

## WASTE MANAGEMENT IN BULAWAYO CITY COUNCIL IN ZIMBABWE: IN SEARCH OF SUSTAINABLE WASTE MANAGEMENT IN THE CITY

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### ABSTRACT

Human beings are bound to produce waste whether being it in residential areas or workplaces. Rapid urbanisation and industrialisation in developing countries has resulted in too much refuse being exposed which then poses health hazards to the local people, Huttly (1990). There is therefore a greater need to promote smart and health built environment as a way of protecting human life as well as the environment. Smart and health workplaces and living environments are centred on community engagement, regulations as well as communication and education to promote the smart environments. This paper looks at the waste management side as a way of promoting healthy environment in communities. The research employed both quantitative and qualitative methodologies. The interviews were the main qualitative methods employed and questionnaires were the chief quantitative method used. The research found out that there are a lot of challenges that are faced by cities in the third world and these range from collection, methods of disposal and the involvement of other key stakeholders. In promoting best practices for sustainable products and outcomes of built environments, there is need for capacitating residents on waste generation and management.

**Keywords:** Environment, Waste generation and management, Refuse, City Council, Urbanization and Industrialisation, Human Life, Community Engagement, and Bulawayo

### BACKGROUND OF THE STUDY

According to Gourlay (1992), waste is matter thrown away or something which is no longer useful and it has been discarded. Refuse is mainly solid waste disposed from either residential areas or work places. Refuse normally comes from domestic, workplaces, street cleaning, hospitals and other institutions. Waste from heavy manufacturing is collected, processed and disposed by the companies or other contractors who are into such business. Failure by the local authorities to collect refuse results in urban dwellers dumping it at open sites as well as peri-urban areas which are health hazards and cause pollution (Coad, 2006). It is the duty of the city fathers to collect waste. According to Thomas-Hope (1998), uncollected refuse is posing a great challenge to cities mainly in the developing countries. According to Tanaka (1999), waste management nowadays is about waste reduction and recycling. Items valued as useless are processed and find their way back to the market and this practice is encouraged as it is helpful in waste management. In developing countries, including Zimbabwe, the problem of Solid Waste Management is becoming complicated and requires long-term and sustainable programmes for its solution. According to UN-Habitat (2006), less than 20% of urban solid waste is collected and disposed of properly. In an effort to solve the problem of refuse, communities had been empowered through the Community Based Organisations (CBO) to manage waste in their areas.

Refuse collection is affected by social, economic and political factors. Rapid urbanisation caused by massive exodus of people to cities has caused some municipalities to strain their budgets through refuse collection and waste management. According to the UN-Habitat report (2006), management of solid waste in developing countries consumes 20 to 40 percent of municipal revenue. Refuse collection in urban areas is erratic with most of it remain uncollected especially in the high density areas. Third world cities lack funding to purchase up to standard equipment for refuse collection. Equipment and manpower needed for refuse collection is usually inadequate and in most cases old and obsolete. Despite the fact that municipalities charge for refuse collection, their charges are very nominal and in some cases fail even to cater for the operational costs. Government funding and donor community play a crucial role in subsidising the operations of cities and yet the funding is not consistent with the operations and this result in them failing to deliver the services (Thomas-Hope, 1998). Most of the operational plans are imaginary and theoretical as they are imposed by the government or adopted from other towns or countries yet they do not suit the prevailing situation. Zimbabwe having been colonised by Britain has a tendency of adopting most operations which may not suit the conditions and hence the resources for the operations are not readily available.

### **STATEMENT OF THE PROBLEM**

Solid waste collection in Bulawayo is inconsistent with some areas going up to a month without being offered such service especially in the high density areas. Bulawayo City Council (BCC) like any other African city is faced with the problems of waste management. The frequency of collecting waste and the level of consistency leaves a lot to be desired in the city which is facing a serious threat of disease outbreaks. Sule (1997) highlighted that even Nigerian cities experience the problem of refuse collection and people end up dumping waste in open areas which pose health hazards to people.

### **AIMS AND OBJECTIVES**

Aim: To assess the sustainability of waste management in the city of Bulawayo

Objectives

The specific objectives of the research were to:

- Assess the frequency of refuse collection in the various suburbs of Bulawayo
- Analyse the refuse disposal systems that are prevalent in the city
- Evaluate the contribution of community participation in the refuse collection and disposal.

### **JUSTIFICATION**

The research will produce information on refuse management in the city of Bulawayo and how it has contributed in the establishment of a sustainable city. The information will be used by both city fathers and the community at large in bringing up and maintaining a sustainable city. The importance of this information is rooted in the contemporary urban issues of sustainable cities. Failure to live up to the dictates of sustainable cities will result in cities degenerating into fertile grounds of breeding diseases and catastrophe for human life.

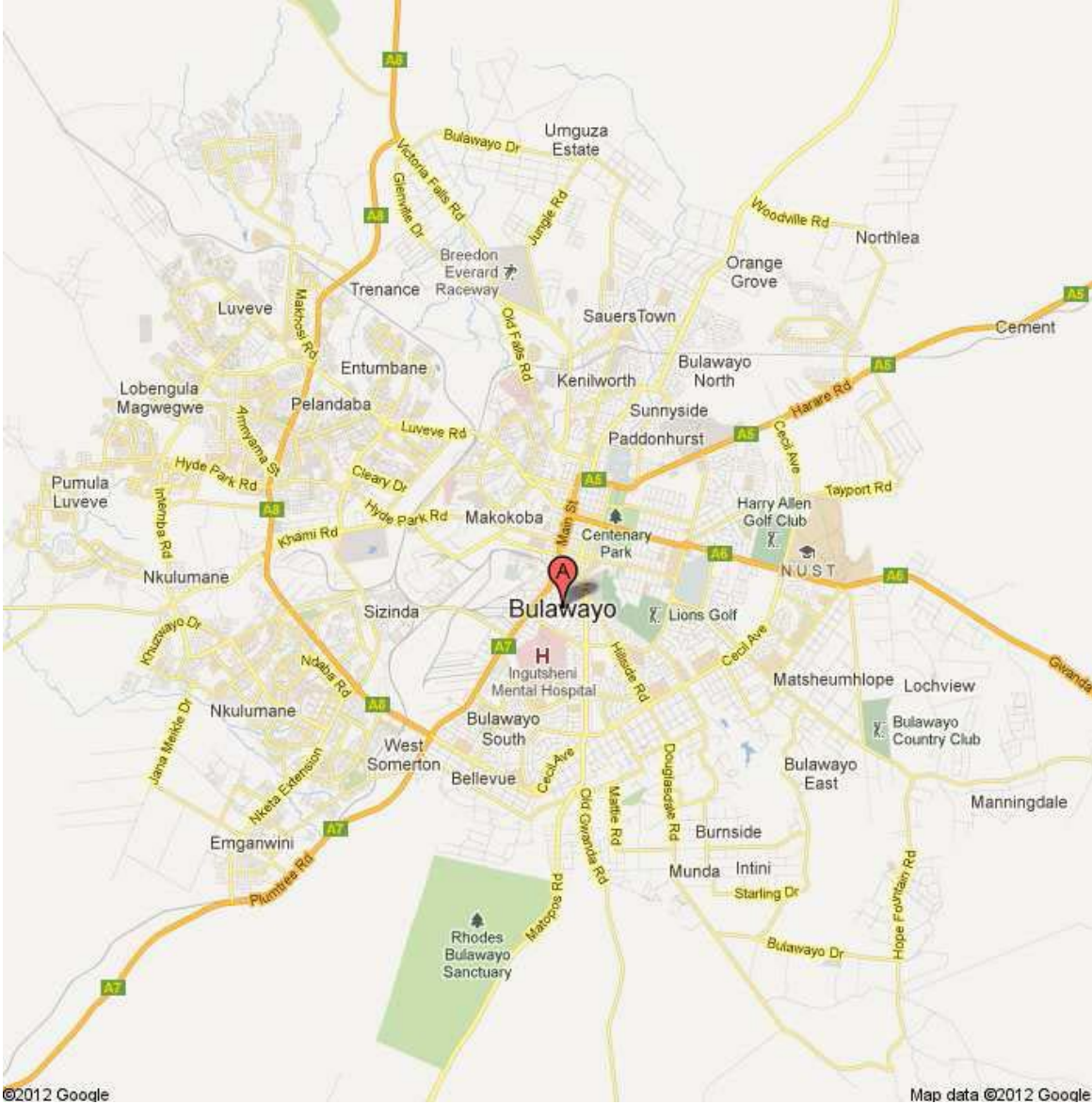
## **RESEARCH METHODOLOGY**

The study looks at waste management through refuse collection in developing countries as a way of promoting smart and sustainable built environment. There has been a major cholera outbreak in Zimbabwe due to poor water and sanitation problems (UN-Habitat, 2006). Uncollected refuse is a major problem in developing countries and this has affected human life and the environment. The research is based upon extensive literature review and desktop research accompanied with primary data sources which were utilized. Survey research method was employed and interviews with the stakeholders were done. This research went a step further in visiting households from where the bulk of the refuse is generated and questionnaires were administered to randomly selected households. They collected information on refuse generated at household level and the refuse management techniques they practice. Focus group discussions with the community were done to assess the collective overview of waste management practices in the areas. Areas of refuse generation were divided in to clusters which are high density, low density, institutions and industrial areas. Strauss (2002) highlights the advantages of cluster sampling which promotes the representation of marginalised groups and it caters for all groups in the study. Simple random sampling was then done to choose respondents from these clusters and questionnaires were administered. Interviews were done with key informants such as city officials, and other officials from Environmental management Agency. Kumar (2005) says simple random sample reduce bias and every object has an equal chance of being selected. Field visits were also done to observe the dumpsites both legal and illegal. Data from a sample of 200 households was collected and analyzed qualitatively and quantitatively.

### **Study area**

The research was done in the city of Bulawayo which is the second largest city in Zimbabwe after Harare. The city is located in the south western part of the country and it is 439 kilometres from Harare which is the capital city. According to the Central Statistics Office (2002), the population of Bulawayo is approximately 1.5 million. Most cities collect refuse on their own as they have fully functional waste management departments. In some cities in Zimbabwe, municipals may fail to cope up with the demands of refuse collection and hence they contract private companies to do the business for them. Figure 1 below is the map of Bulawayo.

Figure 1: The Map of Bulawayo



## **CONCEPTUAL FRAMEWORK**

### **Stakeholder Participation**

The main stakeholders in waste management includes: government, waste processors, waste generators, city council, private sector and donor agency (Beukering et al, 1999). Stakeholder participation involves implementing a programme with the involvement of the concerned people. According to Pinnock, (1998), stakeholder participation is necessary because it reduce the impact of the project on the people and the environment. The stakeholders have different interests which can be economic, political or social. All these stakeholders contribute to the sustainability of waste management through identification of problems, evaluation of the system and recommendations for improvement of service. Increased participation by the concerned people improves the waste management system and it helps to reduce the amount of refuse generated.

### **Legislation on refuse collection**

Refuse collection in Zimbabwe is governed by Environmental Laws and Urban Councils Act., Public Health Act and Municipal by-laws. According to the Environmental Management Act (2007), all people have the right to live in a clean and health environment which is not harmful to their lives. The Environmental Management Authority (EMA) and the Ministry of Health officials always do some check-ups and enforce the hygiene and environmental laws. They regulate the collection, disposal and treatment of waste. The Environmental Management Act requires all persons whose activities generate waste, to employ measures essential to minimise the waste through treatment, reclamation and recycling. The Zimbabwe National Waste Management Strategy's main objective is to make sure that waste management does not affect human and environmental health. EMA can fine an individual, company or even the city council for illegal dumping of refuse and the amounts range from US\$1500 to US\$5000 depending on the offence committed. Plastic containers are also easily dumped and EMA is tough on anyone found carrying fuel in plastic container as this will also cause fire which destroys the environment. To make sure that city councils and residents are complying with the waste management laws, EMA carries out periodic environmental audits of projects and special emphasis is put on the management of waste. National Environmental Management Authority (2001) of Uganda also has legislation for the protection of the environment as well as people in terms of waste management.

### **Environmental impacts of refuse**

Usually when refuse is collected, it is treated then recycled or deposited. The main challenge is for waste disposed at illegal dumpsites which is the main concern to the environment as the local authority tends to turn a blind eye to it. Refuse is a health hazard if it is uncollected (UN-Habitat, 2006). The people at risk from the disposal of solid waste include residents in areas where there is no proper waste disposal method, especially the pre-school children, urban farmers and waste workers. People living close to a waste dump and those, whose water supply has become contaminated either due to waste dumping or leakage from landfill sites, are also at risk. Uncollected solid waste also increases risk of injury, and infection.

According to Chibanda (1990), flies breed in some constituents of solid wastes, and flies are very effective vectors that spread diseases. Mosquitoes breed in blocked drains and in rainwater that is retained in discarded cans, tyres and other objects. Mosquitoes spread malaria which is a deadly killer disease. Rats find shelter and food in waste dumps. Rats consume and spoil food, spread disease, damage electrical cables and other materials and inflict unpleasant bites. In

particular, organic domestic waste poses a serious threat, since they ferment, creating conditions favourable to the survival and growth of microbial pathogens. Direct handling of solid waste can result in various types of infectious and chronic diseases with the waste workers and the rag pickers being the most vulnerable (Gourlay, 1992). At the Richmond dumpsite, workers interviewed feared the risk of contracting tuberculosis and other diseases although there are safety precautions which are being taken by the Bulawayo city council like provision of safety clothing and creating a hazardous free environment to work.

According to Sule (1981), Solid waste creates water pollution problems as it changes the composition of air and water. The unpleasant smell coming from refuse disposals is not good for human and animals. The aesthetic value of the land is affected by the refuse which can be blown by wind and spread all over. Some waste are flammable which may end up creating veld fires which harm the environment despite the city council having control measures to avoid fire at the dumpsite by burying the waste under layers of soil which is then compacted.

### **Challenges of Waste Collection in third world countries**

Challenges faced in the collection of refuse in Bulawayo town are just similar to those faced by other cities in Zimbabwe and other African cities. Blight and Mbande, (1996) says refuse is bulk and can be poisonous when not handled properly and this will affect workers as well as residents and can damage the vehicles used for transportation and disposal. On the issue of subcontracting refuse collection to private players, this has failed because the nature of business for waste management is less profitable in relation to the investment made. This leads to inefficiency and dishonesty on the part of the contracted companies.

According to Masocha, et al (2005), the economy of Zimbabwe heavily relies on agriculture and industrial manufacturing with different seasons bringing in different types of waste for which the authorities should be well equipped to deal with at the different times of the year. This poses a challenge of having several types of waste removal fleet. Local authorities face the serious technical and resource shortage to meet their refuse collection mandate due to underperforming budgets. The capacity of the city council to deploy adequate number of vehicles and waste containers is limited and hence refuse is collected after a long time or not collected at all.

The rates paid by residents are subsidised and moreover the city council is mainly sole responsible for its management which becomes difficult to offer services to the ever-escalating population in cities because of the massive rural to urban migration. Thomas-Hope (1998) says members of the public have failed to adopt a culture of cleanliness and they litter around which makes it difficult even for city cleaners to be on the standby for the whole day. Bins which are provided for use are either stolen or vandalised. There is also the absence of municipal by-laws, arresting powers and municipal courts to punish refuse dumping and littering culprits.

Containers in form of refuse bins and public refuse collection points are not protected from rain and sun that makes the garbage to cause smell pollution, unsightly urban scene and deterioration of the neighbourhood and disturbance of human activities. The dumping sites are also exposed to animals like dogs, cats, and others which during scavenging they scatter the wastes in the surrounding areas (Chimhowu, 1998).

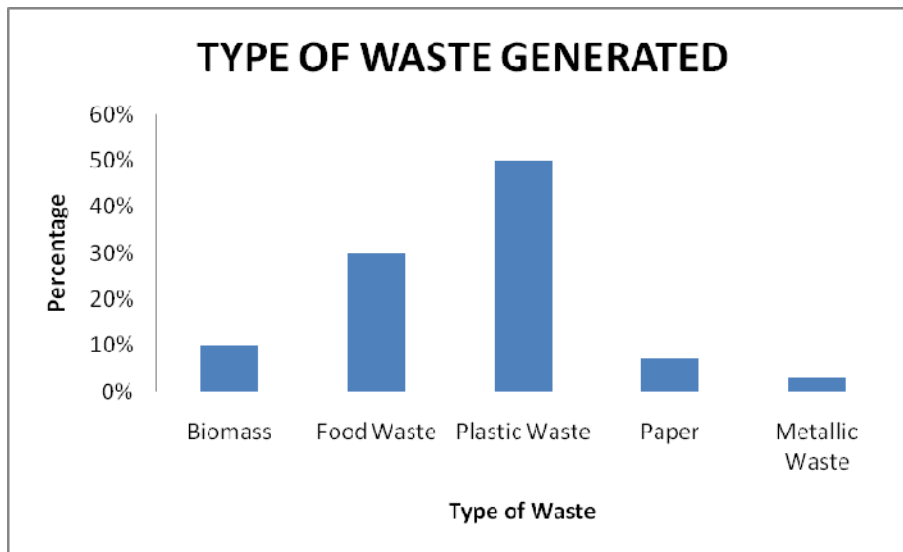
## DISCUSSION AND RESULTS FINDINGS

### Source of refuse

The main source of refuse is domestic which is in form of food waste, waste from weeding, garden waste, hedge cutting, and unwanted household materials like plastics, rubber, old clothes and papers. Other household waste includes batteries, used lights, disused furniture and books. Miraftab (2004) carried out a similar research in Cape Town on waste collection using the method of interviewing city officials and collecting waste data from the city council and concluded that most refuse generated in urban areas is from households. As people gather at some points for functions, they generate waste at schools, hospitals, institutions of higher learning, bus stops and even at workplaces. Litter was thrown anyhow in the streets accumulates this despite the availability of street cleaners who seem to be overwhelmed by the rate of refuse accumulation.

Industry is another source of refuse and this can be in form of used and scrap metal, debris from construction sites, and waste from shops and food outlets. Waste from these industrial areas is usually collected and is not a major problem in the city. However the informal sector popularly known as home industrials generates a lot of refuse which remain uncollected as their operations are usually unplanned. Figure 2 below shows the type of refuse as generated by residents:

Figure 2: Amount of waste generated in the Bulawayo City



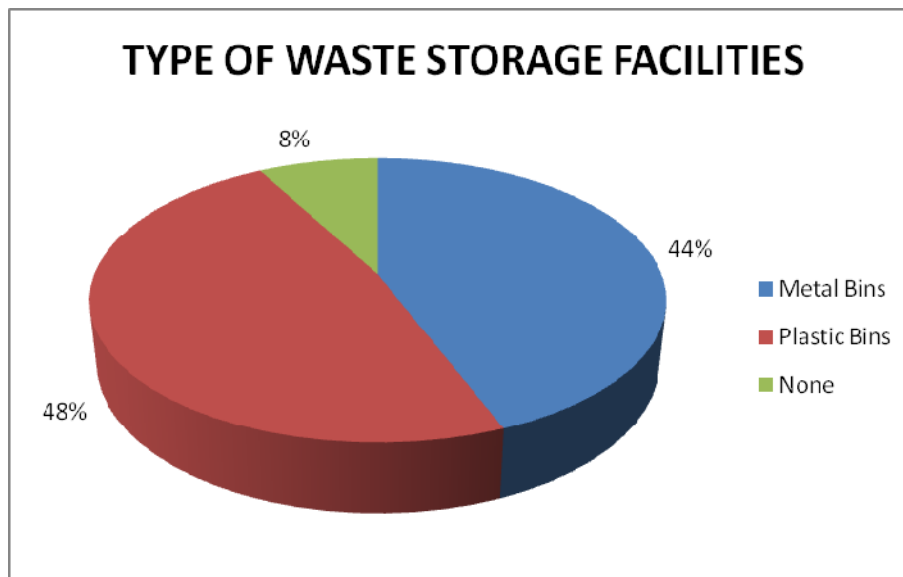
More plastic waste (50%) is generated in Bulawayo city and this is attributed to packaging as most goods are wrapped in plastic, which is then dumped after use. In a bid to reduce plastic waste in Zimbabwe, the Environmental Management Authority (EMA) had advised shops owners to charge for career bags as a way of encouraging shoppers to use shopping bags which has a longer lifespan than plastics and they are not dumped anyhow. Food waste and biomass waste constitute 40% in total and its less than plastic waste because part of it can be used for composting. Metallic waste is the least as manufacturing companies are required to manage their waste hence little waste of such type is found at the

dumpsites and metallic waste is easily converted and recycled for other purposes. According to the bylaws of Bulawayo City Council, all chemical waste is managed by the relevant companies, then it is neutralised and tested. If the waste meets the requirements for dumping then it is dumped at the rightful place. Tanaka (1999) says it is important to build the capacity of local people to teach them on ways of reducing, collection and management of refuse. Tevera (1991) echoes the same sentiments by encouraging the involvement of women in waste management as they do much of food preparation and working at home where most refuse is generated.

### Refuse Storage Facilities

When waste is generated, it is temporarily stored at the homes or work places before it is transported by the responsible authorities. Different refuse storage facilities were used by residents in the city of Bulawayo and they include the following shown in figure 3 below.

Figure 3: Waste storage facilities in Bulawayo



Bulawayo City Council used to supply metal bins to its residents but due to high manufacturing costs, plastics bins became common as temporary waste storage facility as 48% of the households store their refuse in plastic bags. 44% were still using metal bins while 8% neither have metal bins nor plastic bins and this is caused by the introduction of a fee of US\$2 per plastic bin which some cannot afford. Mangizo (2007) also highlighted the same challenges in her study, which was done in Gweru the provincial town of Midlands Province in Zimbabwe. She recommended the city councils to make sure refuse bins are readily available to residents for sustainable waste management. Refuse bins must be charged at a nominal fee so that members of the community can afford them.

### Refuse collection fleet and frequency

In a research carried out in Kenya by Muniafu and Otiato (2007), municipals are responsible for the collection of refuse and this can be done through: door-to-door collection, block collection for clients like food outlets, shops, universities,



hospitals, schools, enterprises, and institutions requesting the municipality to provide them with refuse containers; and containers system where residents put their refuse in containers provided by the city council and then the city council will timely collect the refuse to the dump sites. The total workforce for waste management in the Bulawayo City Council is 420 which is considerably a high number and they are capable of offering services in refuse collection, dumping and management without having any problems using the methods above as employed in other African countries.

For effective refuse collection, there is need for a strong fleet which should be frequently serviced for effective service delivery. The composition of the equipment used for plays a crucial role in the efficiency execution of the duties. Information from the key informants showed that there is an acute shortage of equipment and the Bulawayo City Council is striving hard to make sure refuse is collected and disposed at the rightful place using limited resources. Table 1 below is a breakdown of BCC fleet composition for refuse collection and management:

Table 1: Fleet composition for waste management at the Bulawayo City Council

<b>TYPE OF FLEET</b>	<b>OPERATIONAL</b>	<b>BROKEN DOWN</b>	<b>IDEAL FLEET</b>
Compactor Trucks	10	4	25
Tipper Trucks	2	0	2
Front end loader	1	0	2
Dozers	1	0	2
Landfill compactors	0	5	5

Garbage is mainly collected through the door- to- door collection method from the residential, industrial, enterprises and institutional areas. Container system is mainly used at open and markets places where paper and metal bins are not provided. There are only ten compactor trucks out of the required twenty five and this means a great challenge when it comes to refuse collection. From the table 1 above, we can conclude that there is shortage of equipment for refuse collection and management and this result in refuse being illegally dumped at undesigned areas. Equipment which is also required for the effective execution of the duty at the Bulawayo City Council includes skip trucks, landfill compactors and tractors. However there is critical shortage of equipment in the city as there are no landfill compactors out of the five required by the city. All other equipment that are required are available at less the half the required stalk. Blight and Mbande (1996) also highlighted the issue of equipment shortage and the use of old and inappropriate machinery which is inefficiency in the management of waste in many cities in developing countries. With these

shortages, there was need to engage private players to assist in the collection of refuse and at the present moment there is no private sector engagement in refuse collection though there are initiatives to engage them in the future. Table 2 below shows the frequency of refuse collection in Bulawayo city:

Table 2: Frequency of refuse collection in the Bulawayo City

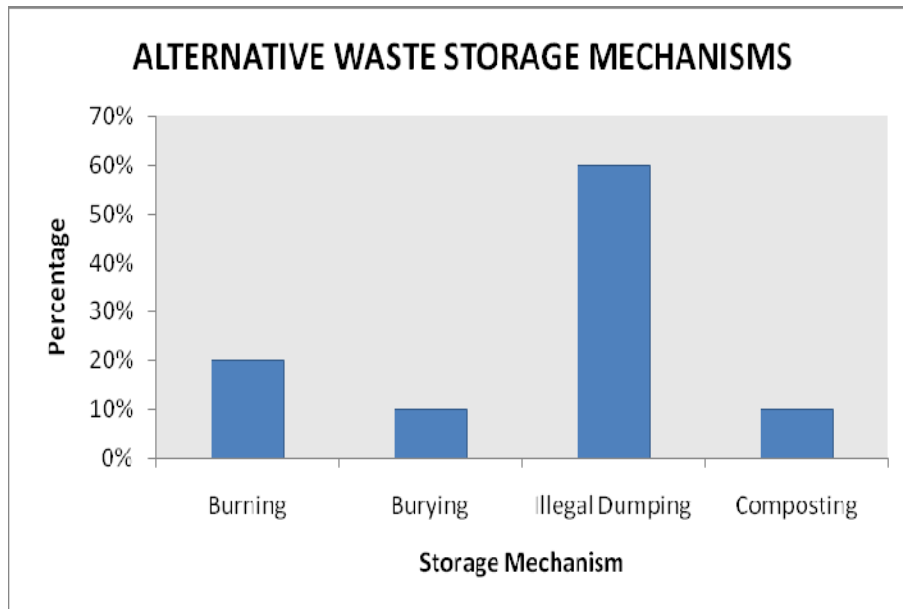
<b>SECTOR</b>	<b>Current Frequency</b>	<b>Required Frequency</b>
High density areas	Once per month	Once every week
Medium and low density areas	Once per month	Once every week
City Centre	Once per week	Once every week
Market places	Once per week	Twice per week
Hospitals	Three times per week	Three times a week
Industries	Once per month	Once every week
Food outlets and shops	Three times per week	Three times a week
Schools, colleges and universities	Three times per week	Three times a week

The Bulawayo City Council (BCC)'s policy on waste management is that every household must have a bin for storage of waste. The city council also emphasise on collecting the bins on a weekly basis in the residential areas and the industrial areas. Chibanda (1990) emphasised the need for waste to be collected at the stipulated times to avoid accumulation of refuse, which are fertile grounds for breeding of pathogens. All waste must be disposed at designated sites and illegal dumping is a criminal offence which attracts a fine of up to US\$20 from the Bulawayo City Council and US\$1500 from the Environmental Management Authority (EMA) the two organisations which complement each other in waste and environmental management. The city council can however improve the frequency of collecting waste as the current frequency is far much below the required rate and this will create space for illegal dumping of refuse. They can increase manpower, equipment and possibly rope in other stakeholders to help them in the business of refuse management. The involvement of the private sector is very handy and brings in an edge of sustainability in waste management, (Masocha et al, 2005).

#### **Alternative waste management practices**

Refuse collection is inconsistent and this is mainly attributed to the shortage of equipment, however waste is generated daily regardless of the prevailing conditions. In most cases, residents resort to other ways of getting rid of the waste if it remains uncollected. Mungai (1998) says even in Kenya, residents resort to illegal dumping if refuse is not collected in time by the responsible authorities. The figure below shows the alternative storage and dumping practices for uncollected refuse by the residents. 60% resort to illegal dumping when refuse is not collected. Waste is usually dumped in open space, along roads and other communal areas such as bus termini. Figure 4 below shows the alternative ways used by residents for storing uncollected waste:

Figure 4: Ways used by residents to store uncollected refuse



Illegal dumping is a criminal offence which can attract a fine of around US\$1500 from the Environmental Management Authority but residents sneak in the dark to dump their refuse at night. 20% of the residents resorted to burning of refuse. This method is not allowed as it causes further environmental pollution. Most of these activities again happen at night for fear of being penalised by environment watch dogs. Burying and composting is practised but to a lesser extend as they both constitute a total of 20%. These are however more environmental friendly measures of waste management. Bartone (2000) argued that to improve solid waste management, there is need to enforce laws against illegal dumping and municipals should be given arresting powers to enforce this and this could alleviate the problem of illegal dumping.

**Management of the Dumpsite**

The collected waste is dumped at Richmond Dumpsite which is the main dumping area for the city of Bulawayo. There is another small dumpsite located in Pumula East however this one is not used frequently. Richmond dumpsite is located on the north western part of the city. The present method of disposal is crude open dumping; hauling the wastes by truck, spreading, compacting and levelling by bulldozer and grader. The dumpsite is getting almost full and measures are already in place to open another dumping pit in the same area. Johannessen (1999) in the research on solid waste landfills in developing countries says the landfills must be compacted to avoid polluting the environment. No burning is allowed

at the dumpsite as this will be violating environmental laws and it also causes pollution. The location of the dumpsite is surrounded by residential areas and institutions. The gas generated from landfill causes air pollution as smell from decomposing refuse filters through the nearby residential areas. Urban agriculture is a common activity near the dumpsite and jobless individuals can always be seen loitering around the place picking items for recycling. Figure 5 below shows the Richmond Dumpsite in Bulawayo:

Figure 5: Richmond Dumpsite in Bulawayo



At the dumpsite, waste is firstly separated according to the source of origin that is high density areas, low density areas and the industrial or commercial sector. From the interview held with the supervisors and staff at the dumpsite, private companies can as well dump their waste at a nominal fee which starts from US\$18 and individuals from residential areas can pay US\$9 per one tonne truck. These charges although they are very low, some residents evade paying these fees and end up dumping in open areas. Thomas-Hope (1999) says in developing countries illegal dumping is difficult to control because there is lack of community participation on issues concerning waste management.

A dozer is used to level and compact the waste and then cover it with soil. This will avoid outbreaks of fire, pollution of air and water and also prevent disease vectors such as flies and rodents from transmitting diseases. Burning is not allowed at the dumpsite and Environmental Management Authority usually visits the site to check if operations are in line with the gazetted rules and regulations for the protection of the environment. Theodore and Theodore (1996) say the major environmental issues facing 21<sup>st</sup> century is destruction of ozone layer which is caused by exhaust fumes burning of waste and industrial operations.

When it rains, usually running water will washes some of the waste or even dissolves some thereby polluting the nearby water sources or even the environment. The Bulawayo city council put some measures to control such hazards by digging a pit with compacted base so that there is no leakage and it contains contaminated water, which is just left to dry by evaporation and is prevented from flowing into water courses. The National Environment Management Authority (2001) says in Uganda, there are measures put in place to avoid both air and water pollution at the dumpsites. These methods include compacting the refuse with soil as well as avoid seepage through the use of the drainage ponds. The city council had made three such ponds at the Richmond dumpsite. Below is a photograph showing one of the water ponds at the dumpsite. Figure 6 shows the pond at Richmond Dumpsite:

Figure 6: Pond at Richmond dumpsite to contain seepage



### **Waste Management Options in the city**

Waste management is crucial in every urban environment as it promotes safe and healthy living and working environments. According to Bartone (2000), Management of waste involves prevention, recycling and disposal.



Prevention is reducing or trying to minimise the quantity of waste generated. Reduction of refuse also means reduced burden on collection and disposal of refuse. It also reduces transport cost as they will be reduced loads of refuse that need to be ferried from source areas to dump sites. This is applicable both in homes, manufacturing and service sectors. In the industrial areas, prevention can be promoted by the use of efficient processing systems that minimise waste material. In the homes, there is need for capacity building on ways to reduce the amount of waste generated and these include recycling and re-using products as a way of reducing waste e.g. re-using boxes, refilling, and use of napkins in the homes instead of disposable pumpers. Re-use is using the product more than once for the same purpose or different purpose. Composting is a good way of disposing bio- degradable waste materials especially in residential areas and at food outlets. The decomposed material can be used in gardens and other agricultural purposes (Coffey, 1996).

At the Richmond dumpsite, there is a squatter settlement for people who pick items for recycling from the dumpsite. Initially there was chaos as the refuse pickers were difficult to control and they could scramble and fight for items. The city council then put some measures of making them to pay an amount of US\$10 and US\$50 for individuals and groups respectively. Individuals pick specific items for example metal, plastics, broken chairs and many others which they clean and sell for reprocessing and then sent them back to the market. Banwari and Reddy (2008) highlights the importance of recycling waste as a way of reducing environment pollution as well as the cost attached to waste management. The photograph figure 7 below shows some items selected for recycling from the Richmond dumpsite:

Figure 7: Collection Waste Selected for Recycling at the Richmond dumpsite in Bulawayo



The items are selected, separated and then several customers can come and pick what they want for recycling. Bulldozers are used to level and then compact the refuse at the dump site. Incineration is another way of disposing the waste whereby organic materials are burnt at high temperatures and converted into ash or gas particles. However this

method is not operational in the city of Bulawayo. Some residents use illegal dumpsites if the refuse is not collected and this can have an implication on the health of the residents (Pinnock, 1998). Rand et al (2000) recommends the use of other waste management methods like incineration, recycling which reduce the amount of waste and are cost effective.

## CONCLUSION

The main objective of waste management is to promote an environment free from pollution and safeguarding the public. Bulawayo has challenges in refuse collection and management. Their problems range from inconsistent refuse collection in residential areas caused by poor resource management. Their vehicles for collection are not adequate and some are grounded due to mechanical. This had been compounded by shortages in manpower. The most affected areas are the high density areas. The most common disposal method in the city is the dump site where the city collects refuse in various areas and dumps it in the designated areas. However the inconsistent times of collecting the refuse result in residents dumping refuse in various undesignated areas such as open spaces, road sides and other areas that causing eye-sores in the city. The residents are not even provided with adequate waste storage bins which results in illegal dumping. The city council's dumpsites are characterised by a hive of activities as the waste will find its way back and there are few companies who are into recycling business prompting the collected rubbish finding its way back into the city space again.

Participation of stakeholders such as communities and the private sector are very limited and this is putting a lot of burden on the city council as they are failing to adequately fund operation of refuse collection. The stakeholder involvement will go a long way in alleviating the cause of the city. There is need to urge the residents to actively participate in refuse management as the process should start at households where sorting and composting should take place. Community involvement should start by building local capacities and activating them to take an active role in waste management.

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