



## THE IMPORTANCE OF INTERGRATED SOLID WASTE MANAGEMENT IN INDEPENDENT ZIMBABWE: THE CASE OF GLENVIEW AREA 8, HARARE

<sup>1</sup>Agnes Mangundu, MDS; <sup>2</sup>Eric S.M.S. Makura: PhD; <sup>3</sup>Manenji Mangundu, MPH, & <sup>4</sup>Roy Tapera, MPH.

<sup>1</sup>Faculty of Gender and Development Studies, Women's University in Africa, Zimbabwe

<sup>2</sup>Faculty of Gender and Development Studies, Women's University in Africa, Zimbabwe

<sup>3</sup>College of Health Sciences, University of South Africa, South Africa

<sup>4</sup>School of Public Health, University of Botswana

### Abstract

The volume of waste being generated continues to increase at a faster rate than the expansion of solid waste management measures and ability of the municipal authorities to improve on the financial and technical resources needed to parallel this growth in Harare City. This has been shown by lack of refuse trucks in Harare City; Harare city health department reported using 33 refuse trucks instead of 120 trucks. Data was gathered through observation, interviews with Glen View 8 residents and the City of Harare key informants and desk review. A total of 80 households participated in the study and 10 key informants from City of Harare. Majority (90%) of the respondents in Glenview 8 indicated that council does not come to collect waste from their houses in Glenview 8 while 10% reported once per month and this contribute to the proliferation of waste dumps around the suburb. Key informants from City Health department reported challenges such as limited resources, capacity, negative public attitudes and the unwillingness to spend on waste, fast growing urban population which surpasses provided social facilities, administrative machinery and social-political influence as key factors leading to poor management of wastes in Harare.

There is no integrated solid waste management in Glenview 8 this was shown by mixed solid wastes at illegal dumping sites and in some observed bins. Mixing of solid waste made any recovery, reuse and recycling difficult and not practical. Most of the garbage from Glenview 8 is biodegradable and residents are willing to engage in waste separation and to collect waste for recycling purposes but there is no value or motivation for doing so (80% of the respondents). Research concluded that waste management problems in Harare Municipality are caused by poor enforcement of policies and by-laws. The legislations and policies exist for solid waste management but enforcement of the by-laws was found to be very weak leading to illegal waste management practices.

**Key Words:** Reduce, Reuse, Recycle, Dumping.

### 1.0 Introduction

Globally, in most cities especially in developing countries solid waste management has become a challenge. According to the World Report of June (2012) solid waste is a silent problem that is growing daily. Rapid urbanisation and population growth has contributed in straining of social amenities including solid waste management. There is irregular collection of waste from most high density suburbs and this leads to illegal dumping on nearby open spaces. Babayemi (2009) reported that urban centres throughout Africa collect less than half of the solid waste produced and 95 percent of that amount is either indiscriminately thrown away at various dumping sites on the periphery of urban centres, or at a number of so-called temporary sites, typically empty lots scattered throughout the cities. Throughout most of Sub-Saharan Africa solid waste generation exceeds collection capacity (Jibril, Ibrahim, Dodo, Sheelah and Suleiman, 2012; Kaseva, 2005; Henry, 2006) as shown in Tanzania, Zimbabwe, Zambia and Kenya. There is a sharp rise in the amount of garbage generated by urban residents between now and 2025. Jibril et al (2012) and Ezeah (2010) argue that very few urban areas in the developing world have adequate and sustainable waste disposal systems and litter is a growing problem which has not received much attention in Sub-Saharan Africa (Ezeah, 2010). This gives rise to irregular collection of solid wastes hence the uncollected waste is dumped in unauthorized areas such as open fields, ditches and streets. During raining periods some waste for example plastics are washed away into the drains blocking them and flooding results. This scenario is peculiar to Zimbabwean cities and towns especially the high density suburbs.

The attainment of independence in 1980 by Zimbabwe saw the easing of colonial policies which were restrictive, in terms of population movements, especially on the part of the black populations in urban areas. This contributed to massive rural to urban migration leading to urbanisation with majority settling in high density areas. Majority of these high density suburbs in Zimbabwe such as Mbare, Budiriro, Mabvuku, Glenview and Chitungwiza were characterised by illegal dumping due to erratic waste collection systems (Kaseke, 2005, Chidavaenzi, 2006; Tsiko and Togarepi, 2012). In Kaseke's view (2005), solid waste management has become a major problem in Zimbabwe's towns and cities and the problem is increasing due to urbanization, population growth, industrialisation and increased use of non-biodegradable plastics and bottles. Practical Action Southern Africa (2006) alludes that more than 2.5 million tonnes of household and industrial waste are produced per annum in urban areas across Zimbabwe. Urban solid waste collection was reported by Practical Action South Africa in 2006 to have dropped from at least 80% (in the mid-1990s) of total waste generated to

as low as 30% in some large cities and small towns. Chidavaenzi (2006) argued that most of the municipal solid waste in Zimbabwe, which is collected, is disposed in open dumps, and almost half of the wastes generated do not reach the designated disposal sites. Such improper waste disposal creates serious environmental problems that affect health of humans and animals and results in unplanned government financial expenditures during disease outbreaks. These conditions lead to poor environmental health which aggravates poverty and leads to disease outbreaks such as the cholera outbreak of 2008/9, which affected Glenview 8 the most.

Information from inter collegial discussions and media reports, indicated that Glenview was receiving erratic waste collection; the city council had challenges in collecting solid waste in the high density suburb. It became evident from inter collegial discussion with Harare City Health department staff, Environment Control planners, Environmental health staff and administrators, politicians as well as general public that solid waste management in Harare was a nightmare. Evidence of the need to address solid waste management was the accumulation of solid waste in Glenview 8; the presence of waste heaps on open spaces, road sides and streets.

Due to the challenges of the current solid waste management system in Glenview 8, this study seeks to advance the importance of pursuing an integrated solid waste management in Glenview suburb in Harare. The study looked at the importance of adopting an integrated solid waste management system in Glenview 8, Harare.

Srinivas (2003); Simon (2008); Henry (2006) and Regassa et al (2011) in their studies noted that while cities in developed world generate larger amounts of solid waste, they have developed adequate facilities and competent institutions for managing solid waste. This is reflected by the fact that wastes produced are efficiently removed and safely disposed of. Also a National Waste Report of 2010 in Australia similarly concluded that national litter levels were trending downwards as 99% of households undertake recycle and reuse. There have been major changes to the way society manages waste in the last two decades in Australia as recycling and waste generation have both increased. Thus the National Waste Report (2010) emphasized the fact that landfill standards in Australia have increased for the past 20 years.

An evaluation report by United States Environmental Protection Agency (USEPA) (2006) observed that in USA the perception of waste has changed over the past 40 years. Instead of waste being considered as having no value, there is now widespread public awareness that waste is comprised of multiple commodities with value. USEPA (2006) posits that US citizens practice source reduction altering the design, manufacture, or use of products and materials to reduce the amount and toxicity of what gets thrown away. This has led to materials substitution and changes in packaging design as well as changes in practices both at home and in the office to reduce waste. Waste Advantage Magazine January (2010:26) states that, “there are more than 560 material recovery facilities in USA with an estimated total daily throughput of more than 91,000 tons per day that process a wide range of recyclable materials for re-entry into the marketplace as raw material feedstock for new products”. This showed that integrated solid waste management approaches work well if established.

Saungweme (2012) in his research of an integrated solid waste management in Mbare, similarly opines that at a consumption level reduction can include reuse of containers and bags, changing buying habits, reducing the use of disposable products, and packaging. Source separation makes collection, recovery and reuse of solid waste easy. TARSC (2003) argues that less than 10% of waste paper, plastics and scrap metals are recycled nationwide. Dev, (2007) is of the view that resource recovery which includes the extraction of economically usable material or energy from solid wastes has not been set up in developing countries. Recovery or recycling of resources differs between developed and developing countries. In the former Fudery (1990) is of the view that recovery and recycling processes should be institutionalized and supported by government instead of promoting recovery and recycling through waste scavengers.

According to Tchobanoglous *et al* (1993) the common methods of solid waste disposal used in the early practices in solid waste management included, dumping on land, canyons and mining pits, dumping in water, ploughing waste into the soil, and feeding to hogs. In Puopiel's (2010) view some of these early methods in solid waste disposal used in the 1950s still exist today for instance indiscriminate dumping of waste on open land and in gutters is still evident in many towns in developing countries Zimbabwe included as well as dumping of waste in water in coastal areas. Momoh and Oladebeye (2010) opine that burning of waste is also common in towns in Africa including dumping of waste in gutters, drains, dumping of waste by the roadside, and on unauthorised dumping sites. Most of these cities turn to these methods which they think is cheap and easy to get rid of solid waste. But Simon (2008) and Regassa et al (2011) reported that this solid waste disposal need to be improved through use of burnable materials to produce either electricity or heating water for hospitals and schools.

UNEP, (2009) views composting as the biological decomposition of biodegradable solid waste under controlled aerobic conditions to a state that is sufficiently stable for handling and nuisance free storage of waste for agricultural and other uses. Puopiel, (2010) describes composting at best as an option suited to contexts of limited resources in developing countries and it's highly adaptable. It also facilitates and encourages separation at source of solid waste generation. Thus, Zerbock (2003), Axinn (2006) and Munzwa (2010) observed that composting is a low-technology approach of solid waste reduction and suited for developing countries since over 50% of solid waste in developing countries is organic material.

In studies conducted by Tanskanen (2000), Wilson (2007) and Masocha (2004) all revealed that ISWM can effectively protect human health and the environment through proper management of solid wastes. The major ISWM activities are waste prevention, recycling and composting, and combustion and disposal in properly designed, constructed, and managed landfills (Tanskanen, 2000). Anschitz and Van de Klundert, (2000) supported Tanskanen (2000) when they contended that the integrated solid waste management approach views waste management as an equity and public health issue and this means that all people have a right to a regular waste collection and proper sanitation.

Without ISWM uncontrolled dumping and improper waste handling arise (Tanskanen, 2010; Anschütz and Van de Klundert, 2000). Zuilen (2006) is of the opinion that improper waste management also increases greenhouse gas (GHG) emissions, which contribute to climate change. Therefore integrated solid waste management is important in that it makes use of the systems approach which helps reduce the environmental impacts. As the markets of recyclable materials open employment and livelihoods opportunities emerge. All this leads to less garbage thrown away at the end (Zuilen, 2006). Furthermore, reuse, recycle and incineration to generate energy rather than disposal as an option are attractive ways to alleviate energy problems which is common in most developing countries.

For an integrated solid waste management program to be successful, it is vital to maintain a high level of public support, as this determines ultimately the ceiling of solid waste separation at source that can be achieved. It can also be treated as a livelihood opportunity for the urban poor if they recycle solid wastes. New global perspectives in what to do about our growing mountains of solid waste can be addressed through integrated solid waste management.

## 2.0 Methods Used

A descriptive cross-sectional survey was used to establish solid waste management practices and extent of compliance with integrated solid waste management systems. Data was gathered from Glenview 8 through observation, interviews with Glen View residents and the City of Harare key informants and desk review. Interviews were conducted with the assistance of 5 enumerators. The study population comprised of inhabitants of Glenview 8 approximately 6000 people. There were approximately 1200 households in Glenview 8 during the period of the study. A sample size of 80 households was calculated using EPI-INFO 3.4.1, STATCALC from a population of 1200 households in Glenview and 95% CI.

Information was gathered from solid waste generators (80) and Harare city council's Cleansing Superintendent's Office (Solid waste management department).. The study covered the responses of 80 waste generators (households) and 10 implementers, which were classified as Harare city officials. Respondents from the residential areas (solid waste generators) were chosen using simple random sampling while Harare city staffs were selected based on convenience (convenience sampling), only members of Harare city cleansing department staff who were present on the day of the interviews were interviewed.

Data was first gathered through review of reports (annual), policies and legislation governing the management of solid waste in Zimbabwe specifically Harare city council.

Structured interviews were used to gather information about the status of waste management problems faced by Harare city council from key informants working for Harare City Cleansing department. Convenience sampling was conducted as managers who were in the office during data collection were interviewed.

A questionnaire survey was administered to 80 households in Glenview 8. The survey aimed at generating information on residents' level of awareness of solid waste management and legislative framework guiding waste management in their area. It also collected information on efficiency and adequacy of the waste management system as perceived by Glenview 8 residents. Field observation of dumpsite and illegal dumping spots along roads was also conducted where a checklist was used and digital camera was used to take photos of all dump sites along streets and roads. Observation was done through transect walk across Glenview area 8 suburb. A checklist was developed which was being used to cross check illegal dumpsites and uncollected skip bins.

## 3.0 Results

### 3.1 Characteristics of research participants

Interviews were conducted with 80 heads of households, representing 7% of the total households in Glenview 8. Majority (62.5%) of the participants were women and 26% were females. The age range of people interviewed was 15 to 60 years and median was 22. Majority of the research participants (46%) were between 30-39 years. The literacy levels of people in Glenview 8 were high, with only 2.5% confirmed having done primary level and majority 97.5% had completed "O" Level and above, amongst them 30% had done vocational educational. The mean household size was 8 people and results indicated that Glenview 8 is overpopulated since each household had at least families staying at the house.

### 3.2 Waste collection processes in Glenview 8

There is no waste collection by city council, which has led to waste dumps and waste everywhere. Ninety (90%) of the respondents indicated that council does not come to collect waste from their houses which has led to the proliferation of waste dumps around the suburb. During the transect walk, it was observed that Glenview Furniture complex council was not provided by a skip bin as is the case with business premises. This therefore has led to an established waste heap at the complex which is controlled by burning on a daily basis.

### 3.3 Type of wastes generated in Glenview 8

Based on key informant interviews and review of waste department statistics the following estimates of solid waste in Glenview 8 were established; 10% rubbish, 7% food, 22% paper, 25% plastics, 5% glass, 5% agricultural waste, 2% construction waste, 10% metals, 12% textiles, 2% other (City of Harare Department of Waste Management, 2011). The above statistics indicate that more than 42% of Glenview 8's solid waste is organic materials (rubbish, food, paper, agricultural waste).

### 3.4 Waste collection receptors at source

The question sought to establish the type of receptors households use for waste collection. The majority 50% indicated that council did not provide bins as such they used bin liners which are black plastic papers. 40% resorted to waste dumping at an open space as the bins were not affordable. Only a negligible number 1% indicated that they had old bins provided by council. Pie chart below clearly shows the scenario. Majority of the respondents (90%) indicated that the solid waste collection frequency at households is non existence and the minority of the respondents (10%) indicated once per month is for collection of waste from the waste heaps not from their home. Ninety percent (90%) of the respondents indicated that they ferry their bins and waste to the dumps in the area when waste is not collected. This is a common act done during broad daylight as in Figure 1 below.



**Figure 1:** Illegal dumping of Solid Wastes along roads and drains

### 3.5 Separation of solid wastes at source

The study showed that most households in Glenview 8 do not separate their waste. Most of the time waste is mixed and this makes any recovery, reuse and recycling difficult. Only 20% of the respondents to the household survey said they separated their waste while 80% said they do not separate their waste. Figure 4.3 below, a photograph taken by the author during field observations also confirms that households in Glenview 8 did little separation of waste at source as various waste types are seen mixed in a skip bin

### 3.6 Recycling

Recycling in Glenview 8 is done by individual households who separate plastic containers, bottles, and paper to either sale these to informal waste collectors, reuse these or sale them to occasional formal waste collectors like Delta Beverages (for reusable empty beverage bottles) or National Waste Paper Collection Company (for paper that will be recycled at their plant in Granite site near Mbare). Plastics and plastic containers are sometimes cleaned up and sold to vegetable vendors to package vegetables for sale. Paper and cardboard boxes are also used to generate fire for cooking. During field observations the researcher encountered a group of scrap metal dealers who reuse metal waste from abandoned cars and other objects made of metal and produce various arti-facts that are sold to some local dealers who then re-use the scrap metal to make tins and hoes.

### 3.7 Dumping sites

A solid waste management system may have the following elements: generation, source separation, storage, collection, transportation and transfer, processing, recovery and disposal at an approved site. Glenview 8 has two types of solid waste management system: the legal and the illegal. The legal system is where waste is stored in receptacles and then transferred and transported to legal landfill sites by the municipal workers eg Pomona Landfill. The illegal stream observed in Glenview 8 was along streets, roads and open spaces. The illegal stream accounts for all the waste that is not collected by the municipal workers or private companies. Some of the waste is dumped by the street side, some burned, while some is just dumped at open spaces and in drains.

The City of Harare has only two “landfill” sites, Pomona and Golden Quarry. The methods used to dispose the waste at the Pomona site is the “spread and compact” method. Solid waste collected in Glenview 8 by the municipality is disposed of at the Pomona “landfill”. The “landfills” in Harare do not meet the engineering standards of landfills as they face problems of seepage. There is no compaction of daily dumps at the landfill. The Golden Quarry “landfill” was closed for all solid waste disposal and is only being used for disposal of liquid waste and “natural decomposition and evaporation are the main drivers of the system” used at Golden Quarry (City of Harare Department of Waste Management, 2011:14)

### 3.8 Challenges of integrated solid waste management

City council faces problems such as limited resources, capacity, negative public attitudes and the unwillingness to spend on waste, fast growing urban population which surpasses provided social facilities, administrative machinery and social-political influence. The council informants argued that HCC inherited the problems from the commission that was there before the current commission. It also emerged that there was no service delivery for the past 20 years. Key informants also said service delivery deteriorated during the time the council was outsourcing services such as refuse collection. Lack of checks and balances also exacerbated the problems during the late former Harare mayor, who was given the tender to collect refuse, as the planning authority, the commission had not done its homework to ensure city by-laws were adhered to by both individuals and industry. The city requires about 120 trucks to effectively service all the areas but currently it is running on 33 refuse trucks which are far way below the required number of trucks. Interviews revealed that council lacked a clear-cut policy to address the rising demand for services. Basically, the population in Harare has been growing over the past 10 years against dwindling service delivery. The Harare City Council has no concrete plan to address service delivery and has no strategic direction in terms of refuse collection.

#### 4.0 Discussion of Findings

Harare city council is failing to collect refuse. From the interviews conducted with Harare waste management department it emerged that this has been made worse by the proliferation of street vendors both in the CBD and high-density suburbs, as people try to eke out an honest living. Waste dumping everywhere increases due to these activities. While council has by-laws to regulate the discharge of refuse, the local authority appears to be failing to enforce them as obtained from key informants from HCC. These findings agree with Chidavaenzi (2006), Kaseke (2005) when they found out that the integrated solid waste management in Harare was non-functional due to lack of resources and technical solid waste management staff as well as non-enforcement of solid waste management by-laws.

Solid Waste collection in Glen view area 8 remains a challenge as evidenced by accumulation of solid wastes at collection points, along roads and open spaces. This has been witnessed during transect walk (observation) and concurred by responses from the majority (90%) of the respondents, who reported that solid waste collection by Harare city council is random and very often irregular if not at all. This study finding in Glenview area 8 is in agreement with Sakuva Township solid waste management study conducted by Manyanhaire et al (2009), who found that two streams existed in Sakubva that is the legal and the illegal. The legal stream is the one that is collected by MutareCity Cleansing department once per month (10% of respondents) just like as found in this study in Harare city. The illegal stream accounts for majority (90% respondents) the waste that is not collected by the municipal workers or private companies. Some of the waste were dumped by the street side, some buried underground, and some deposited in waterways (swamp areas), while others were just dumped at open spaces and in drains.

The issues underlying urban solid waste management are more of managerial than physical, e.g. lack of co-ordination, and inadequate technical and financial capacity and community participation. In the same light Tsiko and Togarepi (2012) found that urban waste collection dropped from at least 80% (in the mid-1990s) of total waste generated to as low as 30% in some large cities and small towns in Zimbabwe, while in Glenview 8 it showed that it had dropped to 10%. The areas worst affected by erratic waste collection are low-income residential areas of which Glenview area 8 falls. The collection system is grossly inadequate, inefficient and unreliable for domestic waste. This is also as a result of poor operations and maintenance of solid waste collection fleet as reported by Harare City Waste Management department that currently out of 100 trucks and tractors only 33 Trucks and tractors are working. As well Harare City Council need a fleet of 120 refuse trucks to efficiently collect solid waste but it is currently using 33 trucks. The findings in Glenview area 8 of low collection coverage, irregular, inconsistent and inadequate solid waste collection services were consistent with findings of other studies (Ogawa (2005), Manyanhaire et al (2009), Masocha (2004) and Zurbrugg (2002) in third world cities. By failing to provide adequate and regular waste collection services in Glenview area 8 the municipality were breaching provisions of Section 9 of EMA that obligate the municipality to ensure adequate collection and monitoring of solid waste as well as Public Health Act, Chapter 15:09.

These findings agree with Puorideme (2010) who purported that rapid urbanisation and the resultant solid waste generation have rendered the traditional solid waste management system inefficient. The main elements of collecting, transporting and disposing of solid waste is unsustainable and inefficient due to the challenges of huge volumes of uncollected solid waste. Africa Development Bank (2002) findings are not far from this researcher in that the problems of solid waste management in Africa cannot be treated in isolation as they are inseparably linked with municipal policy on solid waste management.

Integrated solid waste management system remains a challenge in Glenview area 8. Solid waste reduction at source is very low, this was revealed by majority (80%) of the respondents who reported that solid waste is not separated while very few (20%) reported separating at source. The findings of low levels of separation of waste at source also confirms findings by Wilson (2007) and Simon (2008) who noted that while separation at source is very important in achieving solid waste reduction, separation was not widely done in third world cities. On the other hand recycling is done at minimum levels and this is limited to plastics containers, bottles, papers, metals. In light of this researcher's findings, they agree with Africa Development Bank (2002), who opines that in general, at the household level in low-income urban areas, resource recovery begins with the reuse of plastic bags, bottles, paper, cardboard, and cans for domestic purposes, thereby extending their useful life. The rate of reuse in this instance is high, and these materials enter the waste stream only when they are no longer fit for domestic use. Rather than reusing the materials directly, they sell bottles, plastics, cardboard, and paper to middlemen or commercial centres that pay for these materials. The extent to which these transactions occur depends on the availability of marketable end uses for the materials. While such industries may be found in Harare city but they do not consistently stimulate recycling. Glass bottles are usually returned to their point of

sale for direct reuse by the beverage industry. A deposit system has helped maintain a high return rate. Some bottles not used for beverages are diverted from the waste stream and used as containers in homes.

Findings from the household survey revealed that some composting is not done in Glenview 8 by individual households. Even though 42% of solid wastes generated in Glenview 8 are organic, include rubbish, agricultural waste, food leftovers and paper. Other scholars that include Puopiel (2010), Regassa et al (2011) and Zerbock (2003) asserted that composting was a low income technology approach which is sustainable and suited to low income areas like Glenview area 8 as composts do not require expensive engineering and are easy and cheap to maintain.

Residents' awareness of the policies and laws governing waste management is critical in ensuring that residents are conscious of their roles and responsibilities in waste management in their areas. During the household survey 82 % of respondents said they were not aware of any policies and laws governing solid waste management in Glenview 8. Of those who said they knew some policies and laws most of them only mentioned that they knew that it was illegal to dispose waste in open areas and by the roadside. These findings of little awareness of policies and laws governing waste management among residents also confirmed the findings of Maseva (2005) and Practical Action Southern Africa (2006) whose studies concluded that there have been poor communication of national policies on waste management to local authorities in Harare, hence the lack of programmes of action aimed at raising public awareness among residents on the existence of these policies. Anschitz and Van de Klundert, (2000), deemed policy and legal frameworks as some of the key aspects in a sustainable integrated solid waste management system.

The policies that have a bearing on solid waste management in Zimbabwe do not really emphasize the important role of stakeholders in solid waste management systems. Some of the major weaknesses of national level policies on solid waste management as documented by Maseva (2005) and Practical Action Southern Africa (2006) include the fact that the national level policies fail to consider communities as resources as they ignore communities' potential roles in solid waste management. The national policies also ignore the interest of small communities and are biased towards the interest of big industrialists. The study established that in Glenview 8 the stakeholders in solid waste management include: the municipality, National Waste Paper Collection Company, Delta Beverages, Informal traders, residents, informal waste collectors, scrap metal dealers and NGOs.

The law enforcement system on solid waste management is flawed as well. This has been observed spontaneous and unregulated disposal of solid wastes on open spaces, along streets and drains. However their major weaknesses and challenges are similar to Maseva (2005) and Practical Action Southern Africa (2006) findings which stated that the policies fall short of providing practical steps needed to achieve their desired goals; the policies largely fail to consider communities as a resource as they ignore communities' potential role in the waste management; the policies do not take the interests of small community enterprises into consideration as they are biased more towards industrial development and there is no legal obligation on the part of local authorities to adhere to of these policies

While Environmental Management Act, Chapter 20:27 (EMA) stipulates clear rights that every person has with regards to a safe environment to human health, these rights are however not enshrined in the country's supreme law, the Constitution of Zimbabwe (Maseva, 2005). Section 9 of EMA read with Section 10 (1) (b) (ii), (vii), (viii), (xii), (xiii) and (xiv) provides for the setting up of an Environmental Management Agency whose functions and powers are to regulate and monitor the collection, disposal, treatment and recycling of wastes; regulate and monitor the management and utilisation of ecologically fragile ecosystems; make model by-laws to establish measures for the management of the environment within the jurisdiction of the local authorities and undertake any works deemed necessary or desirable by councils for the protection and management of the environment. From the reviews conducted one of the key weaknesses of the ACT was its failure to clearly stipulate waste management standards that have to be adopted. Even though some useful provisions do exist in the Act, the overall enforcement of the Act is still very weak and this is in agreement with Maseva (2005) and Tsiko and Togarepi (2012). The other important issue is that the Act also leaves out important aspects of waste management such as the sorting and separation of waste at source.

The Urban Councils Act Chapter 29:15 is silent on importance of integrated sustainable waste management practices like 3Rs (reduce, recycle and reuse); silent on what councils should do with the waste they collect; silent on what should be done if councils fail to put waste management systems in place or fail to collect refuse as is the case with Glenview 8 at present and have no provisions requiring that money levied for refuse collection services be ploughed back to waste management systems for them to be self sustainable.

The Public Health Act, Chapter 15:09 have a couple of weakness. Firstly, the Act prohibits people from causing nuisances on land and places they own and occupy but is silent on land or places people do not own, and this may be a grey area that may be interpreted to mean that the Act does not cover for people causing nuisances on land and places they do not own. Furthermore, Section 87 and 88 of the Act stipulates fines for failure to comply with a notice to remove nuisances as \$20 and \$50. The fines are too low and not prohibitive. Pegging such finds higher will help deter the would-be offenders.

According to the Harare city council waste management by-laws, the council or its contractors have the responsibility for removing all domestic waste from premises, Council supplies standard waste receptacle to residents (City of Harare, 198a) and domestic waste should be collected at least once a week (City of Harare, 1981a). This is not being done and there is no clarity on next steps to be taken when waste is not collected.

It also stipulates that no person shall deposit waste on any vacant land, public place or premises other than waste-disposal site (City of Harare, 1981b) but as a result of non-collection residents are dumping waste everywhere. Also there is lack of enforcement of otherwise good laws that are capable of effectively dealing with the waste management problem, these findings do agree with Tsiko and Togarepi (2012). TARSC (2003), Chidavaenzi (2006) studies conducted in Harare city.

## 5.0 Conclusions

Solid Waste Management is one of the important obligatory functions of urban local bodies. But from the findings, this essential service is not efficiently and properly performed by the concerned bodies of Harare city council and this has resulted in sanitation, social and environmental problems.

Waste management problem is complex because it involves a multitude of scientific, technical, economic and social factors. It is observed that lack of financial resources, institutional weakness, improper selection of technology, transportation systems and disposal options, social problem associated with apathy towards environmental cleanliness and sanitation have made this service unsatisfactory and inefficient in the study area as also indicated in other studies like Chidavaenzi (2006), TARSC (2003), Tsiko and Togarepi (2012).

In order to improve the integrated solid-waste management Harare City Health Department should take 3R (reduce, recycle and reuse) principles and practices as positive practices worth pursuing. Clear goals must be set by the municipality to divert waste from eventual disposal either in the legal or illegal streams. There is need to conduct door-to-door visits and provide adequate receptacles for households to put different solid waste in different receptacles thereby promoting waste separation at source. Campaigns should be done to promote the use of household composts to dispose of biodegradable waste like food and agricultural material. An education campaign program to disseminate information on solid-waste management should be conducted. Education campaigns through road shows, distribution of information and communication materials and radio/television programmes can be done to encourage residents to separate their waste at source. These should be followed by education on policies and its implications to those who violate the by-laws.

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