

**THE PROBLEM OF BURST SEWAGE PIPES AND SEWERAGE OUTFLOWS IN EAST VIEW SUBURB IN KADOMA CITY, ZIMBABWE**

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**ABSTRACT:**

*Cities and towns in Zimbabwe have been facing sanitation problems related to sewage outflows and sewage pipe bursts. In some cases, this has resulted in deaths attributed to cholera. This study, done in the City of Kadoma in East View, intended to establish the causes of the problem, their impacts and make recommendations. It was found that increases in population, old age of sewer systems, vandalism, and disposal of solids into the system resulted in bursting of pipes and outflows of raw sewage. Lack of funds, inflation, and inept operations of Zimbabwe Water Authority worsened the situation. The outflows were both a nuisance and a threat to the health of individuals. It was recommended that regulations should be followed as well as having civic education for residents of East View. There is need to revamp the system to cater for increased population.*

## INTRODUCTION

The provision of sewage services in the Third World is a major challenge. Around two-thirds of the Third World's urban population has no hygienic means of disposing of excreta (Hardoy *et al*, 1993). Most cities in Africa (such as Dar es Salaam, Accra, and Khartoum) and in Asia (such as Jakarta and Calcutta) have no sewer at all, and rivers and streams are where most human excreta end untreated (Hardoy *et al*, 1993). Zimbabwe's cities and towns have been experiencing a lot of burst sewer challenges in the last few years. Most towns have had raw sewage flowing onto the streets and in open storm drains. Rapid urbanization has presented serious challenges on the management and disposal of sewage (Chiuta *et al*, 2002; Moyo and Mtetwa, 2002). Chitungwiza, a dormitory town 25km south of Harare, has grown rapidly in the last decade and its sewer system is under strain, handling about four times more sewage than it was originally designed for (Booth, 1994). This is not peculiar to Zimbabwe's cities alone. The sewage system in Mzuzu in Malawi cannot cope with the growing population; human wastes are exposed at the surface (Chenje and Johnson, 1996). Most sewage treatment works are old and are poorly maintained and are also overdue for rehabilitation. Sewage treatment plants in Zambia handle only 20% of sewage collected, while 80% is lost into storm drains because of leakages and blockages (Chipungu and Kunda, 1994). Raw sewage could be a source of diseases. For example, untreated sewage is likely to have been the source of the eggs of the bilharzias causing flatworm, which were recovered from the dropping of seagulls at the mouth of Mbokodweki River in Durban (O'Keefe in Chenje 2000). Poor management and disposal of sewage may cause waterborne infections, water related diseases, water based and excreta-related infections such as cholera, dysentery, typhoid fever, paratyphoid fever, and diarrhea (Moyo and Mtetwa, 2002). A chorela epidemic in Maputo in the mid-1980s was linked to the raw sewage disposal (Booth, 1994). Pathogens that are introduced into flowing water may be traced several kilometers away from the source. Enteric pathogens, such as *E. coli*, *Shigella* and *Salmonella*, can survive in water up to 117 km from the point of discharge (Mason, 1991). Sewage could lead to pollution of water bodies which in turn can impair the reproduction in fish, retard their growth, or even kill them. The late March to early April 1996 fish deaths in Lake Chivero, especially the Greenhead Bream, were due to high levels of ammonia from sewage water, compounded by low levels of oxygen (Chenje, 2000). Sewage effluent from Firlle Works Sewage Treatment Plant changes the biology of the Mukuvisi River in Harare in Zimbabwe, resulting in the proliferation of the water hyacinth (Moyo and Worster, 1997). Lake Chivero in Harare has experienced problems of eutrophication due to the introduction of sewage into rivers feeding the lake

(Mathutu *et al*, 1997; Chenje, 1998). Khami Dam, which used to supply Bulawayo with drinking water is too polluted and is now more of a holding pond (Chenje, 1998). High concentrations of nutrients (in particular nitrates and phosphates) lead to eutrophication and the “death” of lakes (Sanyanga and Masundire, 1999). Some rivers or lakes, which receive large volumes of organic waste, can have all their dissolved oxygen used up. They then lose their ability to break down these kinds of waste and become black and foul smelling (Hardoy *et al*, 1993). Residents of Mahombekombe Township in Kariba complain that when sewage treatment pumps break down the smell can be intolerable (Sanyanga and Masundire, 1999).

The problem of burst sewer pipes and outflows of raw sewage has almost become ubiquitous in all cities. Kadoma is, therefore, no exception. The whole city was experiencing the problem in various residential areas, as well industrial areas between May 2005 and March 2008, when the study was conducted. However, this study was focused on East View residential area of Kadoma. Findings from this study could be generalized to other areas in the city.

## **RESEARCH METHODOLOGY AND STUDY AREA**

Primary data were collected through the use of key informants, interviews, observations, and questionnaires. Questionnaires were administered to 60 randomly selected residents of East View residential area. The questionnaires elicited residents’ perceptions on challenges posed by the flowing sewage. This was followed up by face-to-face interviews with all major role players [the municipal authorities, Zimbabwe Water Authorities (ZINWA), residents of East View, and health personnel]. Observations were made through several visits to the sites, which were affected by flowing sewage. This enabled the researcher to have firsthand information on what was obtained with regards raw sewage in East View.

Secondary data were obtained through scrutiny of relevant official records and reports kept at the municipal offices and at ZINWA. This was supplemented by critical perusal of books, publications (such as newspapers and journals) on the topic under discussion.

This research was done through a survey design. The study was carried out in East View, which is a low-density suburb in Kadoma, a city 141 kilometres south west of Harare, the capital city of

Zimbabwe. East View was originally an area made up of agricultural plots. According to municipal statistics, there were 153 plots in East View at the time of the study. Prior to Zimbabwe's independence in 1980, whites of a lower status occupied East View. With the onset of independence the black middle class moved into East View. The majority of them have since left this area and lodgers occupied more than eighty percent of the houses during the time the study was conducted (January-March in 2008).

## **FINDINGS AND DISCUSSIONS**

### **Overview of the problem**

Results from the survey revealed that the problems of burst sewer pipes and outflows of raw sewage in East View have been in existence since around May 2005. The city of Kadoma has generally been experiencing the problem of burst sewer pipes. The study however focused on East View. Raw sewage was observed flowing on the streets as well as along the storm drains in East View. Streets such as Cashel, Adlam and Boundary were virtually impassable due to raw sewage. Sewer water was also observed flowing onto residential stands. Raw sewage gushed out of manholes near the Adventist Church in Cashel Street. Pools of raw sewage were observed less than ten metres from Lady Tait Primary School in Cashel Street. Sewage that drained along Cashel Street and Brading Street ended up in Bottom River, where it formed dark stagnant pools with a foul smell. It was also observed that an area the size of a soccer pitch, which lies just next to Bottom River, was flooded by raw sewage. It appeared the problem had no solution in sight at the time of the study.

### **Causes of Burst Sewer Pipes**

The study was able to establish a number of factors that caused the problems of bursts. The main causes included increase in population in the residential area, disposal of insoluble materials in the drainage system, vandalism on the drainage system, lack of maintenance of the sewer system, and old age of the sewer pipes. These problems were worsened by lack of foreign currency to import spares required for the aging sewer system, shortage of running water and the shortage of skilled manpower, , to deal with the problem.

### **Increase in Population**

Originally, East View was a low-density residential area, but with the onset of independence in 1980, the area has experienced a phenomenal increase in population. Four to five families now occupied

houses, which used to accommodate a single family, with an average of six people. Fifty-one stands had more than twenty people residing on one stand. Eighty landlords had added backyard shanties to their houses so as to cash in on desperate house seekers. This meant there was massive pressure on the sewer system, which was meant to handle waste from fewer people.

### **Disposal of Insoluble Materials**

It was observed that residents and members of the public dispose of solids and plastics in the drainage system. According to ZINWA, sewerage blockages are caused by items such as cotton wool, rags, spoons, clothing, and sand used for scouring that are trapped in the system (Chenga, 2008). These cause blockages, which result in overflow of raw sewage. It was revealed through face-to-face interviews that unavailability as well as high costs of toilet tissue papers forced some residents to use newspapers and in some cases khaki wrapping paper. During the interviews it was observed that some residents were ignorant about the consequences of using these materials. It emerged that with the influx of people from the rural areas there was an upsurge in burst pipes. Some respondents confessed they had never used toilets with a water system before they came to the city. As a result, they disposed of materials such as cotton wool, maize cobs, sticks, and leaves into the toilet chambers. One hundred percent of the respondents said washing detergents, such as scouring powder, were out of reach. Therefore, residents have resorted to the use of sand to clean pots. A visit to the sewer main treatment exposed heaps of sand, which were retrieved from the system. The sand contributed to blockages in the city as well as in East View area.

### **The Aging Sewer System**

The cleansing superintendent in the council's health department revealed during interviews that the sewer system in the East View area was installed in the early 1930s. Since then it has not been replaced. Kadoma City, like the rest of Zimbabwe, was experiencing financial difficulties due to recession and inflation. Naturally, through wear and tear the system was no longer able to cope with the increased pressure on it. It was also found out that over the years some huge trees had grown close to sewage pipes. Their roots have caused structural damage to the pipes and in some cases have opened up joints between pipes. This has resulted in leakages of raw sewage in Cashel Street. The cleansing superintendent revealed that severe shortages of foreign currency required to replace the damaged pipes have worsened an already critical situation. This meant that outflows went unattended for long periods.

Interviews with East View residents revealed that raw sewage flowed for more than six months without being attended to.

### **Poor Maintenance of the Sewer System**

The residents of East View expressed dissatisfaction in the way the council maintained the sewer system. There was a general feeling that the sewer system was being poorly maintained. Seventy percent of the respondents said the broken pipes were not attended to urgently. They further explained that problems of burst pipes could go for up to six months without being attended to. It emerged during interviews that it was not clear who was responsible for maintaining the sewage system. Originally the city council was responsible for the water and sewer reticulation systems. However, by an act of parliament, this responsibility was moved to ZINWA in 2007. This has resulted in serious confusion as one part blames the other for not attending to sewer and water reticulation problems. The city council has since abrogated the responsibility, while ZINWA argued that it did not have enough manpower to attend to these problems. This has left the delivery of these services in a chaotic situation. It also revealed that there was no smooth hand over the take-over between ZINWA and the council. To make matters worse ZINWA did not have an office in Kadoma. They, therefore, had to depend on hired skilled manpower from local companies, such as Tissue Mills and David Whitehead Textiles. However, residents maintained that even before the responsibility was moved to ZINWA, the council still failed to maintain the sewer system. It was also realized that closely linked to poor maintenance was poor workmanship. It was revealed through interviews that some pipes would simply burst immediately after being repaired. Residents doubted the craftsmanship of the plumbers assigned to carry out the repairs.

### **. Vandalism of the System**

Observations were made during the study that some residents vandalized council property. Manhole covers were being stolen and, as a result, solids fell into the sewer, thereby causing blockages. Residents also complained that due to lack of civic education some residents threw solids and plastics directly into the manholes. These caused blockages and raw sewage ended up flowing onto the streets. It was observed during the study that bricks and stones blocked the sewer line in Cashel Street. According to plumbers who were working on the blockage, the practice of throwing solids into the sewer system was rife in Kadoma as a whole.

## **Electricity Outages**

Zimbabwe has experienced power outages since 2006 and these have worsened in 2008, with cities experiencing blackouts for periods exceeding 12 hours. This has resulted in reduced water supply to flush and push excreta in the sewer pipes. In some cases, this has resulted in blockages. East View has experienced severe water shortages. All the respondents said the suburb could go for two weeks without running water. As a result sewage pipe blockages were a common phenomenon. Ninety percent of the respondents associated blockages and lack of adequate water supplies in East View.

## **ENVIRONMENTAL HEALTH IMPLICATIONS OF BURST PIPES**

The spillage and flow of raw sewage onto the streets have impacted negatively on the environment of the East View residential area. This has generally compromised the health of individuals, the aesthetics of the area, recreation, as well as the diet of some members of the East View area. In essence, the spillages of raw sewage were a major setback in achieving the Millennium Development Goal Number 7, which aims at ensuring environmental sustainability through improved sanitation. The MDGs are drawn from the actions and targets contained in the Millennium Declaration that was adopted by 189 nations-and signed by 147 heads of state and governments during the UN Millennium Summit in September 2000, and are supposed to be achieved by 2015 (UNDP, 2008).

### **4.1. Health Hazard**

Raw sewage had become a serious health hazard in East View at the time the study was carried out. Most of it flowed into the Bottom River, while some sunk into the ground, thereby joining the underground water. The remainder dried up before reaching the river, thereby forming thin crusts. These were common in the open grounds usually used by children as playgrounds. Sixty three percent of the respondents said that their children had in the recent past suffered from skin problems, such as ringworms and rashes. They attributed these to sewage crusts, which were found all over. Sewage crusts were also found in the spaces used for urban agriculture. The sewage water contains pathogens, which pose the greatest threat to public health. As a result, residents of East View area were exposed to the dangers of contracting dysentery, diarrhoea, and cholera. Incidentally 22 people died in Kadoma City due to cholera in 2007 (United Nations-IRIN, 2007). This was attributed to outflows of raw sewage in the city. The problem of houseflies was rampant close to Bottom River where sewage was stagnant and in semi-solid state. Flies can fly a distance of 5 kilometres (Greenberg, 1971; Pickford, 1983). This

meant the whole of East View area was under threat from houseflies as it is within 5 km radius from Bottom River. Respondents mentioned that the problem of houseflies was very bad during the rainy season. They said council was not doing anything to eradicate the flies. The council's health department revealed that not much could be done in that regard, as it was experiencing cash flow problems.

Bottom River used to provide some exciting fishing spots; however, due to clogging with sewage these have disappeared. From interviews conducted with some of the residents, cases of fish deaths have been reported. These could have died as a result of pollution from sewage water. Despite the presence of sewage some people continue to fish in Bottom River. Unscrupulous fishermen sold fish from Bottom River to unsuspecting residents. This exposed residents to diarrhoeal diseases.

In Cashel Street, it was also noticed that sewage water was flowing close to a leaking water pipe. There was a possibility of sewage water contaminating the drinking water. During the time of the study, Kadoma City was experiencing piped water shortages. This meant that some residents dug wells on their premises to augment water supplies. Therefore, there was a likelihood of water in those wells being polluted either by flowing raw sewage or underground seepage of raw sewage. It was also observed that at least three households in East View had diverted raw sewage to irrigate their vegetable gardens. That scenario exposed humans to environmental health problems.

### **Nuisance**

The raw sewage was a nuisance in the East View area. During the time of study, streets such as Brading, Cashel, and Boundary were impassable as they were flooded by raw sewage. The sewage outflows and stagnant pools produced some offensive smell, which covered the greater part of the residential area. Pedestrians ran the risk of either stepping onto the sewage or having the sewage splashed onto them by passing cars. The aesthetic value of the area was compromised as roads looked smudgy. The storm drains were full to the brim with stagnant, filthy sewage water. These attracted huge swarms of mosquitoes and flies. These later were a bother to residents.

## **POLICY ISSUES ON SEWAGE**

The Environmental Management Agency (EMA) Act states that no local authority operating a sewerage system or owner or operator of any trade or industrial undertaking operating within the jurisdiction of two or more contiguous local authorities shall discharge any effluents or other pollutants into the environment without an effluent discharge licence issued by the EMA (Government of Zimbabwe, 2007). Statutory Instrument 6 of 2007: Section 5 (Effluent Solid Waste Disposal) clearly stipulates that no person shall dispose of waste or effluent into a public stream or into any other surface water or ground water, whether directly or through drainage or seepage, except under a licence. This means that even leakages from the system leading to pollution of water bodies would be viewed as deliberate disposal of sewage. According to EMA Act, pollution of water bodies is a criminal offence liable to a prison term not exceeding two years. However, facts on the ground show that no one has ever been prosecuted. The authority is only paying a lip service to the raw sewage outflow problem.

## **CONCLUSIONS**

Raw sewage has been flowing on the streets in the East View residential area and very little was done to correct the situation. This was because, on the one hand, the council felt it was no longer their responsibility to deal with burst pipes, while on the other hand, ZINWA was not yet ready to deal with problems. They lacked manpower, as well as financial resources needed for the operations. The problem has been on for over three years and residents have lived with the problem for as long as they remember. That scenario exposed residents to serious diseases, such as dysentery, diarrhea, and cholera. They were exposed to malaria, as there was an upsurge of mosquitoes in the area. The problem of burst pipes emanated from increased population, aging pipes, vandalism of pipes, and solids thrown in the system.

## **RECOMMENDATIONS**

There is need to come up with holistic solutions to the problem of burst sewer pipes and raw sewage that flowed on the streets and storm drains in East View residential area. This should be treated as an urgent matter if the state of affairs is to improve in the area. Some of the recommendations include the following:

- There is need for cooperation between the council and ZINWA in water and sewage issues. This will see the repairs being done promptly to burst pipes.

- There is a need for civic education of members of the public so that they can desist from vandalizing public property (such as the sewage), avoid throwing solids into the sewer system, and to stop using sewage water for irrigation.
- The sewer system needs to be upgraded in order to handle the increased pressure on the facility from increased population.
- Council teams must spray the breeding places of flies and mosquitoes so as to avert outbreaks of communicable diseases and malaria.
- EMA Act should be put into effect. Offenders (such as individuals, local authorities, and ZINWA) should be prosecuted to deter them from polluting the environment.

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