2007). Socioeconomic Differentials and Availability of Domestic Water in South Africa. *Physics and Chemistry of the Earth*, 32, 1141–1147.
- Garland, A. & Herzer, L. (2009). Water for the Urban Poor: Integrated Solution. *School of Advanced International Studies Review*, 29(1).
- Gumbo, B. & Van der Zaag, P. (2002). Water losses and the political constraints to demand management: the case of the City of Mutare, Zimbabwe, *Physics and Chemistry of the Earth* 27, 805–813.
- Hug, A. (2009). *Inside Zimbabwe's Cholera Epidemic*. Canadian Medical Association. Retrieved from: www.cmaj.ca, on December 15, 2008.
- Kwidini, T. (2007) Water Shortage Looms in Harare. *Mail and Guardian*, Aug 01.
- Magadza, C.H.D. (1997). Water pollution and catchment management in Lake Chivero. In: N.A.G. Moyo (Ed.), *Lake Chivero: a Polluted Lake*. Harare: University of Zimbabwe Publications.

- Medicins Sans Frontieres (MSF). (2009). MSF Continues Work as Cholera Exceeds Worst-Case Scenario January 30, 2009 (accessed on 11 February 2009)
- Mpande, R.L. & Tawanda, M. (1998). Case Study: Southern Africa population dynamics and the emerging competition for water use in the Zambezi River Basin. In A. de Sherbinin & V. Dompka (Eds.), *Water and Population dynamics: case studies and policy implications*. IUCN, PRB USAID and AAAS.
- Nel, E.L. & Berry, B.B. (1992). The problems of supplying water to third world cities: Bulawayo's water crisis. *Development Southern Africa*, 9(4), 411-422..
- Nhapi, I., Siebel, M., & Gijzen, H.J. (2008). An inventory of the existing water management practices in Harare, Zimbabwe. *Water and Environment Journal*, 22 (1), 54-63.
- Nhapi, M., Siebel, M. and Gijzen, H.J. (2004). The Impact of Urbanization on the Water Quality of Lake Chivero, Zimbabwe. *Journal of the Chartered Institution of Water and Environmental Management*, 18(1), 44-49.
- Nhlanhla, J. (2008). Zimbabwe Water in Short Supply Despite Rain. *Environment News Service* (12 February).
- Nyoni, M. (2007). Bulawayo Faces Water Crisis. *Mail and Guardian* (September 14-20).
- Reuters. (2007). Zimbabwe City Warns of Health Risk as it Cuts Water. *Reuters* (July 18).
- Rondinelli, D.A. (1991). Asian urban development policies in the 1990s: From growth control to urban diffusion *World Development* 19 (7) 791-803
- The Herald. (2010). Acute Water Shortages Hit Capital. *The Herald* (January 22).
- The Standard. (2010). Water Shortage Hits Gweru, Harare, Zimbabwe. *The Standard* (January 16).
- Tsiko, S. (2007). Zimbabwe: Water Quality Supplies Fast Deteriorating. *The Herald*.
- World Health Organisation. (2009). "Cholera in Zimbabwe – update 2". World Health Organization, 20 February 2009. Geneva, WHO.

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